

ARMOR

The Magazine of Mobile Warfare



January-February 1983

United States Army Armor School



"To disseminate knowledge of the military arts and sciences, with special attention to mobility in ground warfare, to promote professional improvement of the Armor Community, and to preserve and foster the spirit, the traditions, and the solidarity of Armor in the Army of the United States."

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Editor-in-Chief

MAJ CHARLES R. STEINER, JR.

Managing Editor

ROYCE R. TAYLOR, JR.

Assistant Editor

ROBERT E. ROGGE

Administrative Assistant

JEANNIE NEWTON

Contributing Artists

MARK W. IRWIN

GARY W. WILLIAMS

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COVER

The US horse cavalry fought its last valiant actions early in WW II and the 26th Cavalry played a vital role in the actions that delayed the Japanese advance in the Philippines, allowing the Philippine and US Armies time to retire onto the Bataan Peninsula. Captain Woodall tells the dramatic story of the 26th Cavalry on page 8.

LETTERS

Kursk Comments

Dear Sir:

I would like to comment on the three letters that you sent to me relative to my recent article on the Battle of Kursk.

First, the letter from Steve Zaloga. I must agree with him that the *T-34/85* and the *SU85* did not take part in the action around Kursk. I have investigated further and confirmed that these two vehicles came into the Soviet arsenal after that battle. As to the number of *Elephants* destroyed, I am inclined to agree with Steve, since even with additional digging, I cannot confirm a figure of 90 vehicles destroyed, only that 90 had been committed. My thanks to Steve for his interest and comments.

As to D. A. Newsom, who disagrees with the assumption that the battle was lost by the Germans before it began, I can only point to the comments made by Heinz Guderian in his book, *Panzer Leader*. Another German who was personally involved with the battle and its planning was F. W. von Mellenthin, quoted by me in the article. A third personality to be mentioned is Erich von Manstein, commander of Army Group South. In von Manstein's memoirs, *Lost Victories*, he outlines his misgivings about the operation. As it was, the German leadership in the field knew that the longer the attack was delayed, the greater were its chances of failure.

Lastly, Douglas K. Lehmann's in-depth summary of the Soviet combat engineer's contributions to the victory over the Germans greatly enhances our immediate knowledge of the "subtleties" of the action around Kursk. My thanks to him for taking the time to comment.

ROBERT P. ARNOLDT
Oak Park, IL

Tank Gun Weight Figures

Dear Sir:

I would like to offer the following comments on Captain Holly's interesting article on the 120-mm gun (July-August 1982 *ARMOR*):

First, the unclassified information will prove useful to those of us doing comparative analysis and, as such, it is much appreciated.

Second, the "gun" weight reported in the article is obviously only the weight of the recoiling mass (sometimes called the cannon, but is clearly the weight of the barrel, muzzle attachments if any, breech-block assembly, and any counterweights or other ancillary equipment.)

The weight of interest to most of us is the total weapon weight, which is the weight of all that's hanging on the trunnion: the weight of the recoiling mass and the weight

of the mount. For this confusion, we can thank our designation system which assigns an "M" number to the cannon, or recoiling mass, but usually leaves no specific designation to the mount assembly, other than an Ordnance drawing or part number.

For tank weapons, the mount weight usually includes that of the recoil (and counterrecoil) system, as well as that of the armored mantlet or shield. For the 105-mm *M68* weapon, I offer these weights as approximately representative of what's supported on the trunnions:

2,500 lb. recoiling mass, 3,200 lb. mount, including 1,500 lb. armored shield.

Unfortunately, I have no mount and shield weight estimates for either the US or German versions of the Rheinmetall 120-mm weapon, and cannot provide any data. Can anyone help?

DONALD J. LOUGHLIN
26499 N. Fairway Circle
Newhall, CA

Power Punch Tactics Rebutted

Dear Sir:

Captain Marc Baur's article "Airland Battle's Power Punch" (Sep-Oct 1982 *ARMOR*) was well-written and presented an interesting and informative thesis to the problem of slowing down a Threat attack. Like many theses, however, the captain has left unanswered (to the GRIT crewmen) many vital questions. Insofar as I have been able to determine, none of the authors who have appeared in *ARMOR* magazine offering their views on armor tactics (ground and air) have ever seriously taken into account the Threat reactions to whatever they have proposed.

It is foolish, nay, criminally stupid, to discount the Threat in any manner, most of all in the thinking powers of its commanders. One must always give the Threat credit for thinking at least as clearly and as imaginatively as we do. If, perchance, he does not exhibit this caliber of thinking when the chips are down, then we are that much ahead. But he must never be casually or thoughtlessly dismissed, which is what I feel that Captain Baur has done.

Captain Baur lists five phases of his proposed GRIT operation: insertion, movement, attack, hide, and return to friendly lines. Let us examine each of these phases to see where they would most likely go wrong.

Insertion. The proposal to allow the GRIT force to hide and permit the Threat attack to bypass it is extremely fallible. Any attack by the Threat is going to hit everything in its path, and its advance is certainly not going to bypass a "battalion or brigade-sized

unit." Such an eventuality is totally inconceivable. Some other method of getting behind the enemy's lines would have to be affected. Perhaps small units could attempt to punch through the attack and then rendezvous at a predetermined point in the enemy's rear. This method, of course, is as full of "ifs," "ands," and "buts" as is the captain's proposal. Rear echelons are alive with troops and transport vehicles of all kinds, and it is extremely unlikely that any single (NATO) vehicle could survive, let alone a group of fighting vehicles. Threat aircraft would be swarming everywhere and we must believe that the aircrews are trained in enemy vehicle recognition. Also, the author implies that the GRIT force is to "lie doggo" for a time before going into action. Such a tactic would require perfect visual camouflage and *no* movement of any kind by its personnel. Assuming these two factors are met—what about electronic surveillance? Such devices would quickly ferret out any group of hidden vehicles, with wholly predictable results. Insertion, therefore, is going to be the first major stumbling block to a GRIT force.

Movement. Any movement by a GRIT force behind enemy lines would, of necessity, be either counter-to or across the enemy's lines of movement and would be instantly detected. Such movement axes would bring the GRIT under immediate fire, thereby destroying it. The movement of any armored force, anywhere, attracts attention—and attention is the last enemy reaction the GRIT force needs.

Attack. The first shot fired by the GRIT force would seal its doom. The GRIT force may be able to carry out one attack in the enemy's rear, but that would be its last action. Threat forces would relentlessly hunt down and destroy every GRIT vehicle—just as NATO rear echelon forces would do if a Threat GRIT force showed up.

Hide. As mentioned above, hiding a GRIT force would be all but impossible before any fighting had taken place. Attempting to go into a "hide" after an action would be totally impossible. Imagine the hornet's nest that would have been stirred up! And, one must never discount the Threat battle police (KGB battalions) placed behind the fighting troops to "remove" anyone who retreats or shows signs of doing so. These troops, though lightly armed, would immediately signal the presence of the GRIT force to all the commanders in the area.

Return to friendly lines. Under the above circumstances, this maneuver would never be carried out. The GRIT force would have been destroyed.

The realities of combat would, I am afraid, preclude any viable use of a GRIT force as envisioned by Captain Baur.

CHARLES COWES
Major, Armor
HQ USAREUR

7th Cavalry Symbolism Queried

Dear Sir:

First let me say that I greatly enjoy your excellent magazine. I do feel, however, that as the "official" custodian of the *Cavalry Journal*, you should be much more careful in your research. I am speaking of the section titled "Symbolism" on the back cover of the September-October 1982 issue. You state, and I quote: "... after its virtual extermination in the Battle of the Little Big Horn in 1876..." Losses at the Little Big Horn were 268 men. This was unquestionably severe, but since the regiment numbered over 700, it hardly qualifies for virtual annihilation. There are enough myths about the Little Big Horn. Please don't be a contributing factor.

MIKE KOURY
P.O. Box 2243
Ft. Collins, CO

(The symbolism material in the above-mentioned unit history was extracted verbatim from Army Lineage Series, Armor Cavalry, Part 1, printed by the Office of the Chief of Military History, US Army, in Washington, D.C. We contacted the Institute of Heraldry, US Army, which prepared the symbolism material, and find that Mr. Koury's criticism is correct. We have been advised by the Institute of Heraldry that a correction to the lineage series will be published.)

