# ARMOR

## THE ARDENNES
## 45 Years Ago




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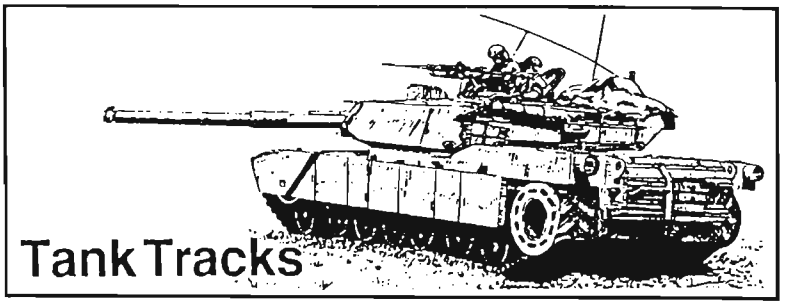
November - December 1989



# Tank Tracks

Forty-five years ago, the Allied war against Germany in northwestern Europe had grown somewhat stagnant. The pace of success we had enjoyed since the Normandy invasion, six months before, had slowed. With the onset of one of the worst European winters in three decades, the accuracy of our intelligence preparation of the battlefield had apparently diminished at the same rate as supplies, which still had to come across the Normandy beaches.

Hitler soon would disturb this relative complacency with a grand scheme that would pose an unparalleled crisis for the Allied armies, involve more than a million men, and highlight perhaps the most severe failure of battlefield intelligence in U.S. Army history.

For his *Wacht Am Rhein* operation, Hitler created 25 new divisions, pulled from the line and refitted four SS panzer divisions, and created the 6th Panzer Army under the command of SS Obergruppenfuhrer Josef (Sepp) Dietrich. The objective of this force was to seize Antwerp, thereby denying Allied use of its port facilities, isolating British and Canadian forces to the north of the penetration, and eliminating the threat to the Ruhr region. Such a grand scheme would surely collapse the alliance, Hitler thought. German armies had successfully attacked through the Ardennes region in 1914 and 1940, why not again?

From such situations are legends born. We can trace much of our heritage to this period, and find many of our great tank and cavalry heroes as participants: George Patton, Bruce Clarke, Creighton Abrams, William Desobry, and Jimmie Leach, to name but a few.

These and others took their lessons learned to the bank in later years in training the force and designing organizations and equipment to meet the threat.

Hundreds of the campaign's facets lend themselves to close examination and provide lessons that still apply today. Our space limits us to a look at two facets. In **Synchronizing Mobility Support**, Major Dom Izzo compares the use of engineer support in the German attacks of 1940 and 1944, and the lessons we can apply to mobility with today's E-force concept.

Mark Clark examines Peiper's spearhead attack, with AirLand Battle's deep attack doctrine as a yardstick, in **Joachim Peiper and the Deep Attack**.

The German plan failed, not because of massive armored counterattacks in the Kursk fashion, but because small units, many of which were thrown together by chance, upset the German timetable and denied the enemy critical terrain, villages, road junctions, and bridges. And therein lies another lesson.

-PJC

By Order of the Secretary of the Army:
CARL E. VUONO
General, United States Army
Chief of Staff

Official:
WILLIAM J. MEEHAN II
Brigadier General, United States Army
The Adjutant General

# ARMOR

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**November-December 1989, Vol XCVIII No. 6**

## Features



## Departments

# LETTERS

## Artillery Not "Broke;" It's Actually Improving

Dear Sir,

This letter is in response to LTC Peter Manza's article, "Tactical Weaknesses Seen at the NTC," in the May-June 1989 issue of ARMOR. Lieutenant Colonel Manza is owed a debt of gratitude for his positive efforts to improve the combat readiness of our Army, especially during his tenure as a battalion commander (regimental commander) of the OPFOR at the NTC. I must comment, however, on the portion of his article that addresses field artillery and fire support.

Lieutenant Colonel Manza addressed artillery at the NTC by beginning with a now-trite and, frankly, inaccurate statement that, "It is broke...". Certainly, I would agree with him that at the NTC, the results are not optimum, but the same can be said of any system on the battlefield. The NTC recently provided a briefing to the Infantry Conference on the results of direct-fire engagements. The briefing addressed successes and shortcomings. The briefing contained observations from analysis of data gathered from engagement simulation exercises (force-on-force) and from live fire. The data for engagement simulation exercises produced interesting results.

- The percentage of OPFOR destroyed has remained relatively constant at 55 percent per battle every year since FY 86.
- Direct fire systems' contribution has dropped from 41 percent to 33 percent.
- Indirect fire systems have increased their contribution of OPFOR destroyed by 89 percent (even though it is still too low at 25 percent).
- The number of field artillery missions has increased from an average of 27 per battle to over 70.

Data from live-fire exercises was even more dramatic for direct fire; however, the

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collection method precluded definitive results for indirect fire. The force-on-force data indicates that commanders are thinking and stressing fire support. We are, by no means, consistently achieving the results we should, and we still have numerous tactical weaknesses that we continue to address with each unit. The system, however, is not broke.

There is room for much improvement, and LTC Manza does address some solutions for maneuver commanders. We, as field artillerymen, can do a great deal more than we do to provide solutions. Emphasizing successful techniques and procedures to field artillerymen is my job. I believe, however, that my fire support team can provide your readers with valid observations and successful techniques and procedures that maneuver commanders might employ to continue to improve fire support.

You published one such article by CPT(P) Rich Cardillo in the same issue as LTC Manza's article. Captain Cardillo's article addresses commander's intent for field artillery. I will have my fire support team continue to provide articles to your magazine on successful techniques for synchronization of fire support, fire support planning and back briefs, specificity of fire support guidance from maneuver commanders, redundancy in fire support execution, the role of the maneuver commander in fire support rehearsals, employment of the FSO (FSCOORD) in tactical execution, and many other issues.

I enjoyed your May-June 89 issue and I look forward to providing additional observations on fire support from the NTC. All of us have the same goal, and it is the Operations Group motto: "Train the Force!"

LARRY D. AARON
LTC, FA
Senior Fire Support Trainer
Operations Group, NTC

## Who Should Get Scout Leader's Reports?

Dear Sir,

We would like to comment on the techniques described in "The Battalion Task Force S2 - Scout Platoon Leader Relationship." by CPT Herbert R. McMaster. Jr.. (ARMOR, July-August 1989). We disagree with his assertion that the scout platoon leader receives his instructions and is controlled by the task force S2.

According to CPT McMaster, the S2 monitors spot reports on the scout platoon net. then "disseminates it to the task force commander, S3, and company team commanders, and updates his situational template." A key part of gaining the initiative and winning is the rapid flow of combat information to the guy who needs it. In order to make decisions faster than the enemy, our information flow to the decision-maker must be faster as well. This requires the scout platoon leader to have a direct communications line to the task force commander.

Information from the scout platoon should be sent to the commander or S3 on the command net. This technique also allows team commanders to monitor the report. The S2 should eavesdrop, either on the scout net (preferably), or the command net. The S2 updates the IPB templates and gives the commander periodic updates on how he sees the overall picture. Sending information directly to the commander also enhances his use of reconnaissance pull. Sending information through the S2 as a "filter" or "processor" will unnecessarily slow the decision process. Many task force commanders have probably lost precious minutes between the report by the scout platoon and the relay from the S2, if it is relayed at all.

Further, the scouts often move out of radio range of the TOC, and the S2 is then unable to monitor their reports.

Although he never specifically addresses the point, CPT McMaster implies that the S2 controls the scout platoon. The commander must synchronize the reconnaissance effort with his maneuver concept. In order to use reconnaissance pull, both the recon unit and units from the main body must be responsive to changes in the situation. Both must respond immediately if the commander wants to quickly shift the main effort. We should avoid the tendency to make reconnaissance a separate intelligence operation.

The commander or S3 should give orders to and control the scouts, not the S2. The scout platoon should be on equal footing with company teams. The IPB and R&S plan should be developed by the commander, S3, and S2, not solely by the S2. The task force XO should be responsible for maintaining communications with and sustaining the scouts. The FSO should be responsible for ensuring fire support is in range.

We appreciate CPT McMaster's article and share his concern about strengthening the weak link so often found between the scout platoon and the task force. It is a link, however, which must include the commander, XO, S3, FSO, and S2 in a synchronized, coordinated effort. The S2 is surely a major player, but the scout platoon is the eyes and ears of the commander and should report to him.

CRAIG B. WHELDON
LTC, Armor
Commander, 2/10 Cavalry

KRIS P. THOMPSON
CPT, Armor
Instructor-Writer, USAARMS
Fort Knox, Ky.

## 120-mm Accuracy Screening Is Being Tightened

Dear Sir,

We appreciate the time and effort put into SFC Lindsley and Captain Davis's article, "Acceptable Margin of Error" (July-August 1989 ARMOR, -Ed.).

Based on previous input from the field, the coordinating draft of Change 3 to FM 17-12-1 reflects a change in 120-mm screening. The range has been moved to 1500 meters, and the screening target size has been reduced to an octagon-shaped 175-by-175-centimeter panel.

The coordinating draft was mailed to divisions and higher during the week of 16 October 1989 for comments.

GEORGE R. WALLACE III
COL, Armor
Director, Weapons Dept., USAARMS

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# COMMANDER'S HATCH

Don Stivers "Sergeant's Valor" - Copyright, used with permission.

*MG Thomas C. Foley*

*Commanding General*

*U.S. Army Armor Center*

## Reflections on the Year of the NCO

Don Stivers has captured a part of the spirit of the Noncommissioned Officer Corps in his painting, "Sergeant's Valor." Sergeant Conrad Schmidt of the 2d U.S. Cavalry rode back into a hail of fire near Winchester, Virginia on September 19, 1864, to rescue his wounded commander. It was never recorded why Sergeant Schmidt risked death to rescue his captain, but his *selfless bravery* sets an example emulated by many other NCOs down through our history.

One hundred years ago, soldiers of America patrolled and protected the frontier. John Wayne portrayed the cavalry officer in countless westerns. But how many of us realize that the vast majority of those long, lonely patrols were led, not by the Captain Nathan Brittles of the West, but by the Sergeant O'Reillys and the Corporal Krugers? Often, with as few as four troopers, they rode for days on end across the American West. Their orders were oh-so-simple, and yet so very complex; patrol and preserve the peace. They, too, present an image of the NCO spirit shining through the long years of *total dedication* to accomplishing any mission.

Sergeant Lafayette Pool of the 3d Armored Division demonstrated yet another aspect of the spirit we find among our NCOs today. During the summer and fall of 1944 in Europe, he directed the efforts of his tank crew so effectively that his record of success still stands as an example of excellence today. In three short months his tank accounted for 258 enemy vehicles destroyed, 250 prisoners taken, and 1,000 killed. Obviously, Sergeant Pool possessed technical and tactical expertise, and the ability to train and bind a crew together into an efficient team. His example inspires all of us to achieve the same high standards of *professionalism*.

But the most important part of the spirit is not very visible. It is difficult to portray on canvas, or even in the written word. It is demonstrated every day, for NCOs are the heart and soul of our Army. Their constant effort is necessary in everything we do.

The Army is a vast body; the officers are the head, planning for today and looking forward to tomorrow; the soldiers are the arms and legs, doing the work that needs to be done here and now. But the sergeants are the backbone, the nerves, and most critically, the heart of the Army. Without sergeants, how many of our small units would run effectively? How many tank ranges would be run efficiently? How many of the seemingly mundane but important tasks of everyday Army life would be accomplished? I daresay very few!

Why do they do it? It can't be for the glory; their achievements often go unrecognized. It can't be for the pay; their leadership and management skills would be far better rewarded in the factory or the marketplace. For most, I believe, it's the pride of knowing they are doing a vital job few others could; they're doing it because their love of soldiers is matched only by their love of country.

Our sergeants are the stabilizing force in our Army. They maintain the standard. Soldiers either develop into NCOs or they return to civilian life after three or four years. Officers often move so quickly from job to job, they sometimes forget the essentials of warfighting between troop assignments. But the sergeants stay in the turret, in the motor pools, and on the ranges, often for most of their entire careers.

It is the sergeant who trains the soldier to fight and win; it is the sergeant who takes the young lieutenant under his wing and teaches him to lead; and, it is the sergeant who takes the major or colonel back into the unit and reminds him how to lead soldiers, fight his tanks, and win wars.

Sergeants of Cavalry and Armor, sergeants throughout the Army, from the "Commander's Hatch," I salute you!.

Forge the Thunderbolt!

# DRIVER'S SEAT

*CSM John M. Stephens*
*Command Sergeant Major*
*U.S. Army Armor Center*


# Excellence in Armor: The Route to Be On

The Excellence in Armor train is moving at a high rate of speed and continues to increase its speed with time. Other proponencies are developing their own programs. The introduction of a new Promotion Point Worksheet for promotion to sergeant and staff sergeant should announce to the world that excellence is the route to be on if you plan to make the Army a career and the route on which you should march your soldiers if you are a commander or leader.

Many of you have had questions concerning the Excellence in Armor Program, administration problems, training programs, promotion capability, NCOES, etc.

First let me throw a few numbers at you. There are 3,200 soldiers in the EIA program in both active and reserve component organizations. The number of soldiers who have passed certification test two is almost equal to the number of staff sergeants promoted annually in the active component. (If a sergeant is not an Excellence in Armor NCO and has not passed certification test two, he will not be promoted to staff sergeant). The competition drives the train.

What actions do you need to take, or do we need to take, to ensure our soldiers are not overlooked?

First, managing the program is the biggest headache. It must be done at company/troop level and consolidated at battalion/squadron. The Chief of Armor provides an updated roster quarterly to the battalion/squadron commanders. It's the organization's responsibility to purify the roster by adding or deleting as necessary.

This must be done because of the program standards. The Chief of Armor must be notified in order to maintain a purified roster. I recommend you assign one of the PAC clerks to maintain EIA files separately, supervised by the battalion CSM.

Training starts at OSUT for those selected when they first enter the Army. A training program needs to be developed in the organization to continue the training and/or the training of those selected for the EIA Program in the unit. I recommend that company/troop master gunners (for those units that are authorized them) and battalion/squadron master gunners develop a training program that stresses vehicular, UCOFT, and higher-level common tasks.

Your unit promotion program should tie into the EIA program. Some units are reluctant to promote a soldier ahead of another, regardless of capability. In the end, the group that feels the impact of that kind of attitude is the unit itself. This is because, at sergeant and above, we compete Army-wide – if you don't stay competitive, you lose!

The Noncommissioned Officer Education System plays a big role in the EIA Program. Your commanders and noncommissioned officers have been doing a great job in getting the right soldiers to school. Early attendance in NCOES is a must for EIA soldiers. I recommend you tie your EIA training program to the BNCOC Program of Instruction and beyond.

There is a new Armor Enlisted Proponency Manual that explains in detail the Excellence in Armor Program and tells where to write or call if problems exist. Use what's available to you inside and outside the organization to ensure you have the best program available for your soldiers.

It is my belief that in the not-so-distant future, the Excellence in Armor Program will be fully developed. The Commander's Evaluation change and Promotion Point Worksheet recommendations point in that direction.

One last point before I close. Each commander and command sergeant major needs to jump on his horse and raise the flag about additional retention money for EIA soldiers. If what we are doing is important and quality is needed, then it seems to me that we, as an Army, should attempt to try harder to retain quality soldiers on active duty.


# Guerrilla Antiarmor Tactics

**by Captain Raymond W. Levesque**

One 1966 study showed that 60 to 70 percent of all guerrilla combat actions included some type of ambush.[1] Another 1969 study showed that mines caused 73 percent of all tank and 77 percent of APC losses in Vietnam.[2] These are guerrilla antiarmor tactics. Guerrillas used these tactics against armor in WWII and Vietnam, and still use them around the world today.

Although many soldiers don't think of armor as a counterinsurgent weapon, armor has been successful against guerrillas where terrain has allowed. The French used armor as a reaction force to relieve besieged outposts. Such operations became more hazardous as the Viet Minh, "often made diversionary attacks against isolated posts in order to lure armored units into ambushes."[3]

In Northern Ireland, the British use APCs to protect their soldiers against the more common threat — small arms fire and rocks. The Salvadorans use homemade armored vehicles for convoy security and route recon, missions which were also important in Vietnam. According to General Donn A. Starry, "The missions universally shared by armored units throughout Vietnam were furnishing route security and convoy escort. Few tasks were more important than keeping the roads safe and protecting the vehicles, men, and supplies that used them. At the same time, no task was more disliked by armored soldiers."[4]

The South Africans use specially designed armored vehicles in a variety of roles, from convoy escort and route security to offensive operations.

Common armored missions in counterguerrilla operations are: route security, convoy escort, reaction force, reconnaissance, and offensive operations. Because each of these important missions leaves the armored vehicle exposed, and because of armor's inherent strength, the guerrilla will attack armor using his favorite tactic — the ambush.

Mao Tse-tung wrote, "The sole habitual tactic of a guerrilla unit is the ambush."[5] George Grivas, who fought for the independence of Cyprus, wrote, "Ambushes and sabotage constitute our two main methods of combat."[6]

Not only do guerrilla authors emphasize the ambush in their writings, this focus is evident on the battlefield. "Concealed attacks on main supply routes were the most fre-

*"El Salvador's guerrillas have taken this lesson to heart. In many cases, attacks are carried out against fixed sites, such as a town or bridge, for no other reason than to draw in the relief force."*

quent kinds of ambush used in Korea, Malaya, and the Philippines. Of 82 ambushes recorded in 1951, 62 occurred along main roads, 14 against patrols in hills or jungles, and 6 in small villages."[7]

Cutting LOCs is a basic guerrilla strategy and tactic, whether he's a partisan supporting a conventional force's efforts or an insurgent trying to isolate a town or region. Attacking LOCs damages a country's economic infrastructure, isolates military units, and attrits the government force with little risk to the guerrilla.

General Alberto Bayo wrote that a guerrilla unit's first act of war, "is to cut the roads and railroads in as many places as possible so the enemy cannot use any means of transportation other than their feet." [8] Che Guevara expanded on his teacher, "One of the weakest points of the enemy is transportation by road and railroad."[9]

This emphasis is reflected in El Salvador, where the FMLN's anti-transportation campaign is one of its more significant operations. The purpose of its periodic campaigns is to attack civilian transportation, primarily business, which helps achieve its strategic goal of attacking El Salvador's economy. Because of this, El Salvador's military has the mission of securing the LOCs.

The guerrilla's emphasis on attacking LOCs and the economy, and on isolating areas, requires that the army secure the same. Highly mobile armored units with their firepower are best suited for this mission *in the proper terrain.* You must realize that in cases where armor has been successful against guerrillas, the terrain has favored armored operations. Armored elements have been destroyed when they've operated in restricted terrain, or without proper infantry support.

The first step in defending an armored unit against ambush is to identify those circumstances, times, and locations that indicate there is a better chance of ambush. Guerrillas will do their best to take advantage of each of these factors.

A common insurgent tactic is to attack a fixed site and set ambushes along the relief force's likely avenues of approach.

Guevara emphasized the importance of blocking reinforcing elements: "Whenever there are sufficient forces...all roads should be protected with ambushes in order to detain reinforcements."[10] He was even more forceful when he wrote, "...the arrival of enemy reinforcements at the scene of the fight can be prevented. A close watch over the points of access is...an axiom never to be forgotten by the guerrilla fighter."[11]

El Salvador's guerrillas have taken this lesson to heart. In many cases, attacks are carried out against fixed sites, such as a town or bridge, for no other reason than to draw in the relief force. On several occasions, the relief force has suffered as many casualties as the defense force on the site. A good example of this tactic occurred in June 1984 when guerrillas captured the Cerron Grande Dam during the night. At dawn, three relief columns started out to relieve the dam, but guerrillas ambushed and stopped each column. Not a single relief element arrived on the ground. An air assault recaptured the dam in the afternoon. (Depending on circumstances, one solution is for the relief element to attack the guerrillas' assault force and not try to reinforce the defense force.)

Other opportunities for a guerrilla ambush occur while friendly elements are carrying out offensive operations. In these cases, guerrillas will try to avoid the maneuver units themselves and concentrate on ambushes along supporting LOCs.

Another vulnerable circumstance occurs at the operation's end. As units return to garrison, they may be running out of fuel, and the troops may be lax after days or weeks of not finding anything. Guerrillas take advantage of these circumstances.

The time of day can also be important. If the counterguerrilla force has good, close air support, is capable of rapid reinforcement, or if the terrain is poor for guerrilla operations, the guerrillas will put more emphasis on night ambushes. The attackers can then use the cover of darkness to escape.

George Grivas recommended that ambushes are better, "at sunset to take advantage of the few minutes of light for the attack or, at any rate, during the early evening hours, to allow sufficient time for the guerrillas to make the getaway.[12]

*"In Korea, ambushers used the same tactics. Although there wasn't as much vegetation, there were plenty of boulders and rock outcroppings for concealment. "Convoys and patrols were frequently ambushed in mountain passes where the road was through rock defiles."*

This doesn't rule out the possibility of a daylight ambush. It means consideration must be given to the guerrillas' capabilities and *their perception of yours*. If they think they can carry out a daylight ambush and escape, they will. In addition to the circumstances and times that increase the odds of ambush, terrain is a critical factor. Guevara lists, "perfect knowledge of the ground," as an essential element of tactics before attacking a column.[13]

Some of the requirements Mao recommended for terrain are: good cover for the attackers, yet allowing observation of the victim; a site that allows attackers to use maximum firepower; and one that allows the attackers "to leap out rapidly at one bound from ambush and come to grips with the enemy."[14] He also prefers spots where the enemy, "cannot use their weapons and where it is not easy for them to manifest their full strength."[15] Grivas specifically said to attack a motorized column near a bend in the road to slow it down, and where terrain doesn't allow the vehicles to maneuver or for them to use their weapons.