GRIT Tactics Clarified

Dear Sir:

Major Cowes has failed to recognize one of the salient features of the modern battlefield: rapid movement on relatively narrow frontages results in exposed flanks and large areas devoid of troops. (See "Letters," this issue.) The Ground Interdiction Task Force (GRIT) exploits these features.

I do not propose to insert a GRIT by hiding it in a path of advance. Major Cowes should reread my article for clarification of this point. "Swarming aircraft" concentrate on the Threat's main effort, and follow-on troops and transport vehicles should bypass the initial position in the same way the combat units do. Good camouflage is essential, of course, but "perfect camouflage" is another of Major Cowes' straw men. No electronic devices in widespread use can detect cold vehicles on radio listening silence.

Lines of movement are only a little more real than grid lines. Moving across someone's line of movement draws fire only if they are there to see you and if they can shoot at you. Since the GRIT moves in the 25-100 kilometer gap between echelons, satisfying either of these conditions would be suicidal—to the Threat. Attention generated by such minor engagements would be detrimental to the GRIT's mission performance, but would assist in overloading the Threat decision makers.

As far as the GRIT's attack drawing a Threat counterattack—let them come on! The M1/M2 combination's firepower and survivability will require the Threat to divert

a disproportionate amount of combat power from his main effort to this minor fray, and will provide the sort of target for air or artillery interdiction the Airland Battle planners have in mind. This is the synergistic effect of the GRIT.

M1/M2 mobility allows a wide selection of hiding places. Again, camouflage doesn't have to be perfect. It must only delay the Threat long enough to prevent his successful deployment for counterattack. The "KGB battalions" mentioned by Major Cowes are not found in any other literature and appear to be his own invention.

The GRIT is intended to confront the Threat with a dilemma and to overload his decision-making cycle. He may choose to ignore it, and let the GRIT destroy combat support and combat service assets at will, or he may choose to divert precious resources from his main effort. In any case, it is just one more thing for him to worry about while he is trying to concentrate on his lead elements. Given the speed at which the GRIT moves, the violence of its attacks, and the competing intensity of the Airland Battle's main efforts, the GRIT is a very viable option.

MARK C. BAUR
Captain, Infantry
Fort Knox, KY

FISTV or TEAMPACK

Dear Sir:

The three photographs at the top of page 51 of the November-December ARMOR are not of the FISTV but are in fact photographs of the AN/MSQ-103A TEAMPACK radar monitoring system as described in column 2.

SINISA LAVRIC
Captain, Field Artillery
OARNG

(You are correct! See News Notes in this issue for a photo of the FISTV. Ed.)

Anniversary Congratulations

(The following letter was sent to Major General Louis C. Wagner, Jr., Commanding General, US Army Armor Center, by Major General Alan A. Nord, Commanding General, US Army Military Police and Chemical Schools/Training Center and Fort McClellan, Alabama. Ed.)

Dear Lou:

On the occasion of the 206th anniversary of the United States Army Armor Force on 12 December 1982, we of the United States Army Military Police and Chemical Schools/Training Center and Fort McClellan, Fort McClellan, AL, extend our heartiest congratulations and warm regards.

We are proud of the outstanding officers and soldiers of the Armor Force. They rank among the finest in the world. Their competence and dedication attest to the standards of excellence for which the Armor Force has become known.

We wish you continued success in answering the challenges we face at present and in building to meet those of tomorrow. Together, our continued efforts will help to form an Army team equal to any task in the new and challenging era which lies ahead.

Sincerely,
ALAN A. NORD
Major General, USA
Commanding

An Author's Rebuttal

Dear Sir:

I am writing in response to Mr. Zaloga's comments in the November-December 1982 ARMOR. I would like first to thank Mr. Zaloga for pointing out what could have been a popular misunderstanding concerning my comments on the Soviet T-72 and T-64 main battle tanks. In my previous letter concerning the status of the T-64 (July-August ARMOR) the word "current" or "best" used instead of the word "new" would have provided a less confusing description of the T-64's most probably position within the Soviet Army.

Secondly, I would like to discuss Mr. Zaloga's theory concerning the T-64. In his letter he contends that the T-64 had been plagued by engineering defects to such an extent, that it appears that the Soviets decided to field the T-72 "even though in many respects it was a retrograde step in Soviet tank design." This move by the Soviets, according to Mr. Zaloga, was caused by the more advanced and reliable capabilities offered by the T-72. This theory, while being true in some respects, fails to bring out two important events from the development history of the T-64. The first of these concerns the development of the Soviet M1970 or T-70 tank in the late 1960's. This tank consisted of a newly developed hull and suspension system mated to a new turret mounting the T62's 115-mm main gun. The second of these events concerns the upgrade program in the early 1970's that included all of the existing T-64s. This program consisted of the replacement of the 115-mm main gun with the new 125-mm gun. This new gun was also to be mounted on all new T-64s. Two questions can be asked at this point. Is it possible that all of the severe engineering defects that were reportedly attributed to the T-64 were in fact characteristics and problems belonging to the M1970 or T-70 tank? Is it also possible that the upgrade program for the T-64 that was conducted included more than the replacement of the 115-mm main gun? It seems that a large scale upgrade program that did not include improvements or fixes to defects identified year earlier, would be foolhardy at best. It can be determined from the above arguments that Mr. Zaloga's theory is not as solid as it might appear. These reported problems and defects, as dated as they are, may in fact refer to a tank that is no closer to the capabilities of the T-64 than that of a close relative.

JAMES M. WARFORD
First Lieutenant, Armor
Fort Knox, KY

COMMANDER'S HATCH

*MG Frederic J. Brown
Commanding General
U.S. Army Armor Center*



The Armor Force: Looking Ahead

I am deeply honored to be assigned as the commander of the Armor Center, the proponent of Armor. As the Home of Armor, Fort Knox serves a great branch—the combat arm of decision on the modern mobile battlefield.

We in Armor are much more than a tank corps. By our lineage and, as demonstrated by our patch, we are combined arms—tank, infantry, artillery. We think, speak, and most important, we execute combined arms. This has been a tough challenge over the years, but particularly today as combined arms are more capable and complex—well beyond the individual scopes of tank, infantry and artillery. As we reequip our army we have an impressive combination of equipment in our various units—armor, attack aviation, scout aviation, cavalry, infantry, artillery, air defense, and combat engineers—in various mixes for which we must provide command and control and sustain combat readiness for both Active and Reserve Components disposed globally. Furthermore, we face impressively modernized Soviet Union and Warsaw Pact armed forces. But I'm bullish as we press on, because we have a solid base from which to address difficult challenges—our combined arms heritage. We just need to bear down—exploit our strengths and improve our weaknesses.

Our strengths are considerable. First and foremost, the Armor Center is the guardian of our ethos of Armor—we think arms and services.

- We understand how to combine battlefield capabilities to crack, then break, the enemy; moving without pause to exploit inside the enemy's decision loop. We all are working to understand and execute if need be, the Airland Battle and Airland Battle 2000 as it evolves. We have lived combined arms on a highly mobile battlefield since WW I. As a branch, we are uniquely prepared to assimilate new doctrine and origin; to lead the way.

- We think soldiers—proud, disciplined, confident Americans, innovative, resourceful if properly trained and left with the flexibility to carry out a mission order. They are our most important asset. We in Armor understand particularly well the need for and use of mission-type orders, leaving our subordinates the flexibility to respond to the unforeseen in accord-

ance with the commander's concept.

- We think equipment—all of us: officers, noncommissioned officers and soldiers. We know we must master our equipment. We operate it as leaders—not through a radio telephone operator. We ensure our vehicle is combat ready before we, as leaders, rest—we know that if we can't communicate, we can't command, and that the bottom line is a target hit. We know we need to train, but we know we *must* maintain. We know how to fight and win, assisted by equipment. It's in our blood as a branch. We don't creep cautiously around. We plan thoughtfully, then execute carefully, but decisively—or we should.

- Last and, perhaps most significantly, we understand the complementary roles of the tank-infantry team and the cavalry, which are essential to exploitation of attack aviation and high-mobility ground attack capabilities.

These are the givens—the bedrock of our arm—which will cause us to adjust rapidly to our evolving tactical doctrine. But they don't come automatically. They are the product of long, hard work on the tank line, range, or major training area. We at Knox exist to support that effort.