Effective use was made of terrain for ambushes in Malaya and Korea.

In Malaya, the few roads were winding, hilly, and cut through thick vegetation and narrow gorges. Most ambushes, "occurred while they (the vehicles) were moving through dense jungles where the attackers had the tactical advantage of concealment and close-range firing."[16]

"In Korea, ambushers used the same tactics. Although there wasn't as much vegetation, there were plenty of boulders and rock outcroppings for concealment. "Convoys and patrols were frequently ambushed in mountain passes where the road was through rock defiles."[17]

In examining guerrilla writings and how they apply their tactics, you can identify a number of common ambush characteristics.

Guerrilla writers describe several different ways guerrillas can ambush a column, but they all use three basic principles. The first is surprise. As with our own principles of war, surprise is required for a successful guerrilla ambush. Sometimes the victim's force outnumbers the ambusher's. Or, the victim's capabilities to reinforce or to call in artillery are significant. In either case, guerrillas want surprise to negate those advantages.

The second principle is violent attack. For the same reasons, guerrillas want to ensure that the victims' return fire, if any, is ineffective. Reacting to shock and casualties, the victims should not be able to return fire. Also, a quick attack allows the successful execution of the last principle.

This last principle is withdrawal. It does no good for guerrillas to have a successful ambush if they can't escape. Overall, guerrillas are outnumbered, and weapons and people are not expendable. They don't have the government's strength, or ability to recruit large numbers. For this reason, a heavy emphasis is placed on withdrawal routes, and ensuring the government force cannot react quickly enough to block that withdrawal.

Guerrilla ambushes generally follow the same pattern. North Vietnam's General Giap described "four quick" phases of the ambush: quick concentration, quick attack, quick clearing and securing, and quick withdrawal. Other guerrilla writers address an important first step - one General Starry called "one slow." This step is planning.

The concept of guerrilla planning for any military operation, including the ambush, is important. Guerrillas – both in practice, such as in El Salvador and Vietnam, and in writings – emphasize deliberate planning, intelligence and rehearsal before carrying out operations. Mao emphasized the importance of intelligence on the enemy column when he wrote, "But first we must understand their plans, the direction in which they are advancing, and the time it will take them to pass. We must also reflect in detail on the location...."[18]

Guevara goes into more detail on the planning factors. Essential elements of guerrilla tactics must always be kept in mind: perfect knowledge of the ground, surveillance and foresight of escape routes, vigilance over all the secondary roads that can bring support to the point of attack, intimacy with people in the zone for support, numerical superiority at a chosen point, total mobility, the possibility of counting on reserves."[19] This list shows the amount of planning guerrillas put into a deliberate ambush.

The first "quick" of the phases of the ambush is *quick concentration*. Because guerrillas are usually dispersed to avoid detection, they must come together for the attack. They must do it quickly to reduce the likelihood of detection and subsequent counterguerrilla action. Guerrillas usually spend little time in the assembly areas or at the ambush site for the same reason. Mao recommends not to lie in ambush too long because of the increased chance of discovery, and because the vigilance of the guerrillas begins to drop. Also, "...if we have already been discovered by the enemy, we should immediately either launch our attack or withdraw."[20]

Next is *quick attack*. This carries with it the element of surprise and the coordinated use of firepower. A quick attack reduces the possibility of the enemy's ability to react, to reinforce itself, and to use artillery or close air support; yet it allows the guerrillas to follow through on success. Grivas emphasized a few times that the attack should only last a few minutes. "Most important of all, the duration of an attack was very short, only four or five minutes, in which case the party or convoy attacked had not time to recover from their surprise and act."[21]

A typical guerrilla antiarmor attack can include antiarmor fire and the simultaneous detonation of mines. This is followed by a quick firefight during which Molotov cocktails or other explosives can be used at close range.

*"Another step that dominates guerrilla thinking in the ambush is the quick withdrawal. There is probably no other point repeated as often as this by a variety of guerrilla writers and practitioners."*

The next "quick" doesn't receive as much emphasis as the others, but if the guerrillas have neutralized the column and are sure they can escape, they will quickly *clear and secure the area.* Often, ambushes have the major objective of acquiring weapons, ammunition, explosives, or other supplies. Clearing the area also means collecting their own casualties to prevent assessments of guerrilla casualties, or the capture and interrogation of wounded personnel.

Another step that dominates guerrilla thinking in the ambush is the *quick withdrawal.* There is probably no other point repeated as often as this by a variety of guerrilla writers and practitioners. In fact, this phase is so important that guerrillas usually will not execute a deliberate ambush without a good possibility of escape.

Both Mao and Guevara emphasized the importance of planning good escape routes. Mao said, "...we must carefully select in advance the route for our own withdrawal."[22] Grivas also wrote, "Generally speaking, the question of our retreat after the engagement should be studied from the moment we set the ambush. A path of escape must be constantly borne in mind."[23] The reason for this emphasis is that guerrillas are usually tactically outnumbered – and they don't like useless casualties.

The importance and use of an escape route is exemplified by a Viet Cong ambush against the 11th ACR in October 1966. The Viet Cong escape route was planned along a trail under a heavy canopy of jungle. They built defensive bunkers at key locations to defend the route, and additional bunkers along two kilometers of trail for shelter against close air attack. This preparation proved to be key because the relief units quickly moved into the area. Yet, despite the relief forces getting to the ambush area in 35 minutes, "the squadron failed to trap the main force of the enemy."[24]

It's important to remember that the guerrilla's capability to attack armor can vary from group to group or even band to band. Only by knowing the specific threat in your area can you anticipate how he will attack an armored force. However, keep in mind the principles and phases of a guerrilla ambush. Expect surprise. Remember the ambush will be a short, sharp firefight at close range. Anticipate his escape.

### Notes

[1]American University Special Operations Research Office, Secrets of Underground Organization and Operations. (Washington D.C., American University, 1966), p. 213.

[2]Donn A. Starry, Mounted Combat in Vietnam, Vietnam Studies (Washington D.C., Department of the Army, 1978), p. 79.

[3]Simon Dunstan, Vietnam Tracks: Armor in Battle, 1945-75, (Novato, Calif., Presidio Press, 1982), pp. 13-15.

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[5]Mao Tse-tung, Basic Tactics (New York, Frederick A. Praeger, Publishers, 1966), p. 102.

[6]George Grivas, General Grivas on Guerrilla Warfare (New York, Frederick A. Praeger, Publishers, 1962), p. 99.

[7]American University Special Operations Research Office, Secrets of Underground Organization and Operations, p. 214.

[8]Alberto Bayo, 150 Questions for a Guerrilla, (Boulder, Colo. Paladin Press, 1975), p. 30.

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[11]Ibid., p. 66.

[12]Grivas, p. 61.

[13]Guevara, p. 64.

[14]Mao, p. 104.

[15]Ibid., p. 103.

[16]American University Special Operations Research Office, Secrets of Underground Organization and Operations, p. 215.

[17]Ibid.

[18]Mao, p. 103

[19]Guevara, p. 64.

[20]Mao, p. 105.

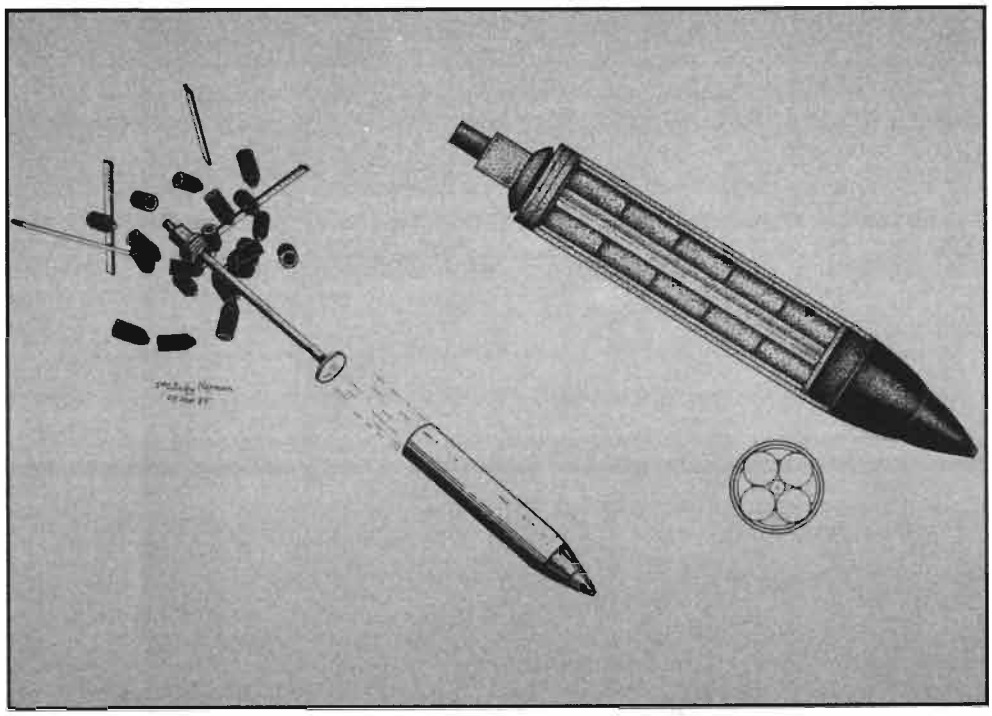
[21]Grivas, pp. 63-64.

[22]Mao, p. 103.

[23]Grivas, p. 100.

[24]John Albright and Allan W. Sandstrum, "Convoy Ambush on Highway 1," in Seven Firefights in Vietnam, ed. John A. Cash, (Washington D.C., Office of the Chief of Military History, 1985), p. 57.

Captain Raymond W. Levesque has served as the S2, 1st Battalion, 8th Cavalry (Armor), 1st Cavalry Division; editor, Military Intelligence Magazine; officer-in-charge, El Salvador Analytical Cell, U.S. Southern Command; and as an instructor/writer in the Low-Intensity Task Group, U.S. Army Intelligence Center and School. He recently commanded F Company, 2d MI Battalion. He is currently assigned as J2, USSOUTHCOM.



**Bomblet Rounds**

Like a shotgun, the unguided mortar shell depends on the dispersion of its bomblets to increase probability of a hit within a 70-140 meter "footprint" circle.

# The Mortar Against Armor

**by Sergeant Gilbert Warner**

Ask the average tanker what threat mortars are to his tank and he will more than likely tell you, "None." The mortarman confidently replies, "If we hit you, we'll kill that tank." Who is right? Can the mortar be a threat to tanks?

Well, let's look at the mortar's boast. First, mortars most commonly used by Western armies are the 81-mm or 3-inch, the 107-mm or 4.2-inch, and the 120-mm. All have shells available with delay fuzes designed to explode after penetrating hard surfaces. Because of the steep trajectory of the mortar shell, a hit strikes the top of the tank, where the armor is not over two inches thick.

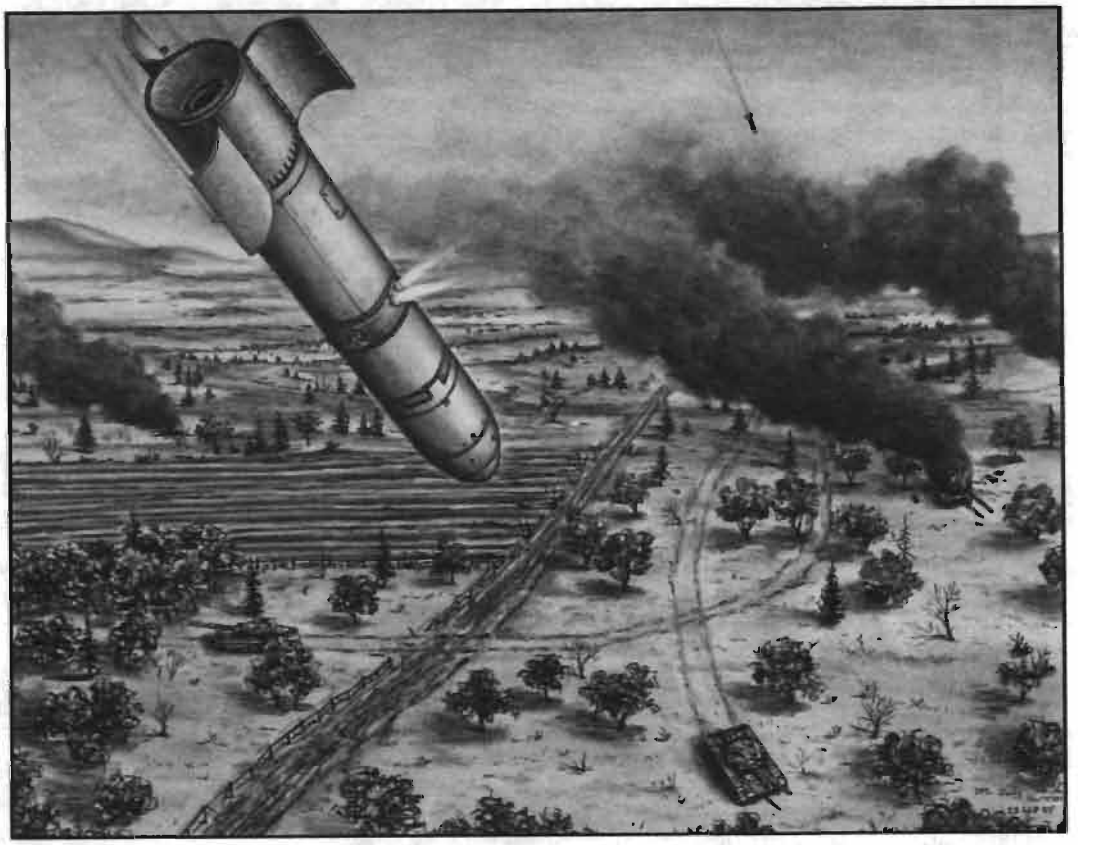
Usually the top includes hatches, air intakes, and optics. It is the weakest point of the tank, therefore a hit on the top should make the tank ineffective.

But, with the equipment in the U.S. Army inventory, a mortar will not hit a moving armored vehicle except through luck or massive use of ammunition. Why?

The mortar is a four-part system, including a forward observer who can see the target and report its location, a fire control center to compute the sight and charge settings, the gun and crew, and – last of all – the ammunition.

To hit a moving target is like shooting geese. A consideration of speed and time is a prime requirement. A vehicle moving at only 12 mph (20 kph) moves 333 meters every minute, 5-1/2 meters per second. A modern tank can kill within 10 seconds after target acquisition. A 4.2-inch mortar typically requires 15 seconds for the call for fire, 15 seconds for the computations, 20 to 30 seconds for the gun crew to aim and prepare ammunition, and an additional 20 to 30 seconds while the round is in the air. During this 70 to 90 seconds, the target has moved 400 to 500 meters.

These time estimates assume that the mortar section is set up and ready to shoot. If it is not, times and inaccuracies go up. Our goose hunter/observer's chances of having the correct lead are remote. Can we improve these odds? I will not argue that they should be. If a system can kill the enemy, or force him to accept our policy, we should use



The German "Bussard" 120-mm mortar round begins searching for targets on the way down, using built-in guidance, which may come from radar, infrared, or laser designation. But can such autonomous guidance systems tell the difference between friend or foe?

## Guided Mortar Rounds

it, as long as it is not counterproductive. Mortars can fire from defilade, they have a good effective range, have a potential for fast rates of fire, and have a low cost per weapon. What the mortar lacks is a high probability of hitting the target.

Any change in speed will help. By improving the M106/M125, it would be possible to provide it with "shoot-and-scoot" capability. The separate fire control is eliminated in those improvements. Speed increases, allowing it to better keep up with the new tanks, at least in a bounding situation. With an improved carrier we can cut the time from target acquisition to weapon firing to 30 seconds, even while the vehicle is on the move. But we cannot improve upon the long flight time of the mortar shell in its high-angle trajectory. We are stuck with a 20- to 30-second flight time, so the target will have time to move about 330 meters into brush, a treeline, or behind the crest of a hill. It seems that in order to get a hit, we must fire a better shotgun, or figure out a way to guide the round as it descends.

### "Smart" Mortar Rounds and Bomblet Carriers

As a matter of fact, some are trying both of these approaches. Spain, Greece, Sweden, and England have developed mortar rounds that greatly increase the usefulness of the mortar against moving targets.

The Spanish and Greek mortar rounds are less expensive, but do not eliminate the problem of leading the target. These rounds are actually carriers for 15 or 20 bomblets, or grenades. When over the target, the shell distributes the bomblets in a pattern around the aiming point. Thus, while any single round fired may have a range probable error of 20 meters and a deflection error of 10 from the aiming point, at least one of the grenades should hit.

For a stationary target, this is fine. However, to expect the observer to predict where the target will be in one minute will still be difficult.

The Spanish round, manufactured by Espin, is a 120-mm round containing 15 bomblets in the long-range version and 21 in the short. Each submunition will penetrate 150 mm of armor and has an effective radius of 20 meters against per-

sonnel. The bomblets are spread over a 60- by 70-meter area.

The Greek version is a 107-mm shell that carries 20 grenades. Armor penetration is 80 mm, enough to break through the top of most armored vehicles. The dispersion "footprint" varies from 70 to 140 meters in diameter. Lethal radius against troops is three meters. Against infantry, these would be more effective than conventional rounds.

The Swedish and British antiarmor mortar rounds are more sophisticated, and offer a better chance of a hit. These self-guided antiarmor projectiles use sensors to detect the vehicle, identify it as a target, and guide themselves to the target even as the victim moves. The sensors may use infrared, millimeter-wavelength radar, a laser designator, or a combination of these methods.

Strix, developed in Sweden, is a 120-mm round with a range of 600 to 8,000 meters. It is carried in two sections, and can accommodate a rocket booster for extra range. It will penetrate over 400 mm of armor, providing a useful degree of overkill.

The British round, called Merlin, is the most compact. It is designed for an 81-mm system, and is said to be usable by any modern 81- or 82-mm mortar. It searches within a 300- by 300-meter area, using an active millimeter-wave radar capable of detecting the target under trees or camouflage. It can defeat 12 inches of armor. The Guided Antiarmor Mortar Projectile (GAMP) should be operational this year. Its range is about 4000 meters. West Germany had been working on a 120-mm version of GAMP, called Bussard. It was to have an interchangeable guidance system, so that the observer can use infrared, radar, or laser designation. Range was to have been 800 to 5000 meters. Successful firings were reported in 1983.

### Are Smart Rounds Smart Enough?

Smart munitions will allow a mortar to engage a moving target with a decent chance of a hit. However, some have raised objections to the GAMP, on the grounds that the guidance system cannot tell the difference between friend and foe.

It may be possible to develop a fiber-optic-linked round, similar to the FOGM, but the operator would have only 10 seconds or so to acquire the target and home in on it, making it appear to be an improbable approach. How could a human operator reliably tell the difference between a T-72 and an M2 Bradley in two or three seconds, from the top, and at a range of 1000 meters on a fuzzy TV screen? Perhaps it would be better to train the forward observer in the characteristics of the round and equip him in such a way that the round won't notice him.

L.B. Holley, in his *Ideas and Weapons*, states that we must always remember that new weapons create the need for new tactics. He was not speaking of a mere improvement, like from the M3 Stuart to the M4 Sherman, but something like the change from the smoothbore musket to the rifle.

The combination of the mortar carrier capable of shooting from a brief halt, and the antiarmor round, is a comparable change. It alters completely the abilities of the system, and creates a new weapon. It does at least require that we consider new tactics and the organizational expression of those tactics. To emphasize the point, we should remember that, in the 1940 Battle of France, the French had more tanks than the Germans. Generally, the French tanks had thicker armor and bigger guns. The Germans won, in large part, because they organized their tanks better. Correct tactical use of a weapon requires correct organization.

An improved M106 or M125 mortar carrier, armed primarily with GAMP, would be able to travel cross-country at about 25 kph and kill armored vehicles between 500 and 6000 meters away, depending on the eventual range of the round. The improved vehicle has limited lethality against light armor inside of 1000 meters. Its own protection will not allow it to close with Warsaw Pact light armor. In a way, it is analogous to a sniper, powerful but vulnerable.

The tanks now in the inventory are faster cross-country. Their fire is fast and deadly out to 2000 meters. They have the ability to survive against most fire, most of the time. Compared to the improved mortar carrier, the tanks are submachine gunners, close-in brawlers.

Brigadier Richard Simpkin, the late British armor authority, advocated tank destroyer/fire support vehicle pairs. Looking at the two types as I just have, perhaps he indicated how we should proceed. Suppose, therefore, that we organize a platoon as three pairs, each pair including an MTB and an improved mortar carrier (IMC). The IMC attacks long-range targets. The tank provides close-in shock and protection. The platoon leader has enough units for fire, maneuver and reserve.