The Home of Armor has other responsibilities. We need to chart new directions—or rediscover old truths—about how we prepare to fight.

- We need to demand tougher standards of quality—precision as we execute crew drill, follow up as we check range cards or stand to, attention to detail as we execute preventive checks and services. Nothing fancy or new. It's the grinding attention to detailed planning and checking before the violent execution. This has to exist in the unit, but the mark is set by the School.

- We need to capitalize better on our inherent strengths as Americans—knowing our mission, soldiers, and equipment, then giving our subordinates the running room to execute. We must, by our actions, encourage the initiative and innovation of our subordinates as they *master the basics* of moving, shooting, communicating, maintaining, and caring for our soldiers. We, as leaders, must ensure that they are technically and tactically competent, that they know the basics and themselves under stress and fatigue. Then we practice the mission-type order,

honing the self-initiation and independent execution that are vital to winning the Airland Battle. Lastly, we as leaders at all echelons must execute our fundamental obligation to personally train our subordinates; but we must reinforce the integrity of the chain of command as we do so. Again, it is a role of the Armor Center and School to start the training process of officer, NCO, and soldier.

•We need to make better use of our national capability in science and technology to improve our training. Not just to permit sustaining a higher level of proficiency in our units all the time (such as by using a conduct of fire trainer or laser engagement system) but also to permit us to train our soldiers at tasks too dangerous or too expensive to accomplish in peacetime. Examples might be moving, multiple, simultaneous flank tank engagements when under fire, using a laser, not bullets, or a night target handoff from a scout helicopter or fire support team to an attack helicopter, using a simulator or an engagement simulation. The bottom line remains steel-on-target, but that can't be a copout for lousy training when the steel is limited.

I have mentioned our new equipment, or old equipment in new hands, which is just as much a problem. Several aspects are particularly sensitive right now:

“The M1/M2/M3/AAH fire support interactions are the guts of combined arms. We need to develop practical ways to train ourselves to use these effectively wherever we may be assigned—whether that be an overseas urban area or local armory.”

•The M1/M2/M3/AAH/fire support interactions are the guts of combined arms. We need to develop practical ways to train ourselves to use these effectively wherever we may be assigned—whether that be an overseas urban area or local armory. The whole is much greater than the sum of the parts; but not unless we really know the parts—then train the whole. We at the Armor Center should develop ways to do this, then lead by example as we execute our training mission.

Regardless of whether we are members of the Active or Reserve components (AC, RC) we all have new capabilities at night and in survivability, mobility, and firepower. Some improvements are more significant than others—but each of these improvements must be exercised frequently—what, how, where, how often?—in a dispersed total armor force that has to fight with little warning. This is a tough problem of understanding and training in busy units! It is, and will remain, fundamentally a unit commander's problem but the Armor Center should describe a (not *the*) way to assist the responsible commander.

•Now that we are fielding the M1, where do we go next to maintain superiority in the means of heavy ground combat? We have a vital challenge to support responsible development of new capabilities for tank, cavalry, and attack aviation. We need to think through, together, not just improved mobility, firepower, and protection for tomorrow but, equally important, how can we upgrade what is fielded today as well as take advantage of existing stocks no longer in service but usable in total mobilization.

The measure of combat readiness, though, is much more than equipment. It is the totality of doctrine, organization, and equipment tied together by trained soldiers into cohesive units. The Armor Center must ensure that all of this “fits” in our operational commands; that at the Home of Armor we provide viable units to our field commanders. Whether derived from the responsibilities of Chief of Armor, requirements of pronency, or responsibilities associated with the fielding of Division 86 in Army '90 to fight the Airland Battle, the mandate is clear—field viable units (tank, ground and air cavalry, and attack helicopter).

All of us at the Home of Armor must pull together to support our AC and RC field commanders as we train skilled,

tough, proud, disciplined, ready soldiers on quality equipment in fighting organizations with clear, simple doctrine. To do this, we must listen *carefully* to what you in the field say. We will listen and will tailor our support accordingly.

This is a great time to move into the Commander's Hatch. It is an important and exciting time for the army, with the Armor Center executing an increasingly important role. I see this role in the form of an informal contract between myself and all of us at the Home of Armor and to you soldiers of

“We owe you a deep abiding concern about readiness of our Armor Force—soldiers and equipment blended into cohesive units tied together with solid leaders who are confident and competent.”

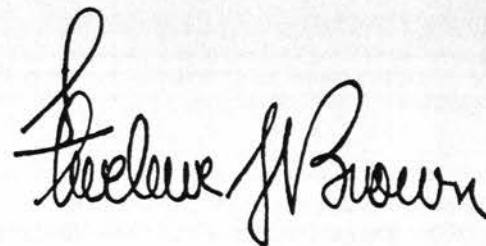
all grades and concerned civilians supporting our Total Force. We owe you:

•A deep abiding concern about readiness of our Armor Force—soldiers and equipment blended into cohesive units tied together with solid leaders who are confident and competent. Units with reduced turbulence and turnover, provided the wherewithal for solid training.

•A quality product from the school and training center—soldiers, doctrine, organization and equipment blended together with solid training.

We need from you steady feedback and comment. I guarantee that we will be listening carefully.

In sum, I am humble before the challenge of leading, and following, you soldiers of our Armor Force. We have a challenging course, but we're basically sound due to the great leadership of my predecessors. Much isn't broken—I don't intend to fix it. Where fine tuning is required, I will press on, listening *carefully* to field commanders of all grades. I am humble, but I am also proud—proud to have the opportunity to serve the finest fighting soldiers in the world—the American armor soldier. I shall do all I can to support you—our most precious military asset. Forge the Thunderbolt!



Major General Brown's most recent assignment was Deputy Chief of Staff for Training at Headquarters Training and Doctrine Command. His troop service includes command of a tank company (M48A1) in Germany, S3 of a mechanized infantry battalion in the Republic of Vietnam, command of a divisional cavalry squadron (M48A3) in Vietnam, and command of an armor-heavy brigade (M60A1/M60A2) at Fort Hood, Texas. Other assignments include command of a support group at Fort Campbell, Kentucky, Deputy Commanding General, Fort Knox, Kentucky, US Army Training Center Armor; and Assistant Division Commander Maneuver and Support, in Germany. He has also served as Division G-3 in Vietnam and as Division G-1/ Director of Personnel and Community Activities, Fort Campbell, Kentucky.

General Brown assumed command of the US Army Armor Center and Fort Knox on 4 January 1983, replacing Major General Louis C. Wagner, Jr., who was assigned as Director of Requirements, ODCSOPS, Department of the Army, Washington, DC.

CSM John W. Gillis
Command Sergeant Major
U.S. Army Armor Center



Meeting the Promotion Board

Once a soldier has been recommended for promotion by his unit and is scheduled to appear before the battalion/squadron promotion board, it is his noncommissioned officers' responsibility to prepare him for that board.

The best counseling tool to prepare soldiers for the board is the one most commonly overlooked. This is the board member appraisal worksheet (DA Form 3356), the actual form used by each board member to evaluate the soldier appearing before the board. There are eight areas on which the soldier will be evaluated. The NCO should explain to the soldier that in:

- Three areas right or wrong answers will directly affect his point total
- Two areas he can gain the maximum points authorized regardless of right or wrong answers to the questions
- Two areas his score depends on what he has done in the military and prior to joining the Army
- One area his attitude may gain him half of the points authorized, again without regard to right or wrong answers

The soldier's noncommissioned officer exerts the greatest influence on five of the eight areas of evaluation on the board member appraisal worksheet. He can guarantee his soldier as much as 150 board points by:

- Inspecting the soldier's uniform and correcting errors.
- Teaching the soldier how to sit properly and to maintain eye contact with board members.
- Ensuring the soldier refers to board members by rank.
- Ensuring that the soldier is prepared to talk about himself.

A soldier who does poorly in these areas is a product of a noncommissioned officer who just does not care about the soldiers he is duty-bound to lead.

These five areas as they appear on the worksheet are:

Personal appearance, bearing and self-confidence: Appearance has to do with uniform fit, items worn on the uniform and placed correctly, shoes shined, hair cut, etc. Bearing is simply presenting himself in a soldierly manner. Self-confidence is the confidence the soldier displays in himself. It is important to note that right and wrong answers have nothing to do with this area. It is *how* he says or does things, not *what* he knows or does not know. If he displays confidence, he should earn points!

Oral expression and conversational skill: This area is also based on *how* he says and does things, such as maintaining eye contact not *what* he knows or doesn't know.

Self-improvement (enrollment in military or civilian courses): All the soldier has to do is relate the appropriate information to the board. The soldier's *entire* civilian educational background can be used to award points. If he completed 60 semester hours of college prior to entering the Army, he should receive the maximum points . . . he has met the Army's goal!

Additionally, all military courses completed from the day the soldier joined the Army to present, should be presented. It should be noted here that the board should consider the soldier's duty requirements when evaluating how much he has done. The board should also consider whether or not the chain of command has given the soldier the opportunity to further his military or civilian education. If not (as in many cases), perhaps all of us in the command structure should share the responsibility for the soldier being penalized by what may equate to half the points in this area.

Achievements (include honors, unit training courses, etc.): The "etc." should not be overlooked in this area. Squad leader/platoon guide in BCT/AIT, acting sergeant, performing in a grade higher, letters of appreciation/commendation, certificates of achievement, and competing for Soldier of the Quarter/Month at any level are all part of the "etc." Achievements during prior service or service in another branch of the military are also considered.

Soldier's Attitude: Logic states that if the soldier does well in the four areas already discussed, he should earn at least half of the promotion points possible in this area.

In all of these areas the soldier can earn the maximum points regardless of the answer he gives. He can earn 150 out of the 250 total points possible without having to exhibit his knowledge on any specific subject.

In the other areas of evaluation on the worksheet, knowledge of world affairs, awareness of military programs, and knowledge of basic soldiering are those right or wrong answers that will affect the candidate's score. Study guides, practice boards in the company, one-on-one assistance, and other methods can be used to prepare the soldier in these areas. However, how well he does will depend on what he knows. How well he answers will determine the number of additional points awarded for the soldier's attitude.

The board member appraisal worksheet has been around for years in one form or another. Putting it to use as I have described will result in a high, but attainable, promotion board standard known and accepted throughout the command.

MASTER GUNNER'S CORNER

Tank Gunnery in the Berlin Brigade

The Berlin Brigade is aptly described as being unique. In the case of the brigade's only armor unit—Company F, 40th Armor—that word is particularly appropriate. We are the US Army's largest tank company and the only separate tank company on active duty. The problems faced in planning and conducting an effective tank gunnery training program within the confines of a city of over 2 million people resemble those of a Reserve Component unit and are totally "unique" in other ways.

Company F recently returned from its Level 1 gunnery deployment at the Bergen-Hohne NATO training area. Among the many challenges we faced, the most significant was the limited time available. Due to scheduling constraints we had:

- Two weeks for all predeployment training including Tank Tables I through VP, the tank crew gunnery skills test (TCGST), and a tank crew proficiency course (TCPC):
 - 28 firing hours (4 days @ 7 hours per day) for fire control system calibration, accuracy screening tests, and firing Table VIA;
 - 12 firing hours (4 nights @ 3 hours per night) for firing Table VIB;
 - 28 firing hours for firing Tables VIIA and VIIIA;
 - 9 firing hours for firing Tables VIIB and VIIB;
 - 14 firing hours for firing Table IXA or refiring Table VIIIA if any crews failed to qualify on Table VIII.

Obviously, we had to get the most possible value from every available minute both before and during the deployment. With that object in mind, the company commander, the first sergeant, and the master gunner carefully examined every aspect of the "normal" (FM 17-12) gunnery training program, and modified the company's internal program to fit the available resources.

The TCGST from FM 17-12-2 was modified only by eliminating the vehicle identification station. All personnel, except some new arrivals, were known to be proficient in armored fighting vehicle identification—there are *some* advantages of being permanently located 115 miles forward of the FEBA!

Each platoon was allocated one-half day to initially fire Tables I, II, and III, using the *Brewster* and *M55* laser devices. A single-tank laser range was established in one corner of our motor pool for this purpose. This laser range remained available to all crews for additional training after the four platoons had finished, and was useful for "hip pocket classes" whenever a tank commander had any available time.

We are also fortunate in having a 1/60-scale subcaliber tank range available where we can fire Tables IV and VP using the *Brewster* device and an *M16A1* rifle with the .22-caliber rimfire adapter. Using this range, each platoon fired Tables IV and VP twice during the day and twice at night.

The highlight of our home station predeployment gunnery training, however, was our TCPC. In its usual form of repetitious dry runs around a fixed course, "engaging" fixed targets with no indication of how well the gunner has aimed, this exercise is of little value. Therefore, we incorporated two highly significant innovations with training aids recently received at the Berlin Brigade Training and Audio-Visual

Support Center. These were the Infantry Remote Target System (IRETS) and the Multiple Integrated Laser Engagement System (MILES). We presented our crews realistic target arrays by using IRETS targets for the troop engagements, and additional IRETS target mechanisms slightly modified to lift lightweight plywood panels for tank targets. The IRETS' portability and small size permitted us to vary the scenarios to maintain crew interest and build proficiency in acquiring stationary and moving targets.

Our second, and perhaps most important, innovation was the installation of MILES sensors on all targets and MILES transmitters on the firing tanks. Each tank target had one number 3 sensor belt from a tank MILES system installed across the face of the panel and a kill-indicator light positioned near it. Troop targets were fitted with the man-worn MILES sensor harness. This system of target preparation provided positive indication of a miss, near miss, or hit on each round, thus enabling unit leaders to measure each crew's speed and accuracy on every engagement. Due to the limitations of the available local training area, the targets were generally located at somewhat shorter than normal gunnery ranges. The size of the plywood panels, however, was easily adjusted to present an appropriate sight picture for the gunners. This gave the crews a very realistic simulation of the gunnery qualification tables and proved to have a high correlation to their live-fire results during the actual deployment. Strong crews, identified on the TCPC, generally outperformed the weaker crews throughout the entire gunnery program. More significantly, all crews demonstrated noticeable improvement in both speed and accuracy after multiple runs on the TCPC course.

In order to make optimum use of the very limited range time available to us at Bergen-Hohne, it was decided that our Table VII would meet the full USAREUR Table VIII TCQC standards. In this way, crews that qualified on Table VII would not be required to fire Table VIII, thus leaving more range time and ammunition for the weaker crews. The success of our predeployment training is clearly demonstrated by the fact that 17 of our 22 crews qualified during the first firing of Table VII, and the remaining 5 crews qualified on the first firing of Table VIII. The high performance of our crews on the TCQC actually enabled us to save enough range time and ammunition to permit firing two section battle runs per platoon and for each platoon to participate in a combined arms live fire exercise. Had we used our ammunition firing Table VIII for all crews this additional training could not have been accomplished. In Berlin the ability to move, shoot, and operate as a well-coordinated section is critical. We deemed it essential that the tank crews that would have to fight together be given the opportunity to train together in a live fire environment.

Based on our experiences, we feel that the MILES/IRETS combination can provide significant tank gunnery training under conditions close to those of a real tank range without actually firing the main gun.

THOMAS P. CURRIER
Sergeant First Class
Master Gunner



A Classic Delaying Action

The 26th Cavalry in the Philippines

by Jeffery W. Woodhall

The history of American horse cavalry did not end with the Indian Wars, nor with WW I. In 1941, while the world watched in apprehension as massive armored formations wrestled for control of North Africa, a determined band of horsemen trained and waited for war with Japan. They were the 26th Cavalry Regiment (Philippine Scouts), and they were the last of the type of men who rode with General "Light Horse Harry" Lee in the Revolution. The 26th Cavalry's story has never been properly told. As today's cavalry is training to fight a war outnumbered and undermanned, their story, and lessons learned, should be focused on and analyzed.

In 1920, the American Expeditionary Force Cavalry Board recommended that since "the mounted combat of large bodies of cavalry is probably a thing of the past, cavalry units should be stricken from the Infantry Division, and the number of total (cavalry) units cut." The reorganization went into effect in 1921, and effectively cut the mounted force to less than half its former strength. Between 1922-1932 reorganization resulted in more cuts in units and personnel. The only bright spot for horse cavalry came in 1922 when the 26th Cavalry was organized in the Philippine Islands. This unit with two squadrons, each with two cavalry troops, one light machinegun troop, and a headquarters troop, was unique, as it was manned by Filipinos and officered by Americans.