As we saw earlier, the mortar is a four-part system. It is not complete without observers. Each platoon also has three scout/forward observer teams. They would be mounted on small vehicles, such as

motorcycles, ATVs, or even something like the WASP individual flying device. These troops must remember that their primary weapon is the mortar. Under more static conditions, they patrol aggressively, seeking to find the enemy. Thus the platoon has combat intelligence and the muscle to do something with it. It is a true combined arms unit.

The company would be composed of four platoons. Two platoons are on the firing line, one is reserve (recalling that reserves win battles), and one is replenishing. Headquarters platoon consists of a pair of Bradleys, to give the commander room for work and for his extra radio equipment. Headquarters also carries the antiair responsibility.

### Concept of Employment

To see how this would work in combat, let's look at a possible action.

A Soviet mechanized infantry battalion with an attached tank company moves westward. Probing eastward, with the mission of finding and delaying or stopping the enemy, is a new type armor company. The Soviets have 33 BMPs, 10 T-72s, and four BTR mortar carriers. The Americans have 12 M1s, 12 IMCs, two M2s, and 36 motorcycles.

First and second platoons are forward, third and fourth behind. The scouts are out about 3000 meters ahead of their platoons. The reserve platoons trail by about 1000 meters, depending on cover and terrain. Visibility is average for Central Europe, that is, about 3000 meters, except for the woods and hills. Both sides are moving at about 250 meters per minute, a closure rate of 500 meters per minute.

The scouts first see elements of the Soviet forces 6000 meters ahead of the main line mortars and tanks. Calls for fire go out at 5000 meters, two minutes later. Mortar tracks stop, fire a first round and move out again, while the tanks take covering positions. Range is down to 4500 when the first volley strikes. Four BMPs and a T72 stop, hit and smoking.

The next wave of rounds comes in, then a slow steady rain. The closure rate of the two forces has slowed, on the American side because of the halts to fire, on the Soviet because of deployment from march. For about every three rounds fired, a vehicle is hit and knocked out of the battle. His tanks have no targets yet, his mortars have just started to deploy, but have no one to give them the positions of the NATO forces.

The scouts are moving at a crawl, literally, as they play hide and seek from ditches, trees, and bushes. Still, their calls for fire and sitreps go back. As long as they can see and report, they are effective.

Only 10 minutes after first sighting, the range is down to 2000 meters. The tanks start to engage, and the company commander has ordered the reserves to open fire. By this time each of the six lead platoon mortars has moved and fired 10 times. If they fired two rounds each time, that was 120 GAMPs. Now, with the reserves concentrating on the remnants of the tanks, the enemy force has ceased to exist. The stragglers get hit by the tanks. No Soviets make it to within 1000 meters of our company.

At a rate of 250 meters per minute, it takes only 10 minutes to move to point-blank range through the effective range of our tanks. Use of cover and concealment may reduce the actual exposure time to three or four minutes in 10- to 20-second glimpses. Scouts, hidden ahead of the firing line, will be better able to see targets and call for fire, or even cue in the platoon's tanks.

In the example we have just seen, if the tanks had to wait until the Soviet battalion was 3000 meters away to open fire, some of the targets would have made it to under 1000 meters range, that is, to effective range of a BMP's 73-mm gun. There simply is not enough time to shoot, move 100 meters, move into a position, acquire a target, move turret up, fire, back out, and repeat the process more than about 20 times in a 10-minute time span, even assuming that a target will present itself at the time that our forces are ready to fire in the new position. One of the most important lessons of the NTC is how rapidly the range closes. One of the other lessons is how important it is to have scouts and outposts to give early warning and to begin to attrit the enemy.

Properly organized and equipped, the mortar can be an equal partner to the tank. To make it so, we must break down some of our old ideas on the weapon and imaginatively develop all of the mortar's promise.

Sergeant Gilbert Warner served 7 years in 4.2-in. mortar sections, including service with the 11th ACR and 3-63 Armor in Germany and the 4-40 Armor at Fort Carson, Colo. His jobs included chief computer and section leader. He currently lives in Newport News, Va., and is assigned to the 329th Transportation Co.

# Vehicle Recognition Quiz

compiled by Dodd L. Caudill, Threat Branch, DCD

1.

2.

3.


4.

6.

5.

**Answers on Page 49**

# Training for Combat Casualty Care In Armor Units

by Captain Paul Dougherty MD,
and Captain Ralph Briggs

What sort of casualties can a commander expect over a 24-hour period in a future conflict of high intensity, such as the October 1973 Arab-Israeli War? What skills do soldiers need to treat the wounded, and what is the best way to train for combat casualty care? This article will give a better understanding of the number and types of battle injuries that a combined arms battalion may sustain, the skills essential for their management, and how best to train for combat casualty care at the unit level.

### The Wounded Soldier

We have used Danon's analysis of 1,499 Israeli battle casualties from the October 1973 war to get an approximate distribution of the casualty load that a combined arms unit may expect in a high-intensity conventional war.

Additionally, we have used a British study of 333 tank and 769 crew injuries from WWII, and two smaller studies for Korea (57 tanks and 181 casualties), and Vietnam (40 tanks and 57 casualties).[1-3, 10]

Let us assume the casualties are from a J-series TO&E combined arms battalion. A commander could expect over 24 hours to have approximately 80 battle casualties of the following relative distribution:

20 KIA (25 percent mortality)
8 Burns
10 Head/Face/Neck
30 Extremities (arms and legs)
7 Trunk (chest and abdomen)
5 Multiple (some combination of the above)

In addition to those who are wounded in action, one could expect about 15-20 soldiers who would fall into the category of psychiatric or combat stress reaction. Some authors would put this figure higher. Few of these soldiers will have true psychiatric disorders, such as schizophrenia.[9]

Soldiers who have been wounded in combined arms units have two basic types of injuries: thermal and ballistic. Unlike non-mechanized infantry war wounds, there are a larger number of burns. About 10-12 percent of wounded soldiers with combined arms units have burns as opposed to one to nine percent for the foot soldier.[10] Toxic fumes, blast overpressure, and blunt trauma are relatively infrequent, and are usually associated with other injuries.

Injuries of those in and around tanks are also different. About 25 percent of tank crew casualties sustain burns. These are mostly flash-type burns of the face, neck, hands, and forearms. This distribution does not appear to have changed since WWII.[1,7]

Ballistic injury is responsible for the majority of the rest of the injuries seen with tank crewman. Those are characterized by multiple small-fragment injuries, often of soft tissues (skin, subcutaneous fat, and skeletal muscle) only. During WWII, wounds to British crewman inside of tanks were from multiple small fragments, which weighed less than about 4 grains in 80 percent of the sampling. This is less than 1/15 of the weight of the M-16A2 rifle bullet, the M-855.

**Head/Face/Neck** – Living wounded soldiers generally have soft tissue injuries only. The incidence of eye injuries is about five to seven percent of the hospitalized soldiers in the October 1973 war, and for British tank crewman in WWII, which is higher than the one to two percent seen in non-mechanized infantry casualties. Airway compromise is very infrequent, from 0.3 to 0.8 percent.

**Trunk (chest and abdomen)** – The collapsed lung is the most life-threatening of injuries to this area, involving about three to four percent of all casualties. Injuries to the abdomen need prompt surgical care over the next several hours to prevent overwhelming infection. In-


juries to both the chest and the abdomen may cause a patient to go into shock, which requires urgent treatment.

**Extremities (arms and legs)** – These compose the single largest category of wounds. About one half of the hospitalized patients will have fractures or traumatic amputations.

## Triage

What system do we have to evaluate casualties? Triage is a means of providing care first to those who need it most, based on the predicted outcome of certain groups of patients. It is accomplished, initially, by the corpsman at the company level who sets priority for his treatment and evacuation plan. Casualties can be divided into roughly three types at this level:

**Urgent/Immediate:** Those who have life-threatening problems that need timely care. A traumatic amputation or a collapsed lung are two examples. By analysis of Vietnam data, about 14 percent of casualties required treatment of the "ABCs" – airway, breathing, and circulation – 10 percent in shock, two to three percent respiratory compromise, and 0.8 percent airway compromise.[12] One survey of battle casualties, taken in Italy during WWII, found that about nine percent of the casualties were non-transportable and needed urgent surgery.[14]

**Minimal/Delayed:** This is a patient whose clinical course will not be altered by a delay of several hours. Most soft tissue wounds fall into this category, as well as the majority of the extremities wounds. This category of battle casualties is the most frequent.

**Expectant:** This patient's course cannot be altered to any great degree. Very few individuals fall into this category. A person with a

penetrating head wound, with fixed, dilated pupils, who is not breathing on his own, is an example.

Evacuation of a wounded crewmember is a hazardous task that may, ironically, cause further casualties. The chain of evacuation in a combined arms unit starts from the individual vehicle to the medical M-113 at the company level. The majority of casualties will be able to do so by themselves, or with the help of one another.

When to remove a crewman is dependent on the tactical situation. Only patients in the urgent/immediate category need to be evaluated at the BAS as soon as possible. Lightly wounded crewman should seek treatment during a lull in the fighting. Ideally, a wounded crewman should leave the vehicle when it is in a hide position, safe from small arms and artillery fire. If the vehicle is immobilized, this may not be possible. Medical M-113 drivers should emphasize tactical driving to avoid losing medical assets when extracting combat casualties under fire.

Because the large majority of soft tissue wounds, fractures, and burns can be managed at the company level for several hours, vehicle runs are feasible by the medical M-113 to the patient collection point or battalion aid station. Medical M-113s are usually set up for two litter and five ambulatory patients. When there are a large number of casualties, alternative vehicles may be used.

### Treatment

What treatment is required at the company level for our group of casualties? (See chart, upper right.)

Those who have psychiatric or combat stress reaction will receive evaluation initially at the company level. Light cases of combat stress reaction may return to duty. More severe cases may need further care at the battalion aid station, or with the combat stress control detachment attached to the medical company of the forward support battalion. The majority of soldiers with combat stress reaction can return to duty before 72 hours, and can perform on a par with their peers. Treatment for combat stress reaction is as far forward as possible, and consists of the "four Rs" — rest, refreshment, reassurance, and return to duty (within 72 hours).

**Company-Level Treatment and Supplies for Typical Casualties**

| | | |
|---|---|---|
| 8 | Burns | Antibiotic cream<br>Bandages<br>Analgesia, if needed |
| 10 | Head/Face/Neck | Bandages<br>Analgesia, if needed |
| 30 | Extremities (6 traumatic amputations) | 6 Tourniquets<br>24 splints (or more, some may be multiple)<br>6 IVs<br>Bandages<br>Analgesia, if needed |
| 7 | Trunk | 4 Occlusive Dressings<br>7 Intravenous fluids<br>Bandages<br>Analgesia, if needed. |
| 5 | Multiple | Combination of above. |

### Prevention

"Stout armor" is the best protection from injury to armored vehicle crews. Unfortunately, at some point, any vehicle's armored envelope can be overmatched by antiarmor weapons. When designing an armored vehicle, there is always a trade-off between protection, mobility, and firepower.

Crew survivability was the top priority for the design of the Abrams M1 tank. "Live-fire testing" has been carried out on the Abrams with actual Threat weapons. Results show the majority of injuries expected would be ballistic, and that the Abrams design reduced burns.

As mentioned above, there is about a five-to-seven percent incidence of eye injuries with combined arms or armor units. No eye injuries occurred with Israeli crewmen in Lebanon in 1982, when they wore goggles with 2 mm polycarbonate lenses.

No casualty data are available for tank crewman with and without body armor. In a Korean War study, the protective vests stopped about 75 percent of small fragments, and reduced the percentages of KIAs (killed in action) from chest wounds from 26.7 percent to 16.9 percent. Protective armor appears to save lives.

Israeli use of Nomex suits (Nomex is a proprietary flameproof fabric. - Ed.) does not appear to have altered the distribution of burn injuries when compared to British WWII tank crewman, though Israeli data shows a reduction in burn severity from 1973 to 1982.[1,7] In the 1982 Lebanon War, Israeli use of Nomex gloves reduced the percentage of hand burns from 75 percent to nine percent.[7] Because about 75 percent of burned crewman have facial burns, a usable face mask for

burn protection is being developed, and needs to be fielded.

Training skills for the treatment of combat casualties need to be reinforced on a regular basis beyond basic training. Not all first aid common tasks apply to combat casualties. For example, casualties do not die of heart attacks; therefore, cardiopulmonary resuscitation (CPR) is of limited usefulness on the battlefield. The first aid common tasks that are most useful for combat casualty care[4-6,13] are application of tourniquets and pressure dressings, splinting, and bandaging.

Current annual testing of these skills is inadequate to maintain a high level of proficiency; therefore, we recommend soldiers be tested on a quarterly basis to ensure those skills are second nature. This can free the medics to perform triage, start IVs, give pain medication, as well as adjust splints and bandages.

How should the medics train? From analysis of combat casualties, the skills most needed will be:

- Triage (patient evaluation)
- Splinting (a variety of splints with various materials, as shown in First Aid for Soldiers, FM 21-11)
- Hare Traction Splints
- Intravenous (IV) fluids
- Intramuscular (IM) injections

Starting IVs is a skill that needs to be practiced on actual patients. Temporary duty in a hospital to practice starting IVs and giving intramuscular (IM) injections will ensure the medics' proficiency in wartime. (Civilian Quality Assurance standards may not allow this practice in Army hospitals.) It is necessary that the medic practice triage with a realistic number of patients, so that all of the important wartime skills can be maintained.

It is imperative for the commander to be the driving force behind maintaining proficiency for skills necessary for the treatment of combat casualties. The quality and specific programs for training are the responsibility of the battalion surgeon, or the brigade surgeon if one does not exist at battalion. Failure to do so may result in a needless loss of life in a future conflict.

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Captain Paul J. Dougherty serves on the orthopedic surgery service at Letterman Army Medical Center, San Francisco. He earned his medical degree at the Uniformed Services University of the Health Sciences, Bethesda, Md., after undergraduate and graduate studies in anthropology at San Francisco State University, where he was also a lab instructor in anatomy. His professional interests include trauma surgery and gunshot wound ballistics.

Captain Ralph Briggs is a 1979 graduate of Virginia Military Institute. He attended the Armor Officer Basic and Advanced Courses and was troop commander of 4-4 Cav, 3d Infantry Division. He is currently an instructor at the Armor School Leadership Branch, Command and Staff Department, Fort Knox, Ky.


SPC Jody Harmon

At left, German combat engineers closely supported rapid river crossings in the Ardennes during the 1940 drive into Belgium. By 1944, few experienced engineers were left, and even small streams hindered mobility.

At right, the present bridge over the Ambleve River at Trois Ponts. The Belgians blew a bridge here in 1940; the Americans did the same in 1944 to slow the Germans.

# Synchronizing Mobility Support

**by Major Dominic Izzo**

*"Zu den vordersten Panzer gehoeren stets Pioniere."*
*– Field Marshal Kempf*

## Introduction

Synchronized, violent execution is the essence of decisive combat.[1] The division piles on combat power using combat multipliers. The sapper or engineer combat multiplier generates enhanced mobility to permit unimpeded maneuver. Heavy forces synchronize mobility support to maintain the initiative, preserve freedom of action, and maneuver decisively. Good organization and repetitive combined arms training engender the superlative command and control necessary to synchronize mobility support.

## Wehrmacht Mobility Support In the Ardennes

The Germans launched two offensives through the Ardennes in World War II. The first, in May 1940, quickly penetrated the difficult terrain of this wooded, mountainous area and lead to victory. The second, in December 1944, stalled in spite of complete surprise and local superiority in tanks and infantry.

The differences in German mobility support in the two Ardennes offensives are relevant and often overlooked. The panzer spearhead crossed the Meuse River almost in stride in 1940[2], but was stymied in 1944 by smaller rivers like the Salm, the Ourthe, and the Ambleve.[3] U.S. engineers rendered yeoman service blocking the way in 1944, while dispersed and worn-out German *Pioniere* could not clear the way for a lightning advance of heavy Tiger and Panther tanks. What was the difference between 1940 and 1944?

In the 1930s, Heinz Guderian, the father of the German armored force, had preached synchronization of the combined arms team during the formation of the panzer arm. His mechanized force was like an orchestra, which only plays in harmony if every instrument plays its part.[4] Guderian included sappers, combat engineers, in his mechanized, combined arms force. In 1940, well-trained sappers were a part of the combined arms team that made blitzkrieg happen. Synchronized mobility support explains the impressive ability of Wehrmacht armored formations to maneuver in the early years of the war. Sappers – *pioniere* – synchronized with tanks and infantry, crossed rivers, cleared obstacles, and reduced fortifications in Poland, France, and Russia.[6]

By 1944, however, the Wehrmacht sapper corps was bled white, more so even than the infantry.[7] Losses in trained leaders, armored vehicles, and specialized equipment were not made up. In November 1944, Germany was able to mass tanks, infantry, artillery, and logistics for the Ardennes offensive, but could not mass enough sapper companies to maintain the initiative gained by their surprise attack.[8] More damaging was the failure of the German

leadership in 1944 to get mobility support, scarce as it was, to the critical point. Again and again, leading panzer units lost valuable time trying to bypass seemingly insignificant obstacles.[9] The result in 1944 was a *stau*, a traffic jam, instead of the blitzkrieg of 1940.

### The Divisional Sapper Brigade

Experience at the National Training Center, and in field training exercises, shows that getting sappers to the right place at the right time is a problem. Engineer command and control often does not keep up with changing operations. The divisional engineer platoon leader, today doctrinally the task force engineer, is overwhelmed.[10]

The brigade staff engineer, once thought to be the solution to the sapper command and control problem, often cannot integrate non-divisional engineer units quickly enough. The time factor has become compressed in the years since WWII.

Engineer command and control systems currently need more reaction time than is available on the battlefield. The sometimes-applied analogy of mobility support from sapper units to fire support from artillery units oversimplifies the problem. The synchronization of sappers with maneuver forces is significantly more difficult. For example, the teamwork necessary be-

Above, an Armored Vehicle Launched Bridge (AVLB) team moves forward to breach a tank ditch in conditions similar to the Ardennes winter.

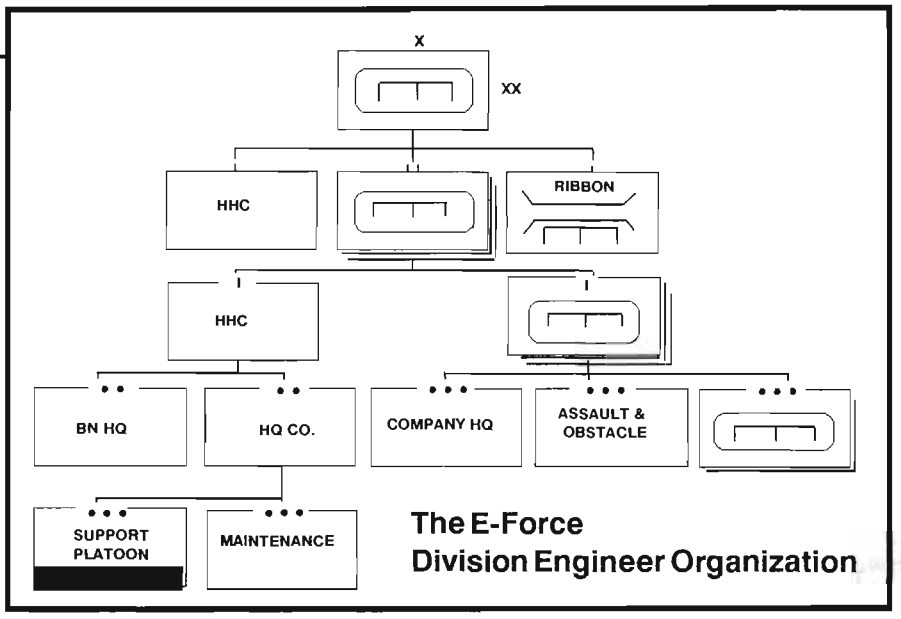
Below left, a Combat Engineer Vehicle (CEV) moves out after breaching a tank ditch. The CEV's power equipment and armament can breach obstacles and destroy fortifications.

Below, mechanized engineers in M113s clear a minefield.

tween sapper and maneuver units for an in-stride breach is harder to orchestrate at task force level than the fire support that goes with it.

Synchronized mobility support requires intensive combined arms training at brigade and task force level to achieve the necessary degree of command and control.

A divisional sapper brigade could solve this problem by providing a sapper battalion headquarters to support each maneuver brigade, under a concept the Engineer School calls E-force.



**The E-Force Division Engineer Organization**

E-Force does not change the total number of sappers in the corps.[11] E-Force moves sapper structure from the "corps slice" into the division to improve command and control of the mobility combat multiplier and institutionalizes combined arms training. Eight conventional line combat engineer companies will be reorganized into nine smaller, more leader- and equipment-intensive E-Force sapper companies. These nine sapper companies will form three E-Force sapper battalions, one per maneuver brigade. This reorganization is in the spirit of changes in the tank and infantry battalions which have increased the leader ratio in the last few years. More important, E-Force provides a battalion headquarters in routine direct support of each maneuver brigade for improved planning, control of additional non-divisional sappers, and improved logistical support of sapper units. If nothing else, E-Force will improve the combined arms training of the current non-divisional combat engineers by bringing these sappers formally into the division family.

Students of mechanized warfare may contend that another brigade makes the division too unwieldy for effective command and control. The concept of a larger sapper organization in the division is not novel,[12] but has been criticized as too cumbersome.[13]

Opponents argue that task-organizing corps battalions to the division, as needed, provides the multiplier effect without creating a "fat" division. However, engineer command and control for the sapper battalions that doctrinally work in the division is now broken. In fact, the habitual association and combined arms training necessary for adequate command and control argue for a divisional sapper brigade if we are to have effective, synchronized mobility support.

### Habitual Association

Theoretically, commanders can synchronize operations in small divisions more easily than in larger ones where the span of control, and therefore the friction of war, is greater.

However, the real size of a division changes as non-divisional units are attached for specific operations. Doctrinally, the heavy division will have two mechanized corps sapper battalions in support, in addition to its divisional battalion.[14] U.S. divisions in Europe today have at least one battalion habitually associated. As part of the "corps slice," the non-divisional sapper battalion trains with its division regularly.[15] In WWII, "habitual association" often led to engineer combat groups – sapper brigades – becoming *de facto* divisional units.[16] Thus, the perceived flexibility of assigning these battalions to the corps troops is a mirage. If the sappers have not joined the division in habitual association, then the friction of war makes synchronization difficult to achieve at best.

To have an effective habitual association, non-divisional sappers must train with the division regularly. This means the non-divisional sapper plans all his training around combined arms training with the division. Essentially, the non-divisional sapper battalion's entire operations revolve around the division. Making the battalion part of the division just streamlines the process. Clearly, problems with SOPs, battle drills, codes, and logistical support take critical staff time and training to sort out. The corps engineer slice and the division need to "cohabitate" before operations to establish working relationships. On the human level, sappers must learn

to interpret the maneuver commander's intent. How much cohabitation, and how many training exercises are necessary for effective synchronization is a vexing question for training managers. But the teamwork required for real synchronization does not happen overnight. Operation Schmidt, a WWII attack over difficult terrain north of the Ardennes, is an example of unsynchronized sappers and a devastating failure in mobility support.

### Sappers at Schmidt

The Huertgen Forest in 1944 was a foot soldier's nightmare. The 28th Infantry Division (28th ID) employed the equivalent of a sapper brigade to support its attack to sieze the town of Schmidt on 2 November 1944.[17] In addition to the 1171st Engineer Combat Group, 28th ID had a dozen artillery battalions, a tank battalion, a tank destroyer battalion, and hundreds of aircraft to support its attack.

The division mission was to break through the Siegfried Line, seize the Roer River dams, and secure the right flank of VII Corps for an upcoming offensive into the industrial heart of Germany. The Germans repulsed the attack with bloody loss. In spite of the mobility support available, the attacks of the 109th and 110th Infantry Regiments did not break through fortifications and obstacles defended by exhausted, third-rate German infantry.

The 112th Infantry made the main attack and captured Schmidt, but was cut off and overrun because the Kall Trail, the only road across a deep, wooded gorge leading to Schmidt, was not kept open. The 1171st did not provide adequate mobility support to 28th ID, although the engineers distinguished themselves in close combat. The 146th Engineer Combat Battalion, for example, conducted a counterattack, which restored the division's front line at a critical point.

Poor synchronization of mobility support was a factor in the failure of the attack at Schmidt.[18] There were enough engineers, but they did not get to the right place at the right time. Infantry soldiers were unable to clear the way alone. The available tanks and tank destroyers, as well as the desperately needed combat service support, could not get forward in the required quantities. The battalion assigned to clear the Kall Trail was not synchronized with the main effort of the 112th Infantry. The sappers did

## AVLB...1944-Style

Tank bridgelaying vehicle, based on M3 tank chassis, was used to set treadways across antitank ditches. Photo below shows treadway sections being placed. Above, the vehicle crosses the ditch. The cannon at left of the hull is a dummy - the mantlet hinged forward and acted as an entry hatch.

not provide 28th ID the mobility support to maneuver decisively and fulfill the commander's intent. The Americans lost the command and control contest to the Germans. Although 28th ID initiated the attack, its sappers took longer to clear the way than the Germans took to counterattack. The 116th Panzer Division marched some 50 km and attacked before the Americans could organize effectively to clear the way to the 112th Infantry in Schmidt. Without synchronized mobility support, the 28th ID failed.

The Huertgen Forest is similar to the Ardennes, the Thuringerwald, and many other heavily wooded areas throughout central Europe where we may have to fight. 28th ID enjoyed superiority in artillery, aircraft, logistics and engineers. The 28th ID, in fact, had more engineer support at Schmidt than U.S. divisions in Europe have today. Clearing the way for decisive maneuver of today's heavy divisions, with more and heavier vehicles than the WWII infantry divisions, will demand first-class command and control to synchronize the sapper effort in the division and keep the lead tanks moving.

## Conclusion

To synchronize mobility support, the division requires an agile sapper organization. The E-Force mechanized sapper brigade, organized from the current assets of one divisional and one corps battalion, will do the job. Corps combat engineer battalions have often been *de facto* divisional units, due to habitual association. E-Force legitimizes the marriage and ensures synchronized mobility support for decisive maneuver in division operations.

## Notes

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[14]FM 5-100, Engineer Combat Operations, 22 Nov 1988.

[15]FM 25-100, Training, March 1989, describes Corps Slice Training.

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[17]MacDonald, Charles B., and Mathews, Sidney T., Three Battles: Arnaville, Altuzzo, and Schmidt, OCMH, DA, Washington DC, 1952, describes the battle in detail.

[18]Taylor, LTC Benjamin G., "Operation Schmidt." Military Review, August 1954, p.10, attributes the failure to seven factors, among them the difficult supply route, and the failure to get sufficient armored support across the Kall River on the Kall Trail.

Major Dominic Izzo, a 1974 graduate of the USMA, is executive officer of the 237th Engineer Battalion, 7th Engineer Brigade, VII Corps, in Heilbronn, FRG, having previously served as the battalion S3. He served in a number of company positions while assigned to the 12th Engineer Bn., 8th Infantry Div., and commanded the 58th Engineer Co., 11th ACR.

**45 Years Ago:**

# Joachim Peiper and the Deep Attack

**by Mark Edmond Clark**

Today, the U.S. Army has integrated the concepts of maneuver warfare into its doctrine more than ever before. FM 100-5 (1986) is a recognition of the operational level of war, the requirement of mission-type orders, initiative at the lower levels, and the concept of striking at an enemy's weaknesses. But, the doctrine's emphasis on the concept of hitting deep into an enemy's flank and rear is perhaps one of its more intriguing aspects.

To hit deep into the rear of static or dynamic enemy forces is certainly not a new consideration for combat on a European battlefield. As recently as WWII, there were many occasions when mechanized and armored forces made deep penetrations into opposing formations in order to reach an objective or to stop an attack. This is especially true with regard to German forces which counterattacked against advancing Allied armies on both the Eastern and Western fronts. Many German officers achieved prominence for their skill and success in conducting such deep attacks. One officer of special note was Oberst (Colonel) Joachim Peiper, commander of the 1st SS Panzer Regiment of the 1st SS Panzer Division.

This article is a brief examination of Colonel Peiper's use of the deep attack during the German Ardennes offensive of 1944, known as the Battle of the Bulge. Its purpose is to provide some insight into the military tactics and decision-making of this commander during this operation. Hopefully, it will also provide a few ideas on some of the many considerations commanders should make when conducting a deep attack on an offensively postured enemy. It will also demonstrate how many of today's generally accepted concepts on the use of mechanized and armored forces in the deep attack served as keys to the deep attacks of the past.

Although well educated and fluent in English, Peiper was a tough, arrogant, and hard-core Nazi officer. He was famous for his ruthlessness and for his success in performing notable feats of daring in Russia. Typical of his exploits was his rescue of the German 302nd Infantry Division in 1943.

The 302nd was withdrawing under pressure from an area near the western banks of the Donets River, and was burdened with more than a thousand wounded. The 1st SS Panzer Division was tasked to come to its aid at a time when the 1st SS was itself under severe assault on the Donets. Obedient to his orders, Sepp Dietrich, the commander of the 1st SS, withdrew a *panzer grenadier* – mechanized – battalion, which Peiper commanded, and sent it in. Peiper's unit crossed the Donets, smashed through the advancing Russian Army, repelled the Russians' furious counterattacks, and pushed on until it had located the 302nd. The battalion formed a protective ring around it and held off Russian assaults until all of the division's remaining elements got safely across the frozen river.

However, at the point of crossing, the river ice was too thin to bear the weight of Peiper's halftracks. He swung the battalion around and drove it through the rear of the Russian forces until he reached a bridge near German forces, which was capable of bearing the vehicles.

With a record of such operations, it is understandable that the German High Command, while develop-


ing its plan for a major offensive in the West during the winter of 1944, selected Peiper for the assignment of commanding the lead elements of the principal drive. The offensive was essentially an all-out effort by Germany to stave off defeat. Roughly, the plan was to push through the weakly defended Ardennes Forest, which lies within the borders of Belgium and Luxemburg, drive on to the Meuse River, and seize Antwerp, a Channel port in Belgium. The capture of Antwerp would have given the Germans an outlet to the sea.

The German High Command depended on two key elements for its attack. First, it depended on fog and weather to ground Allied air power. Second, it depended on complete surprise. Because surprise was a key element for success, many details of the attack were kept secret even from its participants until days before its start. It was under this cloud of secrecy that the Ardennes operation began for Peiper.

Brought to the West two days beforehand, Peiper received orders on December 14 to drive the 1st SS Panzer Regiment rapidly through the northern region of the Ardennes and reach the Meuse River, to ignore his flanks, and to capture as many U.S. fuel dumps as possible. Briefings and maps included most of the tactical necessities, such as accurate information on the U.S. situation and the composition of U.S. forces.

From his maps, Peiper recognized that environmental factors would be of great importance to his attack. The roads assigned to his unit and remaining elements of the 1st SS Panzer Division, which were required to follow him, were generally bad. Their negotiability by tracked vehicles would be difficult. In Peiper's opinion, the roads were best suited for bicycles. Yet, despite these misgivings, he recognized that the route provided many bridges that would aid the speed of the advance.

To fulfill his mission, Peiper first turned to task organization. He wanted to fight an integrated com-

bined arms battle, and sought a precise mix of forces. Armored and mechanized capabilities had to be used to their maximum advantage, and the strength of each had to be considered in terms of how it could enhance and overcome the weaknesses of the other.

The forces available for Peiper's attack included one battalion of Mark IV and Mark V medium Panther tanks, one battalion of Tiger II heavy tanks, and one battalion of *panzer grenadiers*. After considering factors such as mission, enemy, terrain, and troops and time available, Peiper organized his unit into a *kampfgruppe* – combat team. In order to give Peiper's advance additional support, the German High Command reinforced his unit with one regiment of paratroopers from the 3rd Fallschirmjager Division. However, cooperation between the two units was brief. Only a reinforced company of the paratroopers remained with Peiper's column after the morning of December 17, which was its first day of attack. The column would be 25 kilometers long. Most combat elements had to be in the front of the column because it was impossible for the vehicles in the rear to overtake those in the front due to the bad roads. Peiper decided that a few halftracks would proceed ahead as fast as possible until they met resistance. The medium tanks would be among the forward elements. The heavy tanks would be kept in the rear until the unit reached the Meuse River. Then they would proceed at medium speed.

Since contact with U.S. forces was possible at any point during the advance, Peiper made all forward combat elements, except for the lead halftracks, capable of quickly deploying for attack. He created an assault formation from these forces. The formation featured two Panther tanks as point, followed next by troops in halftracks, and then by a mixture of Panther and Mark IV tanks.

Any decision to make a hasty attack after contact with U.S. forces would be a critical decision because all movement would be halted. In deciding, Peiper would have to give consideration to force ratios, U.S. force dispositions, and possible U.S. force intentions. To expedite this decision-making process, Peiper issued orders against firing into small groups of U.S. forces in close proximity to his column when they did not oppose its advance.

In the first hours of December 17, Peiper's force drove rapidly toward its objective. His plans for traveling, movement to contact, and the hasty attack lead to initial success. Ordered to go 50 kilometers, Peiper raced almost 30 before the end of the day.

U.S. forces were completely surprised by the breakthrough. At the town of Honsfeld, for example, Peiper managed to capture a large group of troops still asleep. With the roads leading to Honsfeld full of U.S. vehicles traveling from the front, Peiper's tanks and halftracks simply fell into the column and entered the town with them. Although they were initially oblivious to the Germans' presence, the U.S. troops soon discovered the situation and retreated in disarray, leaving a large amount of equipment.

Despite this early success, Peiper's situation quickly deteriorated. His column's flanks were wide open, and its vehicles were nearly out of fuel. Neither he nor his men had slept or eaten since arriving in the West five days before, and their fatigue was obvious. The entire situation was made worse because Peiper, in his rush to advance, had taken many short cuts through woods and secondary roads. Follow-up elements were bogged down on these roads due to mud and other terrain conditions.

Thus, as a result, supplies and reinforcements could not quickly reach the forward combat elements. Radio difficulties further hampered Peiper; he could not communicate with all elements of his column and

Troops from Kampfgruppe Peiper consolidate at a Honsfeld barnyard after following an American column into the town. The equipment in the background was abandoned by U.S. troops in their withdrawal.

the remainder of the 1st SS Panzer Division.

Peiper's radio problems were seemingly out of his control. But his decision to move the column through short cuts was clearly his error. That maneuver degraded the combat capability of his force despite any advantages gained in speed and time. At the town of Stavelot, where Peiper's unit conducted a hasty attack, the effects of his error were most apparent.

Stavelot controlled an important road and bridge intersection on Peiper's line of advance. The road to Stavelot curved around a gigantic rock and funneled into a single bridge over the Ambleve River. The U.S. force which held the Belgian town was composed of one armored infantry battalion, a platoon of tank destroyers, a battalion of combat engineers, and odd units, such as a few antiaircraft artillery batteries.

This Tiger II threw a track and was abandoned on December 19 on the outskirts of the village of La Gleize. Here, Peiper's battle group was nearing the limit of its penetration into the Bulge.

When Peiper made his initial approach on Stavelot in the late afternoon of December 17, he immediately assessed that it would be difficult to enter the town with his tanks. Peiper quickly ordered a company of *panzer grenadiers* from his forward forces to take the stone bridge at the town's entrance. The company was repulsed and forced to withdraw to safe positions.

Apparently surprised by the strength and determination of the force, Peiper ordered howitzers and mortars to hit suspected U.S. positions. In addition, he sent a tank company out to find another way into the town. Neither maneuver gained any advantage. Instead of succumbing to the Germans' artillery barrage, the U.S. forces launched a counterattack, consisting of one platoon of infantry, against Peiper's column, which he managed to repulse. The tank company found that the only alternate way into the town was impassable with tanks.

Peiper commited another company of *panzer grenadiers* to the attack, but it was also beaten back. It was at this point that Peiper realized that the troops in his forward force were in no condition to conduct a successful assault, so he decided to delay the attack for a few hours in order to wait for the more rested troops of his follow-on force and additional supplies.

At dawn on December 18, Peiper, who was now reinforced, once more committed a company of *panzer grenadiers* against Stavelot. But in conjunction with the infantry attack, he positioned two Panther tanks 200 meters from the edge of the town and instructed them to charge toward the town's entrance at maximum speed.

The tanks drove rapidly around the curve at Stavelot's entrance, firing their guns. The first tank was hit, and it burned, but it had so much momentum that it penetrated some antitank obstacles at the curve and damaged two U.S. tanks positioned there. The second tank used that opportunity to drive through and seize the bridge. Peiper quickly followed up with other vehicles. In the town, a fierce battle developed, which lasted two hours and caused heavy losses on both sides. By the end of the morning, the U.S. forces had withdrawn.

Given the responsibility of serving as the armored spearhead of the German offensive, Peiper's unit was required to perform as a combination reconnaissance and assault force. But it appears that in attempting to drive full steam toward his objective, Peiper felt the need to concentrate more on the reconnaissance role. This seemingly caused him to seek short cuts, which separated his forward elements from his follow-up and support elements. Doing so was a tactical error. The problem was less apparent when the unit encountered light resistance at points such as Honsfeld. The forward elements were adequate to make successful hasty attacks and proceed. However, the problem was more apparent where resistance was relatively heavy, such as Stavelot. Penetra-

tion there was difficult initially because Peiper could rely only on his fatigued forward force, and he used it in piecemeal attacks – a *panzer grenadier* company here, a tank company there. Yet, although these maneuvers were significant to Peiper's advance, they had very little impact on the entire offensive.

Immediately after the engagement at Stavelot, Peiper pushed his forward forces onward through the town and toward the main objective. However, by that time, the U.S. theater commanders had recognized that Peiper's force was key to the German offensive. After reconnaissance flights located him from the air, his force became the target of two U.S. divisions, their troops angered more than ever because they heard that Peiper's troops had murdered unarmed U.S. prisoners-of-war and Belgian civilians.

U.S. forces took Stavelot shortly after Peiper abandoned it. As a result, his force was cut off from all German forces in the rear. With insufficient supplies, especially fuel, the weary column could not continue to fight for long. Peiper, unable to reach his objective, halted at the town of La Gleize in Belgium, and began to engage U.S. forces, which had managed to encircle his unit. After suffering from ground attacks and tactical air strikes from December 18 until December 23, Peiper was forced to order his men to abandon their fuelless vehicles and to retreat on foot to Germany.

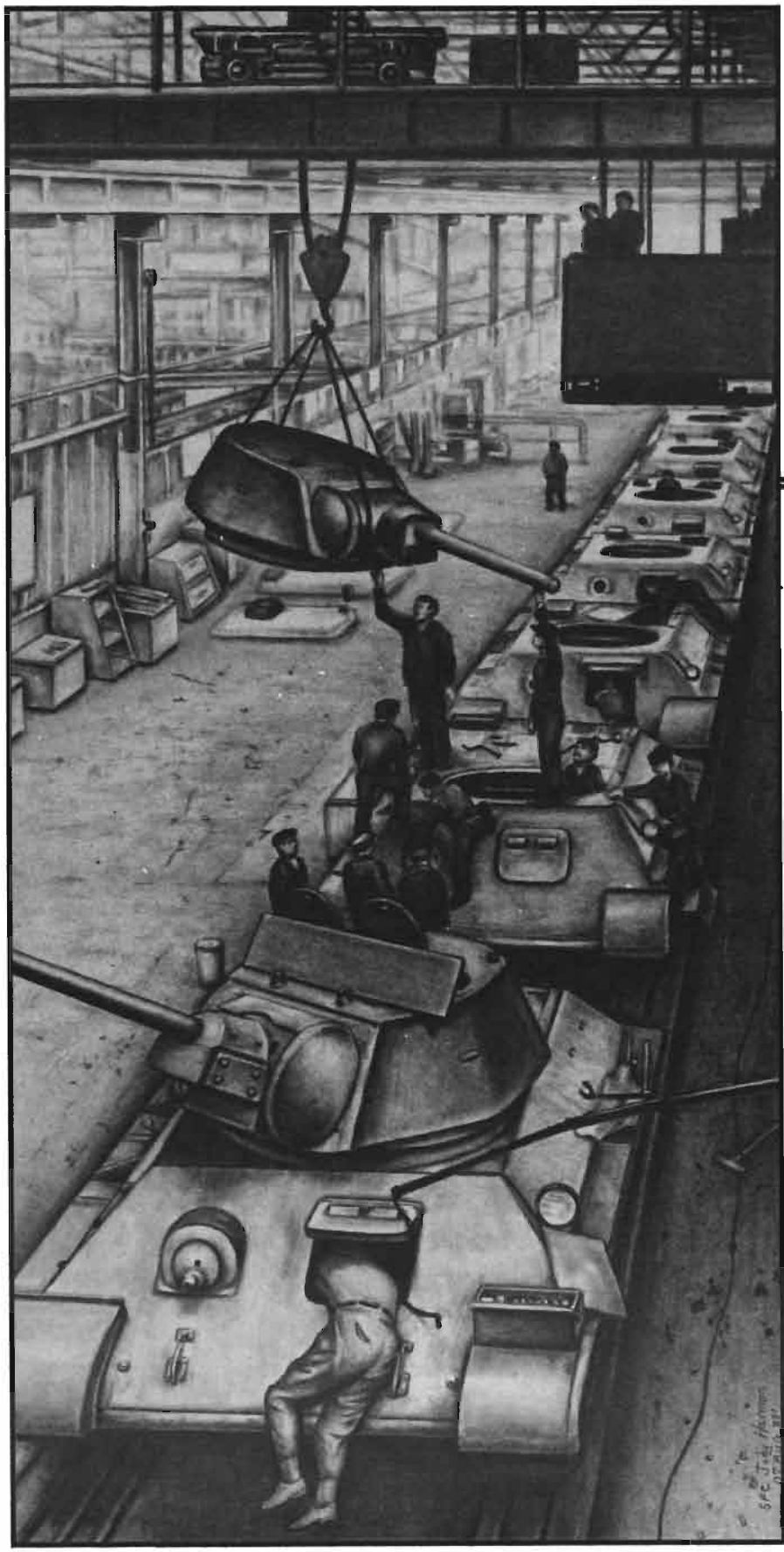
After the war, when Peiper was asked whether he would have executed any measures differently if he had to launch the offensive again, he provided some informative comments. With regard to his own regiment, he claimed that he would have instituted a speedier system of supply. He stated that when combat teams attacked, tanks would attack at the same time as infantry. He recognized that unsupported infantry attacks wasted too much time. Further, Peiper stated that the infantry would ride on tanks. Combat teams would be completely self-sufficient, and bridging units would be assigned to each armored point.