However, the demise of the horse soldier accelerated in 1931 when Chief of Staff, General Douglas MacArthur, directed the Army to adopt mechanization and modernization "as far as is practicable and desirable." This type of pressure led to the establishment of a cadre for a mechanized cavalry regiment at Camp Knox in late 1931 and the mechanization of the 1st Cavalry Regiment at that post in 1933. In 1938 the War Department directed the mechanization of all remain-

ing cavalry units. The era of the horse soldier was thought to be over, except for the 26th Cavalry—for they had been forgotten. In early 1941, the 26th was beefed up, from 575 to 789 men, and one additional troop was added to each squadron. However, the regiment was still smaller than other cavalry regiments. About this time, a scout car platoon was assigned to the regimental headquarters and headquarters troop. The 26th had no artillery, but a considerable number of trucks were added. The regiment lacked antitank guns and mortars. In fact, there was no modern equipment or weapons in the entire regiment. Most equipment was WW I issue or older—some dating to the Philippine Insurrection.

The 26th Cavalry might have been short in men and modern weapons, but they were definitely stout in heart. The regiment was known as the best trained Regular unit in the Philippine Islands, if not the whole U.S. Army.

The reasons for the high state of training were many, foremost being that the regiment was a Regular U.S. Army unit with all the tradition and *esprit de corps* which that implies. Second, many of the Filipino career noncommissioned officers (NCO) had over 30 years service, and even though the regiment was fairly new, most of the NCOs had come from the old, island Cavalry Guard units. Third, even the lowest private in the Scouts held a very enviable position in Philippine society. Their service was fairly prosperous in a very structured prewar caste system where money and birthright dictated social status. Due to the benefits accorded them, the scouts were proud of their units and intensely loyal to their officers. The scouts actually considered themselves more American than Filipinos. This was not generally true of conscripted Philippine Army units.

Finally, the 26th Cavalry's officers were the best. Some, like General Jonathan M. Wainwright, Philippine Division Commander and Colonel Clinton A. Pierce, Commander,

26th Cavalry, were old-style cavalymen who never quite got over the days when cavalry meant horses, not smelly, noisy tanks. Others like Captain T. J. H. Trapnell would prove themselves again and again during the coming days.

The Islands were a lush paradise, and life was good in 1940. But it suddenly ended in the spring of 1941. The threat of war with Japan was imminent, and all dependents were ordered home to the U.S. General Wainwright knew that the old War Plan Orange (WPO-3), which he had helped draft in 1922 for the defense of the islands, had been dropped and the strategic plan was now to defeat Germany before Japan. WPO-3's main point had been that, in the event of invasion, the troops would immediately withdraw onto Bataan and hold there for up to 6 months and await reinforcements. But Army and Navy planners knew that even with the Pacific Fleet intact, due to the war in Europe, it would be at least 2 years before sufficient troops and equipment could reach the islands' garrison. So, almost a year before the islands fell, they had been effectively written off—the troops arbitrarily doomed.

To counter the shift away from WPO-3, General MacArthur was transferred from the Philippine to the American Army and placed in overall command on the islands. He instructed his commanders to plan to fight and defeat the enemy on the beaches. No withdrawal onto Bataan was planned. MacArthur believed the firepower of the Navy would be available to aid his beach defense and that the Army Air Corps would "add the decisive blow to any invading enemy." It is ironic that the massive modern technology MacArthur was planning to use against the Japanese would in reality devolve to a band of brave horsemen whom he had tried to do away with. They would give him his most impressive victories in the islands.

MacArthur created the Northern Luzon Force, commanded by Major General Wainwright, and the Southern Luzon Force, commanded by Brigadier General George M. Parker, Jr. The major units in the northern force were three infantry divisions and the 26th Cavalry. The southern force consisted of two infantry divisions. All of the Filipino-manned divisions were supported by artillery, but no tank units were stationed in the islands. General MacArthur requested that some be sent immediately, but only two federalized National Guard tank battalions, the 192d and 194th comprising a Provisional Tank Brigade arrived in the late fall of 1941. They were equipped with the new *M3 Stuart* tanks armed with one 37-mm gun and two, 30 caliber machineguns. However, the crews were untrained. General MacArthur firmly believed that the war with Japan would not start until April or May 1942 and was very optimistic about the readiness of his troops.

What General Wainwright found instead were units unprepared except for the 26th Cavalry. He made rough plans to do the impossible—defend 600 miles of open beach with untrained troops and understrength units. The one bright spot was the 26th Cavalry that had been training as though they were already at war. They never moved without full packs and wartime ammunition loads. Since the invasion was expected to come after dark, the 26th's night problems were stiff and exacting. Training was first perfected in the classroom and then moved to the field with platoons and troops competing. Each session was followed by blistering critiques that spared no one, including the regimental commander. Exercises were repeated to correct weaknesses. Blank ammunition of all calibers helped accustom both men and horses to gunfire. Special attention was paid to conditioning horses and pack mules. Horses were repeatedly loaded on and off trucks to accustom them to this mode of travel.

On the night of the 7 December (6 December in Hawaii), General Wainwright had dinner with Colonel Pierce. They talked of the old cavalry days and joked about the movie review of the week in the local paper; a new Errol Flynn film, entitled *Custer's Last Stand*. They hoped that history wouldn't repeat itself. Then he and Colonel Pierce rode their horses over to inspect elements of the 26th Cavalry and its pack train. After leaving Colonel Pierce, General Wainwright returned to his quarters and turned in at 2300. The next day the waiting was over.

When war exploded over the American fleet on the morning of 7 December, the 26th Cavalry was deployed as follows: Troop F was at Nichols Field (an Army Air Corps base); Troop A was practicing tactics in the field; small detachments of Troop B were on outpost duty at Baler and Dingalan Bays on the east coast of Luzon and the remainder of the regiment was at Fort Stotsenburg, Pampanga, about 60 miles north of Manila. When word of the Pearl Harbor attack came, General Wainwright ordered Colonel Pierce to place the regiment on full alert and they worked out details for dispersing the regiment to make it safe from air attacks. The

"The first day of war was one of mass confusion supplemented with impotent rage when Clark Field, the major Army Air Corps base, was bombed and the bulk of the Army Air Corps in the Philippines was destroyed on the ground."

bulk of the regiment was to be moved into a concealed bivouac about 3 kilometers north of Fort Stotsenburg. Troop F would rejoin the regiment by forced march as soon as possible. In less than 3 hours, the regiment was moving with all equipment and ammunition—the 26th Cavalry was going to war.

The first day of war was one of mass confusion supplemented with impotent rage when Clark Field, the major Army Air Corps base, was bombed and the bulk of the Army Air Corps in the Philippines was destroyed on the ground. Fort Stotsenburg was attacked at the same time, but with little effect. Troop F rejoined the regiment on 10 December, and recently promoted Major Trapnell learned from the Regimental S3, Lieutenant Colonel William E. Chandler, that General Wainwright had ordered the 26th Cavalry to act as a mobile reserve for the Northern Force and to remain where they were until further notice. The regiment bivouacked in the Bamban River valley.

On the afternoon of the 10th, General Wainwright ordered Colonel Pierce to move the regiment to a position in the hills northeast of Clark Field to cover potential drop zones to preclude an expected enemy paratroop drop to seize the airfield. Prior to the moveout, an urgent message was received that enemy paratroops were landing in the vicinity of Cabiao, about 50 kilometers west of the regiment.

Colonel Pierce asked for a platoon of tanks from the provisional tank brigade and a platoon of self-propelled 75-mm guns from the artillery. He dispatched the 2d Squadron under their new commander, Major Trapnell, to destroy the enemy paratroops. The remainder of the regiment, less Troop G which was dispatched to relieve the elements at the Baler and Dingalan Bay area, was to screen northeast of Clark Field from Mabalacat to Wardville.

Early the next morning, the 2d Squadron reported that no enemy paratroops were found and that the parachutists had been U.S. pilots shot down by Japanese pilots. The screen also had not turned up anything and the regiment was ordered to return to a new bivouac in a woodline along Taconda Hill, 3 kilometers south of Fort Stotsenburg. Although not as

safe as the first bivouac site, being smaller and more open, the regiment would be closer to likely enemy drop zones. During air attacks approximately 40 horses and 20 troopers were wounded and 2 soldiers were killed. After the bombing, one section of the regimental scout car platoon, was dispatched to the infantry forces at Tuguegerao, to enhance communications in the Cagayan Valley.

As a result of constant air attacks, Colonel Pierce ordered officers' calls and meetings to be held at the regimental headquarters building at Fort Stotsenburg, believing that the air attacks there had ceased. This worked well until, Major Ketchum, Commander of the 1st Squadron, and his officers had to abandon the headquarters through windows and doors when the building was bombed and strafed. No one was hit, but Colonel Pierce had had enough and received permission from General Wainwright to move the regiment to a more concealed assembly area, south of Clark Field. Early on 13 December, the regiment began to move and completed it without any losses, due to wide dispersion and the regiment's excellent march discipline. However, at the time, the Japanese Air Force was elsewhere supporting the first, yet undiscovered, landing of troops at Aparri, on the northern tip of Luzon. When discovered, these landings were believed to consist of only two reinforced infantry companies. General Wainwright believed that the main landings would come in the Lingayen Gulf area and the Aparri landings were "nothing more than a decoy." As a result, he did not oppose them.

Late in the afternoon of 13 December, General Wainwright moved his Northern Force headquarters to Bamban, 20 kilometers north of Fort Stotsenburg. In the early morning hours of the 14th, General Wainwright ordered the 26th Cavalry to move quickly to Bamban to plug any gaps in the lines as the Japanese forces advanced. This was very important now that hostile landings had also been confirmed in the west at Vigan, located just north of the Lingayen Gulf. If the main landings were still to come in the Lingayen Gulf area, the 26th Cavalry would be the only trained unit that General Wainwright could throw at them. Also, if the landings at Vigan and Aparri were, in reality, the beginnings of the main landing effort, then the 26th Cavalry would be in position to reinforce other Philippine Army units already engaged.

By 15 December it became apparent that the worst was happening. The untrained Filipino troops were no match for the Japanese forces who were rapidly driving south from Vigan toward Lingayen Gulf. General Wainwright now knew that the main landings would take place at Lingayen Gulf, and if the enemy force at Vigan was allowed to come in contact with the forces defending the gulf, his troops would be fighting on two fronts and would be unable to defeat the landing force. Therefore, the 26th Cavalry was ordered to Vigan, and Colonel Pierce was told to either defeat or delay the enemy long enough to allow the main Japanese landing at Lingayen Gulf to be defeated. During the night of 16 December the 26th Cavalry, now numbering 699 men and 28 officers, began moving toward the town of Rosales, where Colonel Pierce believed he could launch a counterattack against the Vigan force if they broke through the Philippine Army units and continued down the coast toward the gulf. The regiment arrived in Rosales before daybreak on the 18th, where it remained for 2 days. On 20 December the Regiment was ordered to dismount Troop C and send them north of Bowtac to guard the critical mountain road that would connect the Aparri hostile forces with those in the Vigan area. Troop C turned their horses over to Troops A and B, mounted school buses, and moved north, never to rejoin the regiment until they were in captivity.

The fight against the Vigan force grew critical when the

Japanese slipped across a mountain range that was thought impassable, and struck the Filipino force that had been containing them on the right flank. The Filipinos broke, allowing the Japanese to flood into the coastal valley along Lingayen Gulf and to capture the town of San Fernando, in La Union province on the gulf. General Wainwright, disturbed that his line could be broken so easily, ordered Colonel Pierce to counterattack north immediately since the regiment was only about a 2-hour march south of the enemy lines. The 26th Cavalry, while underway and under air attacks, received further orders attaching it to the 11th Infantry Division, Philippine Army (PA), and calling for it to halt at Pozorubio and await further orders. The 26th Cavalry waited on the orders all through the night of 21 December. Only the animals were fed and watered that night. Troopers later reported that that night's lonely vigil was the longest they could remember. At 0300 hours the order was given to move "with all possible speed" to Rosario to help the 71st Infantry (PA), which had been ordered to secure the Manila north road to preclude further southward movement of the Vigan force. But before the regiment could move, it received reports that the Japanese had landed troops at Banang, just southeast of San Fernando, and at Agoo, southwest of Banang, cutting off the 71st Infantry with repeated attacks from the flanks and rear of the unit dividing it in two. The situation was rapidly deteriorating even though the bulk of the Japanese invasion force was still aboard ship. General Wainwright realized the only hope was to keep the enemy

"No fewer than five separate trails, all originating from the Japanese-held Agoo region, entered the road at various points and could allow the enemy to bypass defending units almost at will."

from advancing farther south and cutting off the remainder of his troops still defending the beach area. General Wainwright also knew that the Japanese were heading for Manila and it was necessary for him to hold up the enemy's southern advance. The 71st Infantry must be left to fight its own battle.

General Wainwright ordered Colonel Pierce to hold the enemy advance at a line along the Damortis-Rosario road. The scout car platoon was detached and sent to Damortis to gather intelligence for General Wainwright's headquarters, since the enemy that had landed at Agoo was flooding onto the gulf plain and threatening Damortis.

The weary days and nights of marching and counter-marching appeared to be at an end and the 26th Cavalry moved to their positions north of the road and prepared to fight and die to hold the invading force. General Wainwright believed that the 26th Cavalry was his last hope. They had to give him enough time to remove the remainder of his beach defense force before it was encircled. In fact, he remarked to his chief of staff that, "The 26th [cavalry troopers] are the only ones sure to stop them (the Japanese) from being in Manila in a few hours."

Colonel Pierce knew his regiment would fight, even though they suffered a severe lack of food and sleep. They were under strength, having detached troops, C and G, the scout car platoon, and 85 key NCO's and officers for staff and command duties in other Philippine Army units. They had no artillery, and Colonel Pierce wondered how long they could last. General Wainwright received five tanks of a battalion he had requested for the 26th Cavalry. However, due to a lack of fuel and their late arrival, the tanks added nothing to the battle of Damortis.

The biggest problem facing the 26th Cavalry in holding the Rosario-Damortis line was the road itself. It was a hard-

surfaced road winding through the foothills between the two towns and its curves hindered observation and fields of fire. To the north were the mountains of north Luzon, and to the south was heavily wooded, rolling terrain. Additionally, no fewer than five separate trails, all originating from the Japanese-held Agoo region, entered the road at various points and could allow the enemy to bypass defending units almost at will. Colonel Pierce decided that the key to defending the line was to move the regiment to Damortis, and delay back to Rosario, rather than to defend the easily breachable line between the two towns. This way, the 26th could keep the enemy forces to their front and prevent them expanding south and west toward Rosario without first defeating the regiment.