Peiper took a well-organized approach to planning the execution of his mission, despite the fact that he did not have much time to do so. After receiving his orders, he managed to analyze the maps and information on roads, the disposition of U.S. forces, and the composition of his own unit. He was able to establish – in his mind – a basic framework of action which resembled mission, enemy, terrain, and time. With that framework, he decided on the organization of his force. Peiper's choice was the *kampfgruppe,* and he designed it to provide both reconnaissance and assault capabilities.

The careful preparation demonstrated Peiper's expertise. However, he failed to properly execute his plan. Concerned with speed and time, he compromised his unit's cohesion and hampered its combat capability.

The fact that Peiper's mission, as well as the entire German offensive, ended in failure, should not detract from the tactical lessons that are provided from his experience. As illustrated here, even the most capable and experienced commander can make seemingly unimportant maneuvers which will hinder the conduct of his mission. Certainly, the history of one commander's deep attack cannot build or reduce confidence in those commanders who will have the responsibility of leading deep attacks in the future. However, history may help remind those commanders of the great complexities that the deep attack entails.

Mark Edmond Clark received a B.A. in political science and an M.A. in U.S. history from Columbia University. Additionally, he received a J.D. with a concentration in international law from Georgetown University. He has worked for law firms in Washington D.C. and was an associate in the Office of General Counsel of Mobil Oil Corp. Now, wholly dedicated to the study of military affairs, he has completed a book on U.S. military posture for the 1990s and beyond, and is currently preparing an article on Army modernization during General Maxwell Taylor's tenure as Chief of Staff. He plans to attend Princeton University in 1990 and earn his Ph.D. in political science.



# The Soviet T-34 Tank:

## The Human Dimension

by Dr. George Windholz

The Soviet T-34 was a powerful weapon that contributed significantly to the Soviet victory over Germany in World War II. Archer Jones wrote that "for its size the Russian T-34 was probably the best tank of World War II," and M. K. Dziewanowski stated that the T-34 was "simple to the point of crudity, but,...ideally suited for the rough Soviet conditions." If it is true that "imitation is the supreme compliment," then the T-34 received its share. The German tank warfare expert, Colonel General Heinz Guderian commented that the *Wehrmacht* was so impressed by its performance that in 1941 German engineers were asked to consider copying it.

The technical specifications of the T-34 and information about the battles in which it was involved are available to Western readers. However, not much has been published about the personal experiences of the people who designed, produced, and operated the tank in combat. This article describes some of their experiences and reveals the actions of people under most adverse conditions.

In the late 1930s, the strategic situation the Soviet Union faced

The Patton Museum's T-34/85

was becoming more critical by the day. The Soviet government, facing an expansive Germany and Japan, considered a major war imminent and applied pressure on its armorers. The T-34 was thus conceived in the threatening atmosphere of the Stalinist period. It was designed shortly after numerous senior military leaders were "liquidated" during the Great Purge (1937-1938).

The designers worked under the ever-suspicious eyes of I. V. Stalin who was prone to confuse lack of immediate success with an act of sabotage. In fact, in 1939, the tank's chief designer, M. I. Koshkin, was charged with unfounded yet grave accusations and barely escaped a terrible fate. Thousands of unskilled and hungry people toiled long hours in unheated factory shops to produce the tank. In combat, the crew had to struggle in a highly restricted space under taxing conditions against such formidable German adversaries as the "Tigers" and "Panthers."

Most of the sources I used in this study are memoirs of the men and women who designed, built, and fought in the T-34. By and large, the memoirs were written during or before the 1980s by people nearing the end of their life-span.

One may wonder how accurately events of 40 years past are recollected. However, the noted psychologist Frederic C. Bartlett has shown that memories of dramatic events usually tend to stress the important and crucial as opposed to the marginal and trivial. We may suppose, therefore, that these reminiscences describe the more crucial events leading to the development and use of the T-34.

In 1930 the Soviet Union's trade organization *Amtorg* bought two M-1930 tanks developed by the American tank designer J. Walter Christie. Christie sold the tanks, which had a newly designed suspension system, to the Soviets under the guise of tractors. George F. Hofman claimed that these tanks were "the basis of the Soviet BT series which evolved into the famous T-34...." It is possible that the M-1930s found their way to the Khar'kov plant No. 183, named "Komintern," that had been designing and building tanks since 1928.

The BT-5, the T-34's predecessor

The letters BT represented the Russian words *bystrokhodnyi tank*, which means a rapid tank. One characteristic of the BTs was the capability to move on either wheels or tracks. On paved roads, the crew would remove the tracks, and replace them when traversing terrain. The BT was armed with a cannon, but its armor plate was designed to withstand nothing more powerful than machine gun bullets. In 1930, the designers at the Khar'kov plant produced prototypes of the BT-2 tanks that went into production a year later. Subsequent improvements and modification led to the production of the BT-5, which was followed by the diesel-powered BT-7M.

During the Spanish Civil War, the Soviet Union provided the Republican government with BT-5s, while the Germans supplied the insurgents with antitank guns. Their German-made shells penetrated the armor of the BT-5s, and the Soviet military realized that future tanks must be resistant to cannon fire. In October 1938, the Politburo appointed a 35-year-old engineer, Iu. E. Maksarev, as the manager of the Khar'kov plant. His orders were to develop and produce an efficient new tank. At the plant, Maksarev met the 40-year-old M. I. Koshkin, the chief tank designer.

Koshkin, the son of a poor peasant, participated in World War I and later fought with the Red Army in the civil war. After joining the Communist Party, Koshkin studied at the Leningrad Polytechnic Institute and then worked on tank designs in Leningrad. Epishev, the party organizer at the plant, referred to him as "highly talented," and others who knew him had only words of praise. A. A. Morozov, Koshkin's closest associate, points out that he was both a good organizer and a competent leader.

Koshkin, in concert with his closest associates, Morozov and N. A. Kucherenko, agreed that the new tank should have a diesel engine, a 45-mm cannon, be able to withstand the bullets of a heavy machine gun, and move on either wheels or

tracks. This model, A-20, became controversial because diesel engines were not perfected enough, and the 18-ton weight of the tank required three motive wheels on each side. Also military experts of the period pointed out that tanks seldom ran on highways, and in battle conditions the crew was not able to put on tracks. Consequently, the designers realized that they had to conceive an entirely new tank.

In his memoirs, Morozov insists that this tank design emerged out of the team's conceptualization of a vehicle that would meet several requirements. Essentially, three parameters determined the design: The armor had to be sufficient to protect the crew, a powerful gun was necessary, and, because this was to be a medium tank, a high degree of maneuverability was required. The difficulty was to reconcile these parameters, and yet make a simple and reliable vehicle. To simplify the design, reduce its weight, and yet allow for heavier armor, the new tank was designed to depend solely on tracks. The tank was also to have a powerful 76-mm cannon. The design was named T-32.

In the summer of 1938, the A-20 prototype, in production, and the T-32, on blueprints, were presented to a panel of military leaders, including Stalin. The military leaned toward the wheel and track vehicle, but Stalin, who initially remained silent, stated that the initiative of the designers should not be restricted. Prototypes of both models should be built and compared. In May 1939, both prototypes were ready for testing, and a commission of experts concluded that both models were satisfactory. K. E. Voroshilov, the People's Commissar of the Red Army, saw the T-32 in September 1939 and stated that he had never seen a better tank, and the army needed it. On December 19, 1939, the Soviet government ordered the construction of two prototypes with another modification: armor that was 45-mm thick. The prototype was named T-34.

Early in the morning of March 6, 1940, two T-34s left Khar'kov enroute to Moscow, a journey of about 400 miles. Upon their arrival at the Kremlin on March 17, the Politburo, led by Stalin, inspected the tanks. Stalin was enthused: "This will be a swallow in our tank forces." The tanks then moved to the proving ground where they were tested. Fired on by a 45-mm gun, no shells penetrated the armor, yet the turret was immobilized. But Koshkin, who accompanied the tanks, became ill and died on September 26, 1940, in the Khar'kov plant's sanitarium. Morozov replaced him.

In June 1940, the T-34 was tested on the partly destroyed Mannerheim Line, which had fallen to the Soviets during the Russo-Finnish war. The tanks successfully crossed an eight-meter-wide ditch studded with concrete piles and a barricade of trees piled a meter high. This was also a period of major trouble-shooting. Hundreds of modifications had to be made. The turret was enlarged and a five-speed gearshift box replaced the four-speed one.

Although the T-34 did pass the basic tests, the designers and engineers continuously encountered problems that required immediate solution.

### The Power Plant

The development of the T-34's power plant started in 1932 when a group of engineers headed by Ia. E. Vikhman designed a diesel engine suitable for powering a tank. There was no precedent for constructing such a tank engine, but they thought that a diesel engine would have certain advantages over the conventional gasoline power plant; the diesel was considered more economical, fire resistant, and reliable. In 1936, the first prototype of this engine, the V-2, was built, and by 1938, the Soviet government approved the design for mass production. However, the engines were deficient because cylinders, shafts, and ball-bearings broke during tests. A team of engineers was assembled to make the necessary corrections but its efforts were futile. S. N. Makhonin, an engineer, was given the task of mass producing an efficient engine with a two- or three-week deadline. We may presume that failure to achieve the assigned task would have been ominous. Makhonin went to the assembly shop and found sand and dirty oil clogging the engine's parts. No quality control existed, unskilled and inexperienced workers wasted time. Makhonin called for a general meeting. He had workers clean up and instituted quality control measures. Work then proceeded slowly but smoothly, and soon functioning engines were delivered to the general assembly plants.

The concept of slanting armor to increase the barrier to shells ap-

*"The Soviets feared that the re-tooling might slow production. To avoid this, the designers worked round the clock and slept in beds put in their offices."*

proaching horizontally and to increase the chance that shells would ricochet, was the brainchild of the efficiency expert N. F. Tsyganov. In 1935, Tsyganov arrived in Moscow with a plan to improve the BT tanks. He brought along a pencil drawing of a tank in the shape of a tortoise. Tsyganov had pressed his ideas so persistently, that some very prominent officials had recommended him for a position at the Khar'kov plant where his ideas were taken seriously. Koshkin gave instructions to a team headed by A. A. Moloshtanov to make a conical turret on a slanted hull. Time was so precious that Moloshtanov could not even make a model, but had to proceed directly with the production.

### The Turret

The turret design created unending problems and required continuous modifications. The original turret design, which consisted of welded plates, required highly complex calculations, but time was short. When, in 1943, the Germans produced tanks that had armor so thick that the 76-mm gun of the T-34 could not penetrate, an 85-mm gun had to be installed. This made it necessary to increase the size and strength of the turret. The Soviets feared that the re-tooling might slow production. To avoid this, the designers worked round the clock and slept in beds put in their offices. In this manner the T-34-85 was produced in record time.

### Production

Until the outbreak of the war (June 22, 1941), only 1,225 T-34s were produced. In addition to the Khar'kov plant, two other plants manufactured the tank. One of the plants was at the Stalingrad Tractor Works, and the other was a shipbuilding plant in Gor'kii on the Volga, named "Krasnoe Sormovo." Soon after the war's outbreak, Khar'kov was the target of air raids. In the beginning, the workers would take cover, but the interruptions slowed production. It was decided that work had to continue during bombardments and that the administrators had to stay in the shops with the workers.

As the *Wehrmacht* approached Khar'kov, the government decided to evacuate the plant to Nizhnii Tagil in the Urals. Nizhnii Tagil was an old and important metallurgical center. In 1834, its serf-mechanics constructed Russia's first railroad and steam-locomotive. In 1939, the town had about 160,000 inhabitants, many of whom were skilled in metallurgy. The evacuation of Khar'kov was orderly and systematic with priorities established for the movement of various sections. Workers dismantled machines and accompanied the equipment on trains. Workers took with them a few personal possessions, including food and fuel. The journey was about 1200 miles and took a month or more to complete. They rebuilt the tank plant on the grounds of a factory that had made railroad cars. To speed up production, machinery from other evacuated plants was incorporated into the site. Unloading and reassembling the equipment in mid-winter was a formidable task. Two months later, the plant, now called the Urals Tank Works No. 183, Komintern, went into production. The Kremlin closely watched it; Morozov received frequent inquiries and orders directly from Stalin.

The technical problems they had to overcome were prodigious. The Urals iron ore differed from that found in Ukraine, and the equipment had to be adapted to the variations. The hull of the T-34 consisted of welded steel plates. Originally, skilled personnel did the welding, but they were difficult to find, and work was slow. A team headed by the academician, E. O. Paton, proposed to build an automatic welding machine, using the electrical arc and flux technique, which unskilled labor could operate. In 1941, Paton was able to weld plates of low-carbon steel, but not the special steel plates used as armor. During the welding process, cracks and pores formed along the seams. The desperate and starving team made continued attempts to improve the process. When it solved the problem, it realized that the plant administration was not interested in the process. Paton appealed to the responsible official, who agreed to take a look. Hostile welders watched as the automatic welding machine was set up. Someone (among people professing atheism) said: "With God's help," and a girl pushed the button. The machine worked well, performing the work of 10 skilled welders.

### Working Conditions

In 1941, Nizhnii Tagil lacked resources to integrate a large influx of workers. The newcomers found conditions frightful; the temperature reached minus 45 Celsius, the

housing facilities were strained to the limit, and families lived in dugouts. Morozov was lucky, because he and the six members of his family shared a single, unfurnished room. People did not have adequate clothing. Diseases, such as pneumonia, scurvy, and dystrophy spread. Dystrophy made it necessary for each worker to drink a bitter broth made from fir trees. The food supply was grossly inadequate, and authorities improvised by growing yeast in sawdust. Many people died.

Thousands of teenagers and older men toiled in the shops. Some teenagers were the children of the Khar'kov workers who had been evacuated with their plant, while others came from diverse parts of the Soviet Union. One day, the designer V. D. Listrovoi saw a group of 16- to 18-year-old girls who had come from the Mari Autonomous Republic (located on the Volga). They stood, in their native costumes, in a tight group, and looked with fear on the flashes made by the welding equipment. Youths arriving from blockaded Leningrad were so exhausted and weak that it took them some time to recover before being able to work. Teenagers constituted the bulk of the semi-skilled work force of the plant. The lathe operator, V. M. Volozhanin, recalls that in his section, which consisted of over 100 workers, only five to eight were adults. The elderly Paton referred to the youngsters working in the shops as the "mechanized kindergarten."

The life of the older men was especially hard. Many were peasants whom the military had drafted. The Uzbeks, brought from Central Asia, were not used to the cold and were poorly dressed. They fell on ice and would not eat a supplementary diet, which went against Islamic law, and many became sick.

The workers toiled hard, were poorly fed, and suffered from the cold. The bread they were issued was a soft mass that looked like dark clay. Loss of a ration card had disastrous consequences because no replacement card was issued. Many youngsters could not control their hunger; they ate up their ration before the end of the month, only to starve later.

The work day was 11 to 12 hours, on many days, longer. The shop was so cold that hands stuck to the metal. The work was so exhausting that some workers went to sleep in the shop after the end of the shift. Others, as soon they returned to their barracks, would fall asleep fully dressed. The hastily-erected barracks were poorly heated, and in winter, the temperature inside was slightly higher than the outside. To keep warm, the women workers slept in pairs and covered themselves with their meager possessions. Yet, even in these terrible conditions, the quest for culture and human companionship manifested itself. Women workers managed to go to the movies. In one barracks, 22 girls shared four presentable dresses, and took turns dating. The government organized leisure activities, such as an amateur theatrical group, choir, and dance ensemble, a regular monthly evening for the young, sports activities, and excursions to the mountains.

The conditions in the other tank plants were no better. In September 1941, Colomel M. E. Katukov was forming an armored brigade in Stalingrad. Katukov observed that workers who produced the T-34s at the Stalingrad Tractor Works had inadequate food, yet, without regard to their health, would stay at their posts for weeks.

### First Battle

Soon the T-34 was tested on the battlefield. Its performance did not disappoint the soldiers. In September 1942, Stalin asked General Major Katukov what he thought about Soviet tanks. Katukov replied that the T-34s fully proved themselves in combat and that the crews had confidence in them.

Katukov spoke from personal experience. As a colonel in command of a brigade, in October 1941, he was ordered to stop the advance of Guderian's forces on Moscow. The brigade's position was on a road near the town of Mtsensk. As the Germans attacked, Katukov ran toward the command post. Through binoculars, Katukov saw German tanks entering the positions held by Soviet units. Fearing envelopment, Katukov ordered his T-34s to counterattack. Suddenly the tanks emerged from behind bushes, barns, and haystacks – fired a few shots, then changed their positions. The battle lasted three hours, but it seemed to Katukov that it was only a few minutes. The Germans were temporarily halted.

The late Marshal of Armored Forces P. A. Rotmistrov described the participation of the T-34s in the bat-

*"The T-34 used its speed to advantage. When attacked by an airplane, it maneuvered. On confronting obstacles, it picked up speed and ran over them."*

tle at the Kursk salient. It took him three days to move his tank units to the village of Prokhorovka. On July 12, 1943, at 0600, Rotmistrov and his staff stood on a hill overlooking a field and a forest. The Germans held the forest. Silence reigned.

At about 0700, the *Luftwaffe* launched a bombing attack that was met by the Soviet Air Force. Then artillery went into action. Suddenly, Rotmistrov, through binoculars, saw the T-34s emerging at his left and right. Then he saw the German tanks. Both sides attacked simultaneously.

Rotmistrov saw the Soviet tanks tearing into the German tank formation. T-34s cruised as though caught in a gigantic vortex. The tanks became a tangled mass. The T-34s shot at the enemy Tigers and Panthers, and their fire was returned. Dust and smoke obscured Rotmistrov's vision. The earth shook as the explosions merged into a continuous din. On the radio Rotmistrov heard Russian and German commands intermingled with obscenities. A short time later, Rotmistrov traveled with Georgii Zhukov over the battlefield in an American car, a "Willys." Nikita Khrushchev and their body guards piled into another. The earth was scorched; here and there fires still smoldered. Twisted tank remains cluttered the landscape. Adversaries lay in deadly embraces. Everywhere, there were burned out machines, crushed guns, piles of cartridges, and pieces of tracks. Zhukov looked on the battlefield, and then, quietly, as though he were talking to himself, said: "So that is how a tank encounter looks."

The memoirs of the men who fought in the T-34s are filled with praise for the weapon they drove. Theirs is a declaration of love that fails to relate the full horror of battle. V. V. Kalinin, who began the war as a lieutenant in an armor unit, recalled that he felt safe behind the T-34's armor. D. A. Dragunskii who commanded a tank unit, reported seeing a tank that fought from the river Dnieper to Berlin. On its armor it had about 20 dents left by enemy shells, but not a single one penetrated. Only a direct bomb hit could take out a T-34. So stable was the tank that nearby explosions could not topple it. The T-34 used its speed to advantage. When attacked by an airplane, it maneuvered. On confronting obstacles, it picked up speed and ran over them.

Nevertheless, it was not a comfortable vehicle. During the summer it was very hot inside, and the crew had difficulty breathing. In winter, the crew froze. In cold weather the engine had to be warmed up before starting. For that purpose, stoves were used. The diesel engine reduced the possibility of the tank catching fire.

To work smoothly, the T-34 had to be carefully maintained by the driver/mechanic. One of them, V. G. Savchenko, recalls the care he gave to the engine, changing oil and cleaning the filters periodically. He filtered fuel through a silk handkerchief. The engine ran for 350 hours between regular service periods.

There were service units organized by the Soviet Army, which followed the tank columns. The simplicity of the construction allowed specialists to quickly repair the damaged tanks and send them back into combat.

Morozov, writing about the T-34's designers, claims that they were not geniuses, that none of them attended a prestigious school nor showed unusual talent. They were common men, and their effort illustrates Edison's maxim that genius is one percent inspiration and ninety-nine percent perspiration. Their memoirs show people who, working under extreme environmental stress, used their slender material resources to construct a machine that their fighting men were able to use to great advantage in combat. Commitment, cooperation, and perserverance were the human dimensions essential in making the T-34 one of the best tanks of World War II.