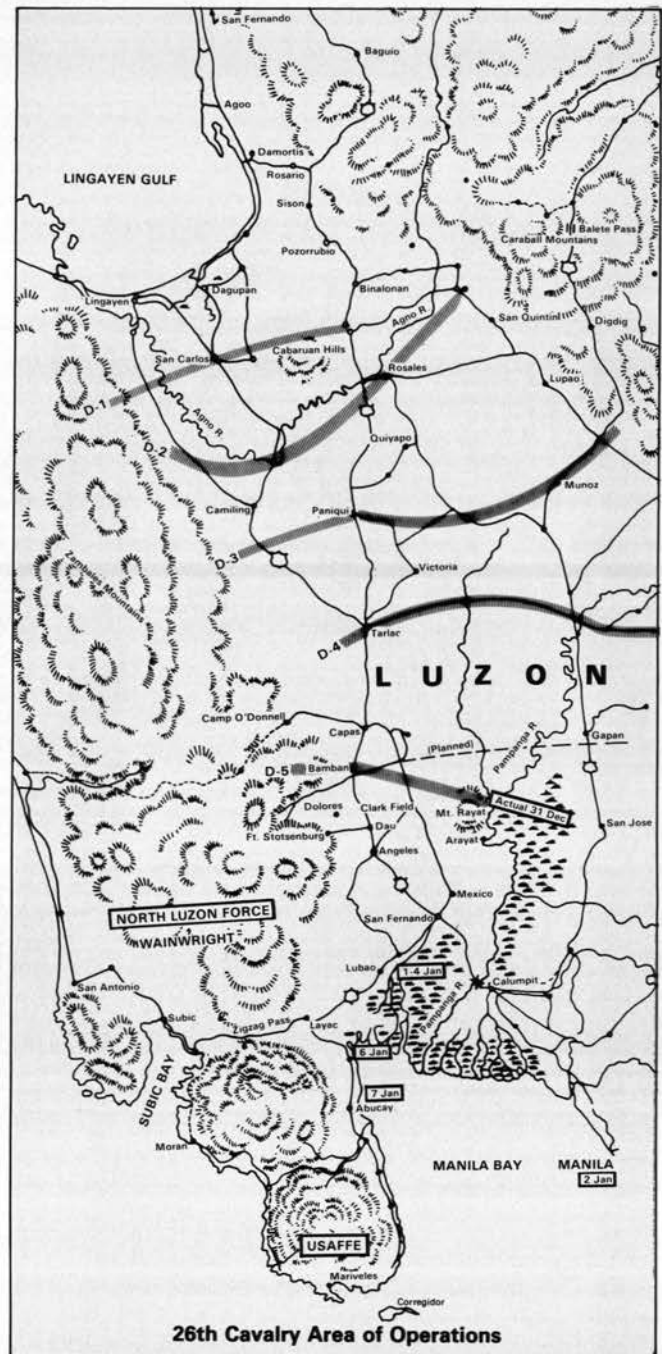
It was a dangerous gamble since the enemy might be able to slip forces behind the regiment by infiltrating toward Rosario on the trails from Agoo. Colonel Pierce did not forget those trails, and broke Troop F into three strong patrols, each reinforced with a machinegun section. They were ordered to advance northward along each of the three largest trails until they made enemy contact. Then they were to delay back toward the road, falling back under extreme pressure. Smaller patrols were picketed along the two smaller Agoo trails. The remainder of the regiment started for Damortis. Colonel Pierce arrived on high ground overlooking Damortis around 0900 and immediately linked up with the scout car platoon. The platoon leader informed Colonel Pierce that he was in contact with strong Japanese forces about 1 kilometer north of Damortis, and that at least 30 enemy ships were in the gulf unloading troops and equipment, with about 45 other ships standing by. Colonel Pierce could mark his regiment's advance from Rosario by watching the Japanese divebombers and fighters attacking the road below him. By 1300 the regiment began closing on Damortis, but losses to air attacks had been heavy.

Colonel Pierce ordered the 1st Squadron (-), to take up defense positions about 600-800 meters north and 500 meters east of Damortis. The 2d Squadron (-) would establish a second line along the road about 3-5 kilometers east of Damortis. The machinegun troop (-) was supporting the flanks of the regiment and protecting the regimental CP on a hill about halfway between the squadrons.

The defensive positions were almost totally lacking in overhead cover and were occupied under a hail of bombs and bullets, but the discipline of the regiment held and no troopers broke under the heavy, continuous attacks. By 1230 the positions were occupied and the thin line of cavalrymen was about to do battle with the entire Japanese invasion force.

They did not have long to wait. Shortly after 1300 hours the enemy struck the 1st Squadron with infantry, tanks, artillery, divebombers, and naval gunfire. It soon became apparent that the 1st Squadron could not hold on very long, even though they were extracting a terrible toll from the Japanese attackers. Finally, around 1440, Major Ketchum requested permission to withdraw to the second defensive line, which the 2d Squadron had been preparing. Before the withdrawal could be executed, the machinegun platoon, which had been attached to the 1st Squadron and guarding the regimental left flank, was overrun by enemy tanks. Major Ketchum ordered the withdrawal to continue, but threw a desperate mounted counterattack at the tanks hoping to save some of the machinegun platoon.

A composite platoon from Troop A attacked the enemy tanks with hand grenades and pistols while riding among and past the vehicles. The surprise cavalry charge allowed some members of the machinegun platoon to rejoin the regiment and the remainder of the 1st Squadron to withdraw at a full gallop past the regimental CP toward the regimental lines. The cost had been high for Troop A for it had lost



about half of the counterattacking force, but the enemy tanks halted in confusion. It is believed that one enemy tank was destroyed. Colonel Pierce found it hard to hold his position and was reinforced by a company from the 12th Infantry (PA), a company from the 71st Infantry (PA), and 5 tanks of the 2d Platoon, Company C, 192d Tank Battalion. These tanks started up the road toward Damortis to support the regiment, but would arrive too late to help. Meanwhile the regimental CP was fighting as the rear guard against the Japanese who had again begun to advance. Fortunately, Troop A's attack had made the enemy hesitant about entering the draw through which the 1st Squadron had escaped, for they feared another attack on their armor while in the confined area. Troop A by this time, around 1500, had successfully slipped east and was headed crosscountry to rejoin the regiment, leaving only the CP and the machinegun section to guard the right flank. Colonel Pierce started moving



Japanese 75-mm guns like these battered at the 26th Cavalry during the rearguard fight to Bataan.

the remainder of his force back toward the second position, and by 1530 the regiment was in place along their second position, halfway between Damortis and Rosario. The five tanks arrived and moved past the regiment's defensive position, heading back along the road toward Damortis. Somehow, they ended up a little north of Damortis, headed toward Ago, when the lead tank was destroyed by enemy tank fire. The other four tanks, each struck by light antitank fire several times, quickly retreated back toward Rosario. No enemy tanks were reported destroyed.

The battle of Damortis ended by 1900 when the Japanese took control of the town and the surrounding area. The battle had not been a victory for the 26th Cavalry, but they had held the enemy for about 3 hours, and the road to Manila was still denied the Japanese. Although the regiment had suffered severely during their baptism of fire, morale was high and they dug in to await the enemy's new advance.

By 1700 hours on 22 December, the regiment had completely closed on its second defensive line, which was now about 5 kilometers west of Rosario, with Troop E astride the road and Troop A farther to the right. The machinegun troop was closer to Rosario and regrouped with the regimental CP.

Around 1730 hours, the four surviving tanks returned to Rosario and their crews informed Colonel Pierce that they had been ordered by the provisional tank brigade commander, to operate forward of the 26th Cavalry to provide early warning until 2000 hours, or until the regiment's reorganization was completed. No mention was made that the tankers were to also cover the withdrawal of the 26th Cavalry from Rosario to a new defensive line, which appeared to be the basis of the newest orders from the commander of the 71st Infantry Division (PA), to whom the 26th Cavalry was now attached. Contact with Japanese forces along the 26th Cavalry's front had been lost, but Troop F was resisting increasing enemy pressure along all five of the Ago-Rosario trails. Colonel Pierce told his squadron commander to quietly prepare to withdraw, for he knew that with Troop F

slowly being pushed back by superior numbers and massive firepower, their current position could not be held.

At 1900 the 71st Infantry Division ordered the 26th Cavalry to march to Agat and guard the right flank of the Division along the Bued River. The four remaining tanks would be the rear guard for the 26th Cavalry. Colonel Pierce was ordered to the division commander for a briefing and would link up with the regiment at Agat. Troop A was to deploy on the road at 1930 in columns of twos and proceed at a slow walk while Troop E moved in behind them.

Meanwhile, the depleted tank platoon started moving through the regiment, headed toward Rosario. Lieutenant Colonel Lee C. Vance, regimental executive officer, stopped the tankers and informed them of their new orders to rear guard the 26th Cavalry. The tank platoon leader said he could not disregard his original orders to depart at 2000 hours and that he did not belong to the 71st Division or the 26th Cavalry but, rather, to the Provisional Tank Brigade. Colonel Vance asked him if he had been in contact with the enemy and was told that they had not seen anything, and that the enemy must still be around Damortis. Closely pursued by the motorcycle-borne regimental S3, Lieutenant Colonel Chandler, who was intent on getting the tank support straightened out, the four tanks rumbled toward Rosario.

What really happened in the next few minutes may never be sorted out. Some say that a lieutenant from Troop E yelled something about a fifth tank and opened fire on the vehicle as it rounded the corner, moving toward the horseman. Others say it was Captain Wheeler, the troop commander, and yet still others say that all hell just broke loose when enemy tanks suddenly opened fire without warning from point blank range. If nothing else was apparent, there is no doubt that the Japanese tanks had been right behind the American tanks as they moved out, and now were right in the middle of the regiment in the pitch darkness.

Individuals attacked the tanks with small arms and hand grenades, but the majority of the regiment was utterly con-

fused. Attempts to get the regiment off the road were thwarted by barbed wire on the left and steep embankments on the right. Near panic broke out as some troopers tried to calm their terrorized mounts in the darkness, lit only by muzzle flashes. The horses were crashing into each other, sometimes unseating riders or running headlong into the enemy tanks. Colonel Vance ordered a retreat to Rosario, and the troopers raced down the road in disarray.