**Acknowledgments**

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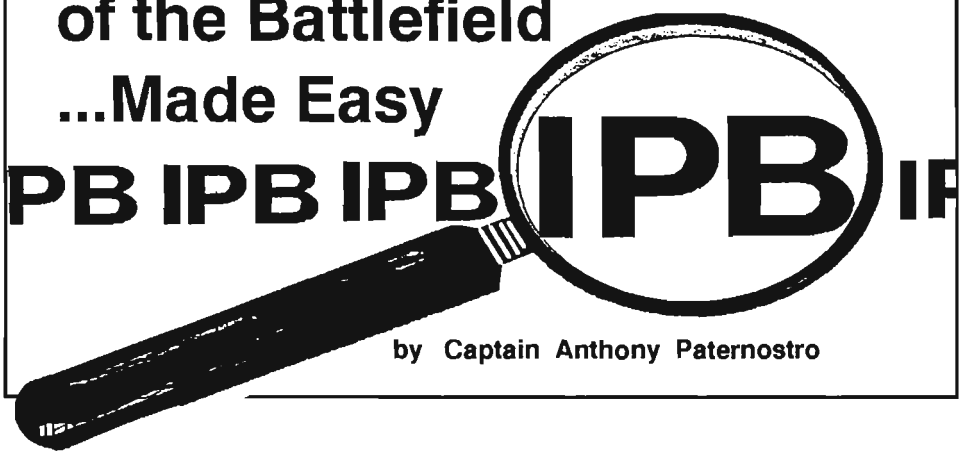
George Windholz is an associate professor of Psychology at the University of North Carolina at Charlotte. He received his doctorate at Columbia University. His major interests are in the history of Russian psychology and German psychiatry.

# Intelligence Preparation of the Battlefield ...Made Easy




by Captain Anthony Paternostro

You can hear almost everyone in the Army today using IPB language. Terms like situational template, named area of interest, and decision support template are thrown around like chicken feed. This, of course, is encouraging to a man like me, who learned IPB when IPB wasn't cool. The thing, however, that distresses me is that only a small percentage of those "urban IPBers" understand what the terms really mean, and even fewer know how to apply IPB doctrine to tactical situations.

I will try to clarify the steps of the IPB process and discuss some common mistakes that S2s and their commanders make regarding IPB. Although I will use some examples from the National Training Center, I stress that the following is applicable to any situation.

The IPB process can be as involved as one has time or assets to devote to it. I am going to focus on the battalion or task force S2. The battalion S2 has a real problem; he has the least resources to devote to IPB, and sometimes (due to improper planning by brigade and division) the least time. Yet his product must be detailed enough to show how (in some cases) enemy platoons will attack and where individual vehicles will be located within the enemy defense. So we see that quite a lot of weight has been placed upon the shoulders of the least experienced staff officer in the battalion. During a deployment to the National Training Center, the S2 suddenly becomes an important man in the staff. The commander and other staff officers expect him to show them how the enemy will attack and to provide options. In wartime, the S2 will be even more valuable, and his analysis can either save or endanger the lives of the soldiers in his unit. The IPB process, done correctly, will enable the S2 to answer the above questions and convey the information in a clear and usable format.

The current five-step IPB process was developed at the U.S. Army Intelligence Center and School in 1980 to support the emerging AirLand Battle Doctrine. It was designed to *standardize* those things that intelligence officers do to convey enemy, weather, and terrain to their units. Not only is this standardization necessary to promote understanding of IPB products, but it also will allow for possible automation of IPB work. Current IPB doctrine is outlined in FM 34-130 (May 1989); you should become familiar with this manual. However, in its current form, it is unwieldy and complicates the process for the novice.

Now let's go through the steps of the IPB process in a logical sequence. I will discuss preparation for a defensive mission and then explore the differences in preparing for the offense.

### The Steps

You should first begin some preliminary analysis of the area of operations. The following steps will prove useful:

- Acquire any maps and aerial photographs available.
- Have your Air Force weather representative supply you with climatological data on the area.
- Try to talk to personnel or POWs that have been in the expected area of operations.
- See if you can get area studies from either the CIA or DIA.

The above requests should be funneled through your higher by way of

a collection plan. This should be an ongoing process targeted to areas where your unit has contingency missions.

### Step 1:
Battlefield Area Evaluation.

In this step, you should divide the battlefield into sectors. The battlefield can be divided into an *Area of Interest* and *Area of Operations.* Area of operations is simple to ascertain; it is defined by your unit boundaries. Area of interest is not so easily defined, but normally it extends forward and rearward to your higher's front and rear boundaries. Laterally, your area of interest is basically half of your frontage added to each of your lateral boundaries. In other words, if your frontage is 8 km, your area of interest would cover 16 km laterally. Thus, your area of interest is basically the same as your higher's area of operations. Of course, physical aspects of terrain or commander's intent may cause your area of interest to vary in size. In these circumstances, use common sense, ensuring that your area of interest encompasses all terrain that you will need to analyze for both your current mission and for preparation of contingencies, such as a friendly counterattack.

### Step 2 and 3
Terrain and Weather Analysis

Now that you know your area of interest, you must analyze the terrain and weather in that area. You must analyze these two battlefield characteristics together. Terrain and weather analysis is probably the most time-consuming part of the IPB process, however, you will receive help from division and brigade through their analysis of the area of operations. This usually comes as part of the division – or separate brigade – OPLAN. If you do not receive this before deployment, you need to start tweaking the system ASAP. When you receive this document, you will see that you must tailor its scope to your unit's specific area and mission. In rapid deployments, or when your higher headquarters is flat on its you know what, you must start from scratch and build your own.

The correct format for the terrain and weather analysis is described in FM 34-130. The IPB graphic associated with this step is called the Combined Obstacles Overlay. Unfortunately, the component parts are not well described in the textbook, so let me list them here.

The Combined Obstacles Overlay is basically the OCOKA factors in graphic form.

- It should cover the entire Area of Interest.
- No-Go terrain: greater than 45-degree slope*
- Slow-go terrain: 30- to 45-degree slope*
- Key terrain/decisive key terrain
- Obstacles, man-made and natural
- Your unit boundaries
- Avenues of approach with mobility corridors
- Legend

*FM 34-130 shows these values in percent slope.

The Combined Obstacles Overlay may also include information on vegetation, soils, or waterways, depending on your mission or area of operations. Once you have completed the Combined Obstacles Overlay, enemy or friendly avenues of approach jump right out at you. Wait! Stop right here! Do you need to do a Combined Obstacles Overlay? The answer is no! If pressed for time, an experienced S2 can skip this step on paper and do it in his head.

Commanders, if given the opportunity to do a leader's recon of the ground, make sure you don't leave your S2 to do a terrain analysis in the TOC with a map. If you include the S2 on leader's recons, he will become keen to terrain effects on enemy formations, and he will be able to come up with avenues of approach just by looking at the ground. The Combined Obstacles Overlay is useful to teach intelligence officers what they should be looking for when doing a terrain analysis, but when short of time, preparation of this template is needless.

Another good technique when short of time is to have the Battlefield Intelligence Control Center (BICC) or intelligence sergeant prepare a Combined Obstacles Overlay while the S2 is out on the recon, or engaged in other IPB steps. This helps take the strain off the S2. When the S2 returns to the TOC, he can quickly discuss differences between the ground and the map, and add avenues of approach and mobility corridors.

Next, you must analyze how weather in your area of operations could affect those avenues of approach. For example, clay soil and steep grades would be easily trafficable when dry, but would become impassable during rains. Sandy soils, on the other hand, can be a problem when dry, but trafficability improves when wet. In the desert,

rain can mean disaster for troops or vehicles using desert washes for cover. In the Arctic, warm summer temperatures can turn once trafficable roads into quagmires when permafrost thaws.

Now that you have the enemy avenues of approach and mobility corridors into your sector, and have considered the effects of weather, you must put them to paper in your para 2. These will become portions of your written and oral order. Remember, you should have others in the S2 shop help you. When writing a para 2b, you must look at the OCOKA factors. In observation and fields of fire, you must look at your unit's observation and fields of fire from ground and air and both direct and indirect fire systems. Consider cover from enemy direct and indirect fire systems and concealment from their air and ground platforms. List obstacles, both natural and manmade, key terrain, and avenues of approach.

### Step 4
Threat Evaluation

This step, like terrain and weather analysis, is ongoing and you should start as soon as you know who your enemy is. When preparing for a European deployment, documents such as the *DIA Secret Threat Fact Book, USAREUR Order of Battle Guides*, and the FM 100-2 series are absolute necessities. Wherever you may be deployed, and whoever your enemy might be, you must study him. What you need to know is the ranges of his weapons systems, where those systems are deployed on the battlefield, how they organize for combat, what are the indicators that will tip his intentions, and what are his vulnerabilities.

All of these things can go into doctrinal templates, which you can prepare at home station on butcher paper, and later use them to brief your unit, or to analyze the best places to look when collecting intelligence or preparing to target the enemy. Remember, doctrinal templates are not something that some other organization must prepare for you. Prepare them yourself using all information known about your potential enemy. For some examples, look at FM 100-2-1, p. 5-5, which shows a doctrinal template for a motorized rifle regiment in march column. The only problem with this example is that it used Soviet symbology to represent the units. *I do not recommend use of Soviet symbology.* I have seen it confuse consumers and, in many cases, those who use it. Use U.S./NATO symbology so that our personnel will understand what is presented. You can template any phase of enemy operations, but if you are a battalion S2, as a minimum, you should template:

- Regimental march formation
- Regimental advanced guard
- Regimental attack against the defending enemy
- Platoon, company, and regimental defensive positions
- You should show how he deploys from battalion columns to platoons on line (see FM 100-2-1, p. 5-12)

In all doctrinal templates, you should show not only the major maneuver units, but also where command posts, scouts, and artillery units will deploy. Deployment of air defense assets are also useful, especially if you are planning a JAAT or other air missions.

Now that we have developed doctrinal templates, we can go on to the next step, but remember the following:

- Doctrinal templates should be a part of the intelligence portion of the operations order briefing concerning enemy formation.
- They can be used to provide focus for collection assets.
- Threat evaluation also includes the preparation of a data base, including enemy equipment, strengths, personalities, supporting assets, and all other portions of para 3 of the Intelligence Estimate.
- Prepare doctrinal templates at home station and bring them on all operations. They are necessary for briefing purposes and to train others in the unit on enemy formations.
- Doctrinal templates are also used to build situational templates in the next step.

*"Wherever you may be deployed, and whoever your enemy might be, you must study him."*

### Step 5
Threat Integration

Now we must use everything we have done so far in forming our conclusions of what the enemy is going to do, and how he is going to do it. We must also develop the enemy's timetable for movement, and turn doctrinal templates into situational templates. Simultaneously, we must prepare the rest of the written intelligence estimate for use in our oral orders brief. The BICC and the intelligence NCO should be trained to assist in the preparation of written portions of the order and brief so that the S2 can concentrate on the Decision Support Template (DST).

Before we get to the DST, let's briefly discuss turning doctrinal

templates into situational templates. Prepare doctrinal templates on acetate at the appropriate map scale. They should illustrate the smallest doctrinal frontage to ensure that you present the worst case for the size unit that could fit on a given AA. This means that if a division covers 10-15 km, you should make your doctrinal template at 10 km frontage. Then apply the doctrinal template to a given AA and move units according to actual terrain features on the ground. The result is a situational template.

The Decision Support Template, as we used to teach at the Intelligence School, is the Intelligence Estimate in graphic form. The DST is our conclusion of how the enemy will attack, and is a vital element necessary for the staff in the formation of its execution matrix. This means that the S2 must have a draft DST prepared when the staff conducts its initial planning session. So, upon receipt of a mission, the S2 must immediately sit down with the S3 or S3 air and ensure that as they prepare a timeline for order development, it allows the S2 time to analyze the situation prior to that initial staff conference. In some cases, this may give the S2 only an hour to go through his higher headquarters' intelligence products, scan the terrain, and decide the enemy's most probable courses of action. This sounds like a tall order, but I have done it, and seen several S2s do it who have done their homework ahead of time. In order to do this, the S2 must have his personnel trained to do most of the stubby pencil work, while he concentrates on analyzing enemy intentions. In extreme cases, S2s may have to do all of the work preceding the DST in their heads.

The draft DST should show enemy avenues of approach, probable objectives, and the various courses of action that the enemy could adopt. These should be limited to only the most probable, and the S2 should "bet his bars" and outline one as most likely. Once this is done, the rest of the staff can begin its planning. The S3 can start looking at engagement areas. These will become Target Areas of Interest (TAIs) and will be placed in avenues of approach outlined by the S2. The engineer, in concert with the S2, can begin planning how to support the defense by slowing the enemy within the EAs or canalizing him into our kill sack. The FSO can plan fires to support the mission, ensuring he covers deadspace, as well as planning FASCAM to support the engineer obstacle plan. The S2 and FSO discuss preplanned fires that become TAIs. The commander and S2 can formalize commander's intent and begin to plan how to execute at Decision Points (DPs) to counter enemy courses of action. (Remember the S2 does not create TAIs and DPs in a vacuum; they are put to paper only after affected staff members have made their input. The S2 should merely recommend these measures, based on expected enemy actions.) The S2 must be able to quickly provide staff officers with what they want to know; *what* will attack (size of formation), *where* it will attack (AAs), and *when* it will attack (timelines). After the initial staff planning session and commander's guidance, the S2 can plan for collection to provide the commander requested information on the enemy. This means turning commander's questions into Primary Intelligence Requirements (PIRs) and preparing a collection plan designed to answer those questions.

The S2 will now build the IPB template that supports collection, the Event Template. In this graphic, the S2 will pick Named Areas of Interest (NAIs) at areas where he expects enemy activities to occur and times when he thinks they will occur. With avenues of approach and enemy objectives also templated, this product will be necessary to produce a collection plan designed to focus collection assets at the appropriate time and place.

The Event Template is also invaluable in the formulation of the Reconnaissance and Surveillance Plan, oral order, and the finished DST. The DST is the only template of the IPB process that must be briefed and reproduced for the written order. The finished DST contains the following elements:

- Friendly unit boundaries
- Avenues of Approach with mobility corridors
- Enemy objectives
- Target Areas of Interest
- Decision Points
- Timelines
- If applicable, the DST may also contain a situational template or series of templates portraying a critical portion of the upcoming battle.
- Legend

Now that we have finished our DST, we must forward any new information about the enemy to the other staff members and funnel it out to the subordinate company areas. When everyone assembles for the operations order, they should have a good feel for the enemy situation. The S2 should now give them the specifics of the enemy plan, using the intelligence estimate as the format for his brief, and the DST, with either Sit Temps on the

DST or Doctrinal Templates on butcher paper, to show expected enemy formations. During this briefing, the S2 should talk to the company commanders, letting them know what they will face in their respective sectors. This, of course, means numbers of vehicles and formations. The S2 should emphasize how the enemy will look in the engagement areas.

### Offensive IPB

Offensive IPB is a subject that we used to leave to common sense. But more and more, I see that battalion S2s are missing the point when it comes to planning for the offense. The key is to tailor IPB to your mission. Basically, the steps are similar, but we must now look at our avenues of approach and template enemy defensive doctrine and deployment.

In Step 1, we may have to enlarge our Area of Interest to include possible enemy counterattack routes. Steps 2 and 3 are virtually unchanged except now the AAs are ours, and we discuss OCOKA factors based on their effects on our movement. And we must pick routes that afford us the best possible cover and concealment from enemy defensive fires and observation.

Step 4 again finds us making doctrinal templates, however, we now portray the enemy defense. It is also important to analyze the enemy's capability to reinforce or counterattack, as well as his artillery and air support.

The 5th step is still situational, event and decision support templating. If your unit is fragged into the attack, then the only thing you may have time to formally produce for the offense is the DST. The DST for the offense contains the same elements as the defensive one, with the following emphasis:

- Friendly and (templated) enemy boundaries
- Avenues of Approach (friendly)
- Friendly objectives
- Target areas of interest (along enemy C/A routes and within the enemy defense)
- Decision points (keyed to where we might enter enemy kill sacks and at the entrance of enemy C/A routes into our sector)
- Timelines (on enemy C/A routes)
- Situational template of enemy defense including:

-Indirect and direct fire range fans
-Air defense range fans
-Obstacles

The Event Template focuses on enemy C/A routes.

### Common Mistakes

In my experience, as both an instructor at the Intelligence School and an intelligence trainer at the NTC, I have seen hundreds of company grade officers wrestle with the problems of IPB analysis and its graphic portrayal. The more S2s I see, the more often I see the same mistakes.

In Step 1, battalion S2s often receive graphics from their higher headquarters that include the headquarters' area of interest. Instead of tailoring this to the battalion area of interest, some merely copy the brigade product. The brigade area of interest is usually too large for the battalion S2 to effectively analyze. Remember, the area we call our area of interest should be roughly the size of our higher's area of operations, add half the width of our frontage to each flank, doubling our frontage. The front and rear boundary of our area of interest should extend to our higher's front and rear boundaries. For cavalry units or any unit forward of the FEBA, their forward boundaries will extend forward as far as necessary to accomplish the mission or contingencies. In the next step, we do our terrain analysis on the entire area of interest.

*"The last, Step 5, is where we see the majority of mistakes. First, many S2s are unprepared to develop IPB templates."*

Common mistakes in Step 2 include: commanders not affording their S2 the opportunity to personally recon the terrain during leaders' recons (or the S2 not expressing a desire to go), not effectively using S2 shop personnel to assist in portions of the terrain analysis, and not providing a proper para 2b of the intelligence estimate. This para 2b is necessary to provide subordinate commanders a narrative from which to study the terrain's effects on his operations.

Step 3's mistakes include simply not paying attention to the effects of weather. Prior to deployment, the S2 should study area climatological data and prepare his unit for possible extreme weather effects common to the period. These should be bounced against actual forecasted weather and weather effects on a Weather Effects Matrix. Analyze these weather effects to predict effects on enemy and friendly courses of action.

In Step 4, the major problem is that S2s wait until they deploy to

produce doctrinal templates. Produce them in garrison for all possible tactical situations employed by appropriately sized enemy forces. Unit symbology for all templates should be U.S./NATO symbology.

The last, Step 5, is where we see the majority of mistakes. First, many S2s are unprepared to develop IPB templates. They understandably have not memorized all components of a given template, so they either leave out important portions or spend precious time looking through their manuals. I recommend preparing checklists to ensure that important points are not missed.

The three so-called control measures of IPB are also often mistakenly mixed. NAIs, TAIs, and DPs are all distinctly different and should not be mixed up. (Review Step 5.)

NAIs are on the Event Template because their only use is for collection. TAIs and DPs go in the DST. NAIs, TAIs, and DPs are often numbered incorrectly, so users can't distinguish between them. S2s at all levels should ensure that the numbers assigned distinguish their control measures from those of their higher unit, or the supporting artillery unit.

In cases where they have adopted an NAI (etc.) used by their higher, they should adopt the number also. This is done so that, when one TOC talks to another and mentions NAI 5, they all know what NAI they are discussing. Ground rules for numbering of control measures should be discussed with the higher unit S2.

Another area where S2s often have problems is in the determination of enemy speeds, and in the monitoring of that speed. Timelines should be based on enemy doctrinal speeds, factoring in terrain and weather effects. The end result should be an estimate of actual enemy speed.

This, however, is only an estimate. Yet some S2s stick with their estimated speeds throughout the battle. The minute the enemy activates the first NAI H-hour, times become real time. Monitor enemy speed to the second NAI. The S2 should then calculate real speed and adjust his remaining timelines. This is extremely important to the success of execution matrices and collection management.

The last common mistake I will discuss is found on the DST. S2s in the defense often analyze enemy avenues of approach up to their battle positions and no farther. Analyze enemy avenues of approach to the enemy objectives or the rear of the area of interest. You may find, when analyzing enemy AAs in depth, that your battle position may be one that the enemy bypasses in reaching his objectives.

### Summary

The IPB process is the nuts and bolts of the tactical intelligence officer's duties in the field. It is closely intertwined into the operations, fire support, and mobility/countermobility portions of the operations order. The S2 should never do IPB as a one-man show. The IPB process can be adapted to any tactical situation or enemy force (I have, in fact, used it for pro-active analysis of terrorist threats), but should always follow the doctrinal checklist of elements that are included within each template. Other elements within the staff cannot effectively prepare their portions of the operations order without a staff conference, convened early, to discuss and modify the S2's draft DST.

Commanders and operations officers must allow the S2 the opportunity to personally recon the terrain, if possible, and allocate him the time necessary to analyze enemy possible courses of action before the initial staff planning conference. Collection management should be keyed to the IPB process, and collection should start as deep as possible to give the staff and maneuver elements time to react to enemy courses of action.

Our potential adversaries should fear units that correctly use Intelligence Preparation of the Battlefield. This tool allows us to know our enemies and concentrate our firepower at the most advantageous time and place, ensuring victory.

Captain Anthony Paternostro has served in Alaska as a battalion S2 and deputy brigade G2 for the 172nd LIB (Sep); in Berlin, FRG, as the chief of the Berlin All Source Analysis Center; and as deputy G2 and G2 Berlin Brigade. He has been a tactical intelligence instructor at the Intelligence Center and School and was an intelligence trainer for the live-fire team at the National Training Center before leaving active duty in April. He now resides in Montana.

# Reconnaissance in Force: To Seize Advantage From the Enemy

**by Captain Andrew F. DeMario**

*"What enables...the good general to strike and conquer...is foreknowledge...Rouse him (the enemy) and learn the principle of his activity or inactivity. Force him to reveal himself, so as to find out his vulnerable spots...He who can modify his tactics in relation to his opponent and thereby succeed in winning, may be called a heaven-born captain."*

*– SUN TZU*[1]

Since the dawn of warfare, forewarning about enemy location, disposition, and intent has been indispensible to those commanders who best understood how to exploit it. But information regarding the enemy does not grow on trees, free for the picking; most often, such information must be forced from that enemy like a bone from a hungry dog. Nevertheless, the information needed to defeat an enemy most often comes from the enemy himself, and one must be prepared to go out and take it.

British General J.F.C. Fuller, the man who gave us the principles of war we apply to our planning today, corroborates the need to fight for information:

*Though, generally speaking, the air reconnaissance will discover the areas in which the enemy is weak or in force, the selection of the more likely points of assault is decided on by fighting...Should the initial blow fail on account of unexpectedly strong resistance, the point of impact is at once shifted. Generally speaking, this should be unnecessary, for if reconnaissance has been thorough the concentration of force brought to bear by the attacker will nearly always be vastly superior to the resistance the defender can offer...*[2]

Units can go out and take information from a hostile force by executing a reconnaissance in force (RIF). This effort centers around forcing an enemy, through armed attack, to reveal hidden strengths and/or weaknesses that the friendly force can exploit. Quite often, this type of information can only be had by literally attacking to see what happens and then adjusting accordingly.

The reconnaissance in force is especially relevant when we know that the enemy is defending at a definite location, but we do not know his strength and, above all, we do not know his intention: is the enemy opposition just a rear guard action or screen calculated to gain time, or is this a main body prepared to halt our advance at all costs? If it is a delaying force, then we must attack quickly to break through that force and deny the enemy his desired time. If it is a series of strong points defended by a determined main body, then we must decide either to make a deliberate attack or to bypass, depending on the overall mission.

Time generally increases the defender's advantages and decreases the advantages of the attacker. That is why it is imperative that attacks begin as soon as possible, and that the attacker determines the type of opposition that the enemy intends to offer. In this regard, aviation and electronic surveillance devices may pinpoint and clarify the extent of defenses, but they certainly will not reveal the enemy commander's intentions, nor many of his limitations.

The same often applies to small unit reconnaissance patrols, which are commonly limited to locating the forward line of defense and locating select equipment or groups of personnel; rarely can they gauge the strength of a position, or the enemy's determination to hold it. One can draw such information

An M48 of the 11th Armored Cavalry Regiment leads a reconnaissance in force near Ben Cat during the Vietnam conflict.

from a competent enemy by a large-scale action, such as a RIF.

Current U.S. Army doctrine recognizes the utility of RIFs:

*While most attacks seek the outright defeat of the opposing force...an attack may be launched simply to force the enemy to disclose his strength, dispositions, or intentions. Such a reconnaissance in force may develop into a major attack if the initial probe discloses an exploitable weakness in the enemy's defenses.*

*– FM 100-5*[3]

How does current doctrine dictate conduct of RIFs? FC 71-100 tells us:

*The division may use several task forces under a brigade simultaneously, or task forces staggered in time and at widely separated points. Such action keeps the enemy off balance, discloses his dispositions over a broad area, and may develop the location and planned use of his reserves. If the reconnoitering force makes a penetration, it disrupts and destroys all possible enemy rear installations and prepares to render all possible assistance to any exploiting force. Multiple reconnaissances in force are favored by operations on a wide front, friendly superiority in armor and mobility, and an inexperienced enemy or an enemy who has weak control and communications. Planning should include arrangements for withdrawal or extrication of the force.*[4]

Other U.S. Army doctrinal manuals expand our view on RIF planning and execution:

*Whatever size the force, the operation is planned and executed like any other attack except that less will be known of the enemy...A terrain objective which, if threatened or occupied, will cause the enemy to react is most often used. If the enemy situation along a front is to be developed, the force conducting the reconnasisance advances along its front employing strong aggressive probes to determine the situation at critical points...If engaged upon completion of the reconnaissance, the force may remain in contact with the enemy or it may withdraw. If the reconnaissance is to be followed by further attack, other units pass through or around the reconnoitering force in the attack, or the reconnoitering force may continue the attack.*

*– FC 71-3*[5]

*A RIF is conducted similar to a movement to contact...*

*– FM 71-2J*[6]

How should a unit be configured to execute a RIF? D.H. Mahan, a famous Civil War-era West Point instructor, gives us the following description of what tacticians thought essential during his time:

*Reconnaissances, made in the neighborhood of an enemy, require to be done under the protection of a proper detachment; the strength and composition of which will depend on the object to be attained...When an enemy's position is to be reconnoitered, with a view to force him to show his hand, by causing him to call out all his troops, then a large detachment of all arms, adequate to the task of pressing the enemy vigorously, and also of withdrawing with safety when pressed in turn, must be thrown forward.*[7]

Civil War era requirements for RIF units have certainly not changed in modern times. FC 71-100 states:

*The reconnoitering force must be of a size and composition to cause the enemy to react strongly and definitely to the attack, thus disclosing his locations, dispositions, strength, planned fires, and planned use of reserves. The size of the force depends on the mission and the situation. The division commander may use a battalion task force or he may use the bulk of the division, retaining sufficient reserves to exploit enemy weaknesses. Tanks and attack helicopters provide the nucleus for these forces.*[8]

Are cavalry organizations suitable for RIFs? FM 17-95 *Cavalry Operations* recognizes the RIF as a corps regimental cavalry mission. We can

expect such a mission of our regimental cavalry because, except for the notable absence of infantry, the regimental cavalry is a relatively large and self-contained combined arms force. However, if the objective is in close terrain and/or the enemy has strong antitank capability, a primarily mounted force, such as the cavalry, could prove inadequate, even suicidal. A corps commander would have to heavily supplement the cavalry with infantry or elect to use a more appropriate unit, such as a mechanized or light infantry brigade.

What about divisional cavalry? Current doctrine (FM 17-95) does not give divisional cavalry squadrons missions involving sustained offensive combat. Presumably, this limitation is due to the divisional cavalry's lack of its most potent ground offensive weapons – tanks. Therefore, battalion task forces execute divisional RIFs.

Perhaps this is not such a bad idea. Given that there is only one cavalry unit in the division, arguably, the division commander would not wish to risk – at least routinely – the rapid attrition of his single, highly-trained reconnaissance unit on what is essentially a high-risk offensive combat mission when he has the choice of some ten battalion task forces that are tailor-made to execute such actions.

What is key to the success of a RIF? Napoleon once said that in war, there is but one favorable moment; the great art is to seize it.[9] This is especially true with a RIF. Commanders need to clearly understand that they must posture their main body for immediate exploitation of exposed soft spots, or the whole effort may be wasted. Also, commanders must take care that their RIF does not reveal their own intentions, and that the operation does not lead to a sudden general engagement for which the friendly force may be unprepared.

*"On the fast-paced AirLand battlefield, information will have to be gained quickly from an enemy who is likely forewarned of your approach through a host of modern detection devices. Fighting for information will probably be the norm rather than the exception."*

In the face of modern electronic sensors, the use of stealth to gain information is rapidly losing realism. On the fast-paced AirLand battlefield, information will have to be gained quickly from an enemy who is likely forewarned of your approach through a host of modern detection devices. Fighting for information will probably be the norm rather than the exception. Today's commanders should see this reality and train and equip today for the desperate reconnaissance battles that will undoubtedly face us tomorrow. Routine planning and execution of RIFs is one way to train for such an eventuality.

### Notes

[1]Sun Tzu, The Art of War, circa 500 B.C., as edited by Brig. Gen. T. R. Phillips and reproduced in The Roots of Strategy, (Harrisburg, Pa.: Stackpole Books, 1985), p. 36.

[2]Maj. Gen. J.F.C. Fuller, "Armor and Counterarmor," Infantry Journal, March-May, 1944, reprinted in Historical Readings, Armor Officer Advanced Course, Command and Staff Department, US Army Armor School, Ft. Knox, Ky., May 1979, p. 126.

[3]FM 100-5, Operations, Washington, D.C.: U.S. Army, 1986, p. 95.

[4]FC 71-100, Armored and Mechanized Division and Brigade Operations, Ft. Leavenworth: U.S. Army, 1984, pp. 8-28.

[5]FC 71-3, The Armored and Mechanized Infantry Brigade, Washington, D.C.: U.S. Army, 1985, pp. 3-49.

[6]FM 71-2J, The Tank and Mechanized Infantry Battalion Task Force, Washington, D.C.: U.S. Army, 1984, pp. 3-72.

[7]Mahan, D.H., Out-Post, (New York: John Wiley, 56 Walker Street, 1861), p. 112.

[8]FC 71-100, pp. 8-27, 8-28.

[9]Napoleon Bonaparte, Military Maxims, as edited by Brig. Gen. T. R. Phillips and reproduced in the book Roots of Strategy, (Harrisburg, Pa.: Stackpole Books, 1985), p. 436.

Captain Andrew F. DeMario was commissioned in Infantry from OCS after serving as an enlisted combat engineer and armor crewman. He branch-transferred to Armor in 1984. A graduate of the Infantry Officer Basic Course, Airborne School, and the Armor Officer Advanced Course, he has served as a platoon leader in both infantry and armor units, as XO of an infantry company, as assistant S3 of an armor battalion, and a force modernization officer with HQ, 3d ID. He is currently the S3 of 4-13 Armor

# Kentucky Windage

**by Colonel Michael A. Andrews**

The U.S. Army War College includes a block of instruction titled "Leadership of the Army and Management of Army Systems." It is nicknamed, "How the Army Runs." The course focuses on the Army Force Integration model. Instruction and practical exercises increase student understanding of the model's systems:

- Determine future Army requirements
- Conduct research and development
- Conduct force development
- Provide resources
- Acquire, train, and distribute personnel.

The course also enhances understanding of the specific documents and procedures used within the systems, such as the Basis of Issue Plan, Qualitative and Quantitative Personnel Requirements Information, the Structure and Composition System, and others. It is a somewhat humbling experience for some students, reinforcing the fact that the military profession has become an extraordinarily complex business.

One of the final classes in this course is titled "A Systems Fix." Students identify a flaw in a system and recommend a corrective action. This is a well-intentioned exercise, with the objective of soliciting ideas and encouraging analysis. It is also a humbling experience. Many students who were critical of the institutionalized procedures during previous instruction find that the opportunity to recommend "a fix" is surprisingly difficult and frustrating. The systems are interdependent. A change in one procedure may cause an unanticipated reaction elsewhere.

But the student recommendations are generally good. A frequently discussed problem deals with the Automated Data Processing (ADP) systems that have evolved in a stovepipe manner through the years. Systems seem to have developed their own ADP to deal with their unique requirements. But sometimes, their ADP systems cannot "talk" with each other. The result is that they are not very interactive, and therefore do not always respond well to change. A change in one system is not quickly brought to the attention of supporting systems. The process of acquiring, training, and distributing a soldier, for example, may be in progress for a position that has changed since the process began.

A round peg may be enroute to a square hole. The result is an incompatible "space" and "face." Students discuss possible solutions to this problem, such as a mega-system, an interactive mechanism for existing systems, or other approaches.

In a similar manner, officers in the course discuss and recommend internal improvements within the subsystems. The most frequent general criticism, however, seems to be that the materiel acquisition process is too long, too slow, and too cumbersome. Once an equipment problem is identified, it becomes obvious that users, program managers, combat developers, contractors, Congress, and Department of Defense agencies all have their own perspectives. Checks and balances lengthen the process. There is sometimes a perception that inappropriate or inadequate equipment may continue to be justified because of sunk costs and time. There is sometimes a perception that the process takes so long, and that so many requirements change, that the final product may no longer be needed. The conclusion is that, somehow, we must shorten the process.

When I was a boy, my grandfather took me hunting on his farm one Thanksgiving morning. He explained the fundamentals of basic rifle marksmanship that day, and mentioned during the discussion that one must lead a moving target. He described the concept of "Kentucky windage" in terms of time and speed. By the time the bullet reaches the target, the target will be in a different place, so aim ahead of the target, in the direction it is moving and in accordance with its speed. The aiming point should not be where the target is now, but where it will be by the time the bullet gets there.

Yes, the materiel acquisition process IS too long, and internal im-

provements undoubtedly CAN be made, but the magnitude of current proposals for change is much too small. Given the phenomenal rate of change and increased knowledge, we are simply failing to apply sufficient Kentucky windage. Our materiel acquisition process takes longer than the time for technology to make the new product obsolete. The final product is therefore sometimes ill-advised – a result of the requirement or threat being poorly defined at the outset. The "fix" is not simply to shorten the process. Perhaps that is needed, but it is not enough. To limit our focus to that fix is like hoping the target will slow down or not move until we can shoot it. The real problem is not the long process, but the original aiming point. We fail to aim far enough ahead.

Our business is future war. The history of war is a series of countermeasures. Since the first Neolithic fighter found a bigger club, military equipment, organization, and doctrine developments have been of critical importance to all societies. Survival may depend upon who counters last. History is replete with examples of technological innovations changing the balance of power – the longbow, breech-loading musket, machine gun, gas, airplanes, radar, lasers, bigger guns, and thicker steel. There was usually resistance for a variety of psychological reasons, to include allegiance to the status quo or a Pollyanna-ish hope that there will not be another war.

Today, the danger of defeat because of technological stagnation is greater than ever before, because of two conspicuous conditions. The first is the very nature of our time and world. Knowledge, information and discovery are geometrically increasing at unprecedented rates. Simply keeping abreast of "what is" - the state of the art – is a difficult task. Discerning what will be, or could be, seems almost incomprehensible, a whimsical, frivolous luxury best relegated to philosophers and visionaries who do not deal with what we have, as things are now. The successful man is the operator, today. He is valuable to this watch. But the entire Force Integration System is predicated upon how well we anticipate future requirements.

The second condition that endangers us is our system itself - the way our government and the Department of Defense operate. It is a here-and-now system. Military equipment is complex and expensive. The procedures established to conduct research, develop, and provide resources are cumbersome and time-consuming. Egalitarian, parochial considerations and interests are involved. Productions that will soon be obsolete, or cost much more than were anticipated, are sometimes the result.

The Army's Force Integration System has evolved over many years and is basically a sound, logical and effective sequence. Improvements could be made, of course, in its components. Computers could interface with one another more effectively – identifying changes, for example, in a more timely manner.

But the most fundamental shortcoming is one of spirit, philosophy, and direction. We need to institute a change in focus at the very beginning of the entire process – Determine Future Army Requirements. The "fix" is to look farther into the future. Progress in all endeavors involves stabilizing the here-and-now and establishing future direction.

We need to look well beyond present requirements, just as we do in our battle doctrine. The problem is analogous to the AirLand Battle's "deep attack." Despite a desperate situation at the Forward Line of Troops, (FLOT), we should use precious resources to look beyond the immediate requirement and see deep, then disrupt the enemy second echelon. That ultimately is in our best long-term interests. It will eventually reduce FLOT pressure and provide counterattack opportunities. In a similar way, we need to be more visionary in our approach to determine future Army requirements. We need to accept more risk NOW for greater gain later. We need to commit a formidable force behind the enemy first echelon. The real enemy is time itself.

The first step in this effort must be to emphasize that the lessons of history clearly demonstrate there will indeed be another war. Preparation for it requires operating on the foremost threshold of change, for the stakes are very high and the target is moving.

We must accept the historical premise that superior weapons favor victory. We are in a hardware business. New technology usually drives doctrine and organization. There are many examples of inappropriate responses to new weapons. We must reverse this trend. Future doctrine and organization should first determine what equipment we will need. We need a major effort, to conceptualize and develop high-technology weapons for long-range goals. Our doctrine should be more revolutionary, not

evolutionary – dependent upon each year's equipment appropriation debates. We need to anticipate and emphasize future equipment needs and possibilities even if they exceed our current state of the art.

Although the military has served as a laboratory for science and industry, the focus has been wrong. It has too frequently been, "Here is a better widget. Determine how to use it;" or, "Make a widget to counter this current threat, right now." We need to envision future war and what we will need then.

The next war is almost unimaginable. Even the intensity of today's weapons systems in an all-out war make the devastation and complexity of command and control procedures taxing to the most imaginative and competent professional soldier. Unprecedented technical expertise and emotional stability will be required. The physiological and psychological impact is beyond our understanding. Already we speak of "smart bombs," laser guns, energy beams, neutron bombs, electromagnetic fields, satellites, hovering command modules, biocybernetics, and extraordinarily maneuverable vehicles; of reaction times in minutes, and total resolution in hours.

Yet we proceed in a direction that is already too little, too late, investing tremendous amounts of money, time, and effort into today's technology to counter yesterday's threat. We then seem to justify sunk costs and production time looking for ways to employ obsolete equipment, stagnating our most important product – our minds.

Our antiarmor efforts are an example – they are as archaic as medieval jousting. We continue to improve steel and ways of physically punching a hole through it using simple chemical or kinetic energy. That is as primitive as it was in the Middle Ages. Surely there is a different, better way, another dimension, another kind of energy, perhaps one that does not physically bore a hole through the steel at all, but passes through it.

Reportedly, the Soviets have invested considerable effort examining military applications of parapsychology – telepathy, extra-sensory perception, telekinesis, and clairvoyance – to include inducing illness and conducting long-range reconnaissance via some type of "out of body" experience. Although that direction may seem eccentric, remember that the concept of a tank was also discarded as impractical and unattainable not very long ago.

There is undoubtedly a better way of incapacitating a tank. Today's eight-dollar hand calculator cost $100 ten years ago and was 10 times as big. Some discriminating consumers did not buy the home computer their children wanted last Christmas because they believed it would soon be obsolete, replaced by one that is better, smaller and cheaper. They will get more for their money with the next generation of equipment.

Current Life Cycle System Management Model and Force Integration procedures take longer than the time required for a better way could be discovered. That is the problem. The process probably can not be shortened enough to compensate for that. Better foresight and vision could produce cheaper and more effective products.

Initially, the fix should be one of philosophy. While being wary of the capricious innovator, we need to regard the conservative bureaucracy that we have become as ominously ironic. The military profession, above all others, should be adaptive and flexible. We need to identify, utilize, and reward futurists, and incorporate their ideas into every dimension of our profession, transforming vision into substantive application. Thinkers are ultimately more valuable than operators.

The Strategic Defense Initiative is a good example. We disengaged from escalating more and improved weapons of the same type and stopped depending upon a strategy of Mutual Assured Destruction for deterrence. A different strategy, using new technology, could drastically change the entire concept, making present assumptions and in-process equipment developments obsolete. Unquestionably, the experimentation will also discover other techniques not yet even conceived.

Another example is development of the light infantry division. Lighter forces are better than heavy forces. Future forces need to be flexible and mobile. Power is not power if it can not be projected. But the most glaring deficiency in our current organization is the absence of a light antitank weapon. Critics use this to question the utility of light forces. The real problem is to make light forces more formidable and sustainable. We should develop a hand-held antitank weapon. We should not permit today's limitations to be the cause of ignoring tomorrow's obvious requirement. The aiming point should be the future requirement, not current capability. We need to transcend our current em-

*"Although much can be gained from reviewing the principles, leadership techniques, and decision-making processes used at Gettysburg, that battle will bear little resemblance to the intensity, complexity, speed, and horror of the next war. We need to prepare for future war."*

phasis on chemical and kinetic energy physics — bigger bullets and thicker steel — and think more in terms of beams, rays, waves, and electromagnetic shields. We need to develop an antiarmor technique that does not require boring a hole through steel like a medieval jouster.

Emphasize high technology. We have an advantage over our potential enemies in this area. We should exploit it. We can determine direction and philosophy without precise specifications for every piece of equipment. Our present material acquisition system does not respond in a timely manner. We therefore need to anticipate better. We need to look beyond this generation of equipment. We need to transcend incremental evolution.

We must encourage imaginative, innovative thinking that challenges the way things are. We must encourage a search for, and an appreciation of, the way things might be, or ought to be. We are really a people business, of course. We tell lieutenants that the human dimension of war has not changed, and we spend considerable time attempting to learn lessons from past battles. Although we can gain from reviewing the principles, leadership techniques, and decision-making processes used at Gettysburg, that battle will bear little resemblance to the intensity, complexity, speed, and horror of the next war. We need to prepare for future war. Some well-selected science fiction should be added to the predictable history books in Officer Professional Development programs. How will it be? What do we need to get the job done? The astronomical rate of technological change may never again give us the luxury of responding after we find out. We need thinkers well versed in the lessons of history, the nature of man, and science. We need to attack deep in all our endeavors. As General MacArthur once said, "The next war will be won in the future, not in the past."

Colonel Michael A. Andrews, a 1967 graduate of West Point, currently serves as secretary to the combined staff, HQ, ROK/US Combined Forces Command, Republic of Korea. He was a platoon leader and company commander with the 25th ID in Vietnam; S3, assistant G3, and troop commander in cavalry and mech infantry units in the FRG; XO of 1-66 Armor, Fort Hood; commander, 2-66 Armor, and brigade S3. He served as an instructor at West Point; as senior training evaluation officer for TRADOC CATA, Fort Hood; force development officer at USASSC, Alexandria, Va.; and at the Office of the Deputy Chief of Staff for Personnel in Washington; and staff officer at USA ELM, Office of the Joint Chiefs of Staff. He also served as assistant division commander of the 2d AD (FWD), in Garlstedt, FRG.

## Recognition Quiz Answers

1. BTR-70. The BTR-70 is similar to the BTR-60PB but has a gap between its front and rear set of road wheels. It also has no rails on the sides.

2. T-72M1. The T-72M1 has a thicker upper glacis with three, rather than four, transverse ribs in front of the driver's hatch; increased frontal turret armor; and applique armor on the turret roof.

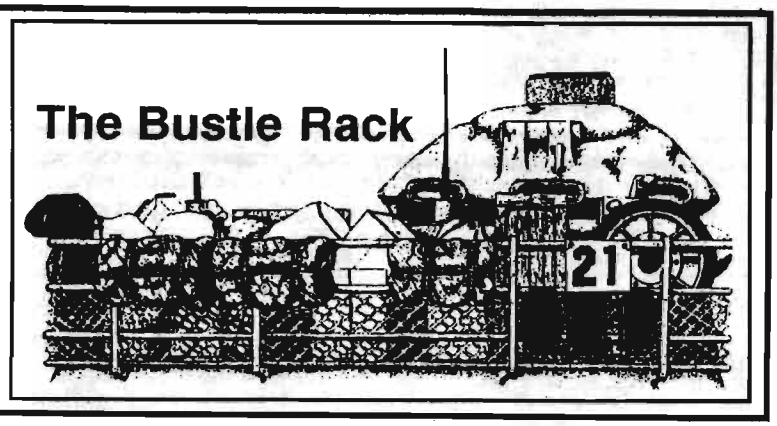
3. Bradley M3A2. Reactive armor blocks on the hull sides and front slope distinguish this model from the original M3. Note improved armor between final drives. This model also has an upgraded power train and interior spall liners for improved crew protection.

4. T-80. The T-80 has a new type of rubber-tired road wheel. These are larger than the T-64's, but slightly smaller than the T-72's. The road wheels are mounted in noticeable pairs.

5. Gepard/CA-1. Based on the Leopard I chassis, the Gepard twin 35-mm self-propelled antiaircraft gun is in service in German, Belgium, and the Netherlands. The peculiar shape of the gun barrels and flash suppressors on the Oerlikon side-mounted guns are distinctive.

6. M60 AVLB. Based on the M60 chassis, the AVLB — capable of crossing 18+-meter obstacles — is distinguished by the wedge-shaped aluminum bridge sections and the T-shaped launcher assembly at the hull front.

# The Bustle Rack




## 4-34 Armor Platoons Go 12-for-12 "Distinguished"

All 12 tank platoons from 4-34 Armor, based in Mainz Gonsenheim, FRG, earned "distinguished" ratings in their first Level I gunnery on Tank Table XII, Range 301, Grafenwohr.

To earn this rating, each tank platoon had to hit at least 38 of 42 moving or stationary targets at ranges between 1200 and 2400 meters. Scoring criteria required platoons to engage targets at the greatest distance, and to call for indirect fire if targets were beyond 2800 meters.

The unit had to overcome very limited home station training facilities - a 400-by-200-meter training area, UCOFT, and mini tank range. Prior to firing, the battalion evaluated each platoon with an ARTEP stressing fire distribution in the defense, conducted force-on-force MILES exercises, and tested each platoon in a Fire Coordination Exercise (FCX) on the mini tank range, using the Brewster device on their 120-mm guns.

One commander improvised miniature thermal targets by taping small heaters - a paper clip across the terminals of a 9-volt battery - to the rear of the targets on the mini range.

The battalion also qualified 58 tank crews on TT VIII with 80 percent target hits on the first round. Eighteen crews shot "distinguished."

## Engineers Work On Fix For M1 Sighting Glitch

The Army's Ballistic Research Laboratory is trying to improve the M1's ability to track and hit evasive and moving targets by modifying the link between the gunner's primary sight and the azimuth turret drive. The problem has been under study since 1982.

BRL's analysis revealed that the action of the servos controlling the sight and the gun have slightly different response characteristics. In tracking a moving target, the system has to frequently update the target lead solution. Because the servo characteristics differ slightly, a momentary "phase lag" may allow slight differences between the gun's point of aim and the gunner's sight.

BRL's design modification, called "decoupling," reduces the mismatch between the two servos and improves the responsiveness of the turret drive. The change also shortens the amount of time the ballistic computer needs to compute lead, eliminating substantial delays, according to the BRL.

The M1A1 program manager approved a proof-of-principle test of the new concept last April, and testing was continuing this fall.

## Regimental Honorary Positions

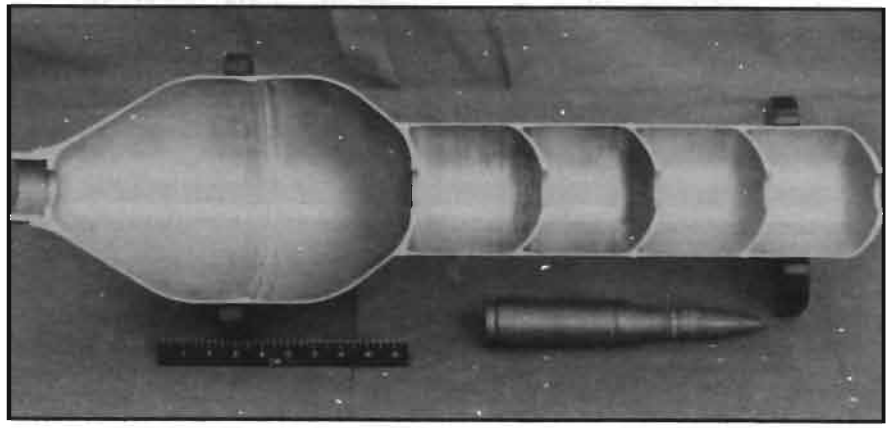
Army Regulation 600-82, 1 May 1986, explains the U.S. Army Regimental System and provides information on regimental honorary positions. The honorary positions of the regiment include the Honorary Colonel of the Regiment (HCOR), the Honorary Sergeant Major of the Regiment (HSGMOR), and Distinguished Members of the Regiment (DMOR). These positions are ceremonial and do not conflict with the chain-of-command. These soldiers must have had prior service in a unit of the regiment or in the chain-of-command above regiment.

The tenure for HCOR and HSGMOR is a three-year renewable period. There can only be one HCOR and one HSGMOR at

## Silencer Developed for Bradley Cannon

After residents living near the Wildflecken training area complained about noise from the 25-mm cannons on Bradley Fighting Vehicles, the Army is developing a silencer.

The 13.5-pound device, developed at the U.S. Army Laboratory Command's Aberdeen Proving Ground, reduces noise from the Bradley's gun by 12-19 decibels, according to the command, and allows firing on the move. It is made of stainless steel.



CUTAWAY VIEW OF BRADLEY SILENCER

M5 Tank with Culin Device

## Fort Knox Building Named For Ingenious Jersey Guardsman

Fort Knox Building 9244, the Ground Mobility Division's instructional facility, has been named in honor of SGT Curtis G. Culin III, who invented a field expedient attachment for tanks that permitted greater mobility in the Normandy campaign of 1944.

Moving inland after the Normandy landing, tanks were unable to move from field to field because of thick hedge fences, called bocage. Tanks were unable to bull their way through these hedges, and were vulnerable when they remained on the roads.

SGT Culin, a mechanic in the 102d Mechanized Reconnaissance Squadron ("Essex Troop," NJNG) used scrap steel girders and a cutting torch to fashion a four-pronged row of "teeth" on a girder frame. (According to some accounts, Culin used girders salvaged from the German beach defenses to make the first versions.) These devices were attached to the lower front of the hull of a tank. When the tank approached a hedgerow, the teeth embedded in the hedge roots, giving the tank leverage to uproot them, push them aside, and pass through to the next field. The devices were called "Rhinos," and later "Culin Devices." Culin died in 1963.

The Fort Knox building was renamed in a ceremony in late September. Considering SGT Culin's crucial contribution to getting Allied tanks moving, LTC Robert C. Mitchell, chief of the Ground Mobility Division, thought it fitting that the building would bear Culin's name.

"There has never been a more appropriate soldier for this building to be dedicated to," LTC Mitchell said.

a time and they must be retired. The HCOR must be in the rank of colonel or above. The HSGMOR must be in the rank of SFC or above.

The tenure for the DMOR is indefinite. There is no limit on the number of DMORs. They can be retired or active duty members and can be officers, warrant officers, enlisted soldiers, and civilians (non-retirees). By appointing DMOR, units are able to reward and recognize service of those who have contributed to the greatness of the Regiment both past and present.

The honorary members of the Regiment give units a link to the past. All three positions can assist in building Regimental esprit de corps, tradition, and morale. They help foster pride and unity and keep the great history of their Regiment alive.

The activities of the HCOR, HSGMOR, and DMOR are outlined in AR 600-82. Some of those activities include attending command ceremonies, speaking on Regimental history, and assisting in historical professional development. Learning about the history of your Regiment helps build unit cohesion and a sense of teamwork – past, present, and future. It is important for today's soldiers to know and understand the Regiment's history and honors. With this knowledge comes a greater appreciation of the Regiment and a basis for how Armor tactics, doctrine, and equipment have evolved. Learning about the proud and glorious history of our Armor and Cavalry Regiments can best be accomplished by having an active Regimental program and allowing our honorary members to actively participate in unit programs and functions. Learning from the past can improve all soldiers' professionalism and commitment. Information and assistance on how to appoint an HCOR, HSGMOR, and DMOR can be found in AR 600-82, or by contacting CPT Lucier or SFC Hartzell in the Office Chief of Armor, ATTN: ATZK-AR, Fort Knox, KY 40121-5187, AV 464-5155/3188.

### Strix "Smart" Mortar Projectile May Join Swedes in 1991

Sweden's FFV Corporation is completing development of the Strix 120-mm guided mortar projectile (see "The Mortar Versus Armor," Page 11, this issue. -Ed.) Test firings from a 120-mm mortar tube took place last year and deliveries to the Swedish Army are expected to begin in 1991, according to Jane's Defence Weekly. Trials demonstrated that the HEAT warhead will penetrate explosive reactive armor and 50 mm of steel armor and still have good behind-armor effect.

### Battle Data Disc Is Available Free

A computer data file on 257 battles between 1937 and 1982, abstracted from the data base of historian COL Trevor N. Dupuy, is available free to government agencies.

For each battle, there are statistics in 45 categories, such as number of casualties, tank losses, weapon counts, tactics, and geography. The 5-1/4-inch floppy disc can be read by using the Lotus 1-2-3 spreadsheet software..

Send requests to Robert McQuie, U.S. Army Concepts Analysis Agency, 8120 Woodmont Avenue, Bethesda, Md., 20814.


82ND TROOPER


PEACEKEEPING


CUBANS


RESCUED

# Grenada: Myth and Reality

**Urgent Fury: The Battle for Grenada,** by Major Mark Adkin. Lexington Books, Lexington, Mass., 392 pp., $24.95 (hardbound).

> "Perhaps the most serious handicap, aside from the conspicuous lack of good intelligence on all aspects of the operation, was that nobody had a map. To plan a military operation without a map is a sure way of ensuring participants are confused and unclear about their objectives."
>
> — Urgent Fury, p. 133

There are a lot of good reasons why American military officers and NCOs ought to read Urgent Fury, and the fact that it is such a wonderfully well-written book is only the most obvious. Major Mark Adkin, a retired British infantry officer who worked on the planning and execution of the operation, has put together an exciting account, packed with detail, sharp characterizations, and shrewd analysis. Not to overstate the case, this is Tom Clancy without the fiction.

Adkin, an outsider, also offers refreshingly objective opinions on an invasion which has assumed a very symbolic importance in recent American political history. Many Americans, not the least President Reagan, saw Grenada as a turnaround in the nation's military progress, a chance to "stand tall" again in the aftermath of the Vietnam defeat. For the first time, a Communist regime was uprooted and democracy restored.

In this flush of jingoism, truth, alas, was again the first casualty. The uncomfortable details of a horribly botched adventure were glossed over and buried in history's back pages, no match for the story on the front pages, with their photos of American medical students kissing the ground in thanks for their rescue.

Adkin is no apologist for the loony regime that had taken over this most peaceful of islands. And he doesn't downgrade the possibility that, given more time, the Cubans and the Russians might have posed a real strategic threat to the Eastern Caribbean, a crucial U.S. trade route. What he's concerned about is the performance of the elite American military units that invaded the island and the tremendous friction and confusion they experienced once the operation began. If Adkin's facts are even half right, not a hell of a lot went as planned.

Of course, no one expects a military operation to follow a plan once bullets start flying, especially one put together this hastily, but the degree to which this plan stumbled along far exceeded random chance. Grenada was a massive intelligence failure at many levels, Adkin argues. And people died unnecessarily because of it. Applying the METT-T yardstick:

Mission - The invasion force was to safeguard the medical students believed to be at one location. Less than half were actually there. If the Grenadian goons had decided to take the other 400 hostage — and clearly they had no plans to do so — we might have faced a far more serious situation. We were lucky.

Enemy - How many Cubans were on the island? Would they fight? Would the huge Grenadian militia take up arms? How many were there? What kinds of weapons did they have? There were no answers at H-hour. We were lucky.

Terrain - Long before the invasion, Grenada was a concern. But when Urgent Fury was planned, the most recent aerial reconnaissance photos of the island were six months old. There were no CIA agents on the island. Despite the fact that thousands of tourists visit the island each year, there were no maps available. The Navy based its planning on a 1936 British naval chart. We were lucky.

Time - The original plan called for a predawn attack and the securing of the island in about two days. The Rangers were delayed, lost the element of surprise, and landed at Salinas at daybreak, the drops spaced over an hour and a half. The Cubans who controlled the high ground near the runway were ordered not to shoot unless fired upon. We were lucky.

Troops - Adkin argues that a major U.S. problem was the seeming need to get as many elite formations as possible involved in the action: "None of them could afford to miss out," he says. "Inevitably, this led to a task force composed of units and staffs that did not know each other, had never trained together, often did not properly understand each other's procedures, and were forced to plan in isolation and ignorance of what others were doing."

Although the author does not make a point of it, readers with a heavy force background, and a bias against "fighting light," will note how the presence of even light armor in inexperienced hands could threaten or even stymie elite light units. One BTR-60, 20 militiamen, and an 82-mm mortar team dislodged a SEAL unit from a radio transmitter building and forced them to hide for the remainder of the day and swim back to a destroyer after dusk. Three BTRs and 24 troops were part of a counterattack on the Rangers; they caused some tense moments before the Rangers dispatched them with light AT weapons, but the fact that the counterattack force arrived too late and the BTR drivers tended to bump into each other helped. The Rangers were lucky.

Unlike many books on military operations that focus on the tactics and strategy of the battle itself, this one sets the stage brilliantly. In roughly the first third of the book, Adkin explains the politics of Grenada, the coming of the Bishop regime, the militarization of the Island, the murder of Bishop, and the Reagan administration's increasing concern about "another Cuba." Most of these events were public and easily accessible in regional newspapers or by talking to people in the Caribbean. Access to the Island was not difficult, and given the level of U.S. concern, it is appalling that so little was known of the situation before the military planning started. If revolutionary Grenada really threatened this nation's interests, one would think we would have

followed these events more closely, but despite the massive national intelligence budget, apparently we didn't. And in the flush of victory, apparently no one asked why.

JON CLEMENS
Armor Staff

**The Bridge at Dong Ha,** by John Grider Miller. Naval Institute Press, Annapolis, Maryland, 1989. 186 pages. $16.95.

At a time when Hollywood is using Vietnam to portray the American fighting man as either a sadist or a dilettante, it is refreshing to once again read about courage, loyalty, and duty under fire. John Miller's new book, The Bridge at Dong Ha, is such a story. The book tells the true story of U.S. Marine Captain John Ripley's efforts to blow up the Dong Ha bridge in advance of a major North Vietnamese Army attack in 1972.

The author is a retired Marine colonel who also fought in Vietnam through two tours. He is currently the managing editor of the U.S. Naval Institute's magazine, Proceedings, and has authored one other book on naval history. Since American servicemen who fought in Vietnam provided more examples of heroism and steadfastness than we will ever know, Mr. Miller has taken one such incident and brought it to life 17 years later.

The book is well-written, smooth, and fast-flowing. The action moves rapidly, creating vivid images of combat, fear, courage, uncertainty, and surprise. The book reads quickly; you will finish it in one sitting. And when done, the reader will be thankful we have such men as Captain Ripley.

Captain Ripley was the U.S. Marine advisor to the South Vietnamese Marine Corps' Third Battalion at the outbreak of the NVA's Easter offensive in 1972. Ordered to Dong Ha to blow up the bridge over the Cua Viet River, Captain Ripley and the South Vietnamese Marines faced an NVA division and 200 enemy tanks bearing down on the bridge from the north. While the book focuses on Captain Ripley, he was not alone in this battle.

There was a U.S. Army major named Smock who was with Ripley throughout the ordeal; Major Binh, who was the battalion commander of the South Vietnamese Marines; the loyal radioman, Nha; and of course, Three Finger Jack.

This is a story of guts and the warrior spirit, of a unit esprit which would not waver, even with only 52 survivors out of a 700-man Marine battalion after the battle was over.

Of incredible tank gunnery by ARVN crews in M48A3s, six hits with six shots at maximum ranges at moving T-55's! Of unbelievable indecision and hesitation by the NVA tanks and infantry in failing to take the bridge intact when they had over three hours of opportunity to do so. Of the loyalty and comradeship which only fighting men can know.

Captain Ripley won the Navy Cross for his heroism. You will wonder why it was not the Medal of Honor. No further mention is made of Major Smock, who is certainly deserving of equal recognition. Captain Ripley is now a colonel, commanding the 2d Marine Regiment, a hero among us when we have so few today.

This book should be read by everyone who searches for the warrior spirit.

WILLIAM D. BUSHNELL
LTC, U.S. Marine Corps
Fort Knox, Kentucky

**The Raiders: The World's Elite Strike Forces,** by Richard Garrett. New York: Sterling Publishing, 1980. 270 pages.

Unlike most books about elite forces, this work does an excellent job of tracing the use of raiders in military history in twelve concise and well-written chapters, each covering a specific organization and military action. Not limiting himself to ground elite forces, Garrett shows how in nearly all successful raids there has been a necessary coordination of ground and sea operations in early military actions, and later, a required synergy of air, ground, and naval forces as a prerequisite for success.

The books covers both the well-known and the not-so-well-known special operations forces and their actions. For example, the reader expects to see (and does) a discussion of the Israelis' raid on Entebbe Airport and the U.S. attempt to rescue POWs from Son Tay prison camp in North Vietnam. However, Garrett also treats us to excellent narratives and informative discussion of not-so-well-known raids, such as the British operation against the Belgian port of Zeebrugge in 1918, and the Confederate raid by Mosby to "snatch" Union Brigadier General E. H. Stoughton (responsible for the defense of Washington, D.C.).

For the reader interested in special operations and their relationship to both national strategy and operational art, The Raiders is an excellent book. Garrett knows his subject and puts it across in readable and enjoyable prose.

LTC G. PATRICK RITTER
Erlangen, FRG

**What Should We Tell Our Children About Vietnam?** by Bill McCloud. The University of Oklahoma Press, Norman, Okla., 1989. 155 pages. $17.95.

This is a good question, but Bill McCloud, a teacher and Nam vet, found out there is no definite answer.

At his school in Oklahoma, he surveyed junior high students and teachers and found that the students knew little to nothing about the war and unrest in the States during the '60s and '70s, and that the teachers felt there was a need to teach more about Vietnam.

Bill McCloud wrote to the people who directed, fought, protested, and reported on the war: politicians, POWs, nurses, military officers, protesters, soldiers, refugees, scholars, writers, and parents of soldiers who died. He asked the question, "What do you think are the most important things for today's junior high school students to understand about the Vietnam War?" The responses poured in.

From all these responses, Bill McCloud selected 128 letters for his book. Some of the people whose letters appear in the book are President Bush, former President Jimmy Carter, General Alexander Haig, General William Westmoreland, Robert McNamara, Henry Kissinger, Irene Faught (whose son was killed in Vietnam), Pete Seeger, Country Joe McDonald, and MG George S. Patton, to name a few.

While I was reading this book, I became very interested in what these people said, and what they felt was the most important thing to tell the students. Everyone had a different opinion, but they basically said the same things.

Before you read this book, ask yourself that same question. See how you would answer. What were the lessons learned — the reasons, ideas, and thoughts behind this war? Then read it. You will be surprised by what you find.

This is a great reference book for parents and teachers. It gives you the ground work to tell today's children, and generations to come, about the Vietnam War, the unrest back home, and the politics surrounding the war.

SFC ROBERT TORSRUD
Ft. Knox, Ky.

# Composite Bradley Under Test

The Army has been testing a Bradley Fighting Vehicle with a fiber-reinforced polymer composite hull that is 25 percent lighter than metal and provides better ballistic protection.

While the vehicle has an aluminum chassis to bear suspension loads, the left and right hull sections are large composite structures, and a composite bottom plate provides mine-blast protection. The interior bulkheads between crew and engine compartments are also composite.

Lighter sections of vehicle are composites replacing metal. Skirts are off the suspension in rear photo, above.

Below, front view shows mine protection plate on hull bottom. Vehicle is now undergoing 6,000 miles of testing.

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