Some troopers were seen on top of the enemy tanks, either grappling with other shadowy figures or firing small arms into the open hatches. It seems that Japanese crewmen did not button up, so the open hatches provided the only way for the horsemen to disable a tank. (Later, the troopers would perfect a maneuver to attack a tank with four horse-mounted troopers each attacking from a different direction. At least one might make it to the tank and attempt to disable it with grenades. This maneuver became a Bataan legend and is often told to illustrate the bravery of the 26th Cavalry.)

Troopers died trying to hold the enemy armor with little more than their bare hands while others were unhorsed and trampled by terrified mounts running completely amok. More died from the constant streams of enemy tank fire.

There was barbed wire on both sides of the road so they could not deploy. Captain Wheeler heard Major Trapnell

"The 26th Cavalry was fighting with a stubbornness never before encountered by the Japanese troops and the invaders were being slowly pushed back by the horsemen."

calling his outfit and found him at a bridge. Major Trapnell wanted to defend the bridge but he and Captain Wheeler seemed to be the only ones left. At that moment Lieutenant Michelson of the Veterinary Corps came up with the veterinarian truck. The three officers then pushed the truck, which had now stalled, onto the bridge, poured gasoline on it and the bridge, and set it afire. For this action, the three officers were later awarded the Distinguished Service Cross.

The regiment had hoped to regroup in Rosario but upon arriving there they found Troop F fighting Japanese in the town square and the regiment continued through town toward the Bued River. Order was quickly restored, mostly as a result of Lieutenant Colonel Chandler, who, while returning to the regiment, was knocked off his motorcycle by a riderless horse, which he wrestled under control and mounted. Lieutenant Colonel Chandler began riding up and down the column, calming the troops. Troop F continued as rear guard until Rosario was cleared.

The day's fighting had been hard for Troop F, since they were only about platoon strength when they broke contact. General Wainwright was very surprised when Colonel Pierce told him that the 26th Cavalry only had 175 effectives upon reaching the Bued River. The next couple of days saw the 26th Cavalry's strength grow, as stragglers and groups of men cut off earlier slowly made their way back to the regiment.

It is estimated that on 22 December the actual losses were 150 killed or wounded. But General Wainwright had been able to extract his other forces and was ready again to oppose the Japanese advance with what was thought to be a unified line.

During the night of the 22d and the early morning hours of 23 December, the regiment was able to stop for a few hours along the Bued River line. General Wainwright instructed Colonel Pierce to hold the river crossing at Agat, and keep

the old road to Baguio open to allow any cutoff troops to rejoin friendly lines. Some intact units of the 71st Infantry Division did come through during the night, but would not join the defensive effort and continued to the rear. The depleted 26th covered the withdrawal of the 71st Division until around 0900 on 23 December. Then they blew up the bridge right under the noses of the Japanese and withdrew to Pozorubio to reorganize.

General Wainwright was determined to give the 26th Cavalry some rest and ordered them out of the line and moved them about 12 kilometers farther south to a position

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near Binalonan, the headquarters of the 71st Division. Movement began after dusk, and was completed by 0100 on December 24th. The march had been a nightmare; the troops had been without food or sleep since 21 December, and were utterly exhausted. Even though the regiment was behind enemy lines, Lieutenant Colonel Chandler ordered outposts to be established north and west—just in case.

Meanwhile, General Wainwright was planning a counterattack to cut off the southernmost Japanese units and had requested that his old Philippine Division be attached to him. When the request was made to General MacArthur, General Wainwright was surprised to learn that not only was the answer no, but that the old WPO-3, the retreat onto Bataan, was in effect and to be executed immediately.

The news was hard for General Wainwright to accept. He knew that the retreat onto Bataan probably meant their death. Also, he had hoped to attack at least once more since

"The Japanese admitted, later, that their attempt to cut off the defending forces before they could move onto the Bataan Peninsula was a complete failure, due mostly to the delaying tactics of the 26th Cavalry."

he believed that the enemy was disorganized and could be defeated. Years later, a senior Japanese commander bore out that belief when he said, "We feared more than anything one more counterattack from the exhausted Philippine-American troops, since it might have driven us into the sea because of our confused state."

General Wainwright realized that it would do little good to force the issue with General MacArthur since the order had already gone out, and units were moving toward Bataan. General Wainwright told his aide that, since the next day was Christmas Eve, he would visit the 26th Cavalry and the 71st Division in the morning and personally deliver their orders. This morale-building trip would almost cost the general his life.

The fortunes of war again turned against the 26th Cavalry. At approximately 0500, Colonel Pierce and his staff were awakened by outpost messengers reporting that enemy tanks and infantry were attempting to overrun their positions. A bivouac defense was established and by 0530 heavy fighting was raging. The 26th Cavalry was fighting with a stubbornness never before encountered by the Japanese troops and the invaders were being slowly pushed back by the horsemen.



In 1941, troopers of the 26th Cavalry fought Japanese tanks like this with their bare hands, pistols, and hand grenades. They had little success. By 1944, however, it was a different story. This

tank was knocked out on Leyte by an antitank gun manned by soldiers of the 32d Infantry Division who had helped make good General MacArthur's promise to return to the Philippines.

Colonel Pierce kept looking for help from the 71st Division and wondered how such a large enemy unit could have bypassed this force. His questions were answered when the enemy had been forced northwest of the town of Binalonan, and Colonel Pierce entered it to find it completely empty—the 71st Division was gone!

Around 1130, a very angry General Wainwright arrived in Binalonan, after almost being killed or captured by a splinter group of Japanese infantry and tanks, which had worked behind the 26th Cavalry and cut one of the two roads into the town. There was supposed to have been a whole division there, and what did he find? Nothing. Major Trapnell and some others who were supposed to have been out on the line were filling soda bottles with gasoline to use on enemy tanks. General Wainwright asked where Colonel Pierce was, and a trooper pointed in the direction of the sound of heavy firing. He found Colonel Pierce at the regimental command post a scant 400 meters from the enemy lines and under mortar, tank, and small arms fire. The mere presence of General Wainwright and the absolute calmness of Colonel Pierce inspired the troopers.

By 1300 the fighting had slackened, and General Wainwright ordered the 26th Cavalry to delay to the Agno River where he believed the 71st Division had gone. Colonel Pierce moved all of his wounded south by 1400 and began to plan the delay. By this time, General Wainwright had departed unescorted in his Packard sedan. The fighting continued until about 1530, when the 26th Cavalry withdrew by trotting 5 minutes and walking 5 minutes—all the way to the Agno River and the village of Tayug. The last men out of the battle area were Colonel Pierce and Colonel Vance, on foot, and leading their horses. The losses of key personnel during this battle were heavy with Lieutenants Vanderlester, Bowers, and Mark killed. Lieutenant Mark was killed when he singlehandedly attacked a tank which was cutting his platoon to pieces. The tank withdrew after killing him. The most serious loss was Major Ketchum who had gone to the right flank of his squadron during the heaviest period of fighting and was never seen again. All of the regimental records, journals, guidons, and standards were lost when a

scout car in which they had been carried was destroyed.

Despite the losses, the 26th Cavalry accomplished a masterful job and, except for the Japanese troops who had bypassed and almost bagged General Wainwright, they had stopped the Japanese advance cold. This allowed the first defense/delay line, D-1, on the Agno River to be established. General Wainwright, in his after-action report, stated, "I was personally present during a portion of this fight and cannot speak in too glowing terms of the gallantry and intrepidity displayed by Colonel Pierce and all officers and men of the 26th Cavalry on this occasion. This devoted little band of horsemen, weakened by detachments and by heavy casualties sustained at Damortis on the 22d of December, held up the advance guard and caused the deployment of the enemy's main column. It effected a delay of 9 hours and maintained the best traditions of the American cavalry. The 26th Cavalry clearly lived up to its code name of MIGHTY that day. I speak of this from the point of view of an eyewitness."

The general withdrawal onto Bataan would actually begin on Christmas Day once the 26th Cavalry was in place. Then the 71st Division would withdraw to Umingan while the regiment held the river crossing at Tayug. It was a memorable day, since the troopers were fed for the first time in three days. Colonel Pierce informed General Wainwright that since Damortis, his losses were approximately one-third of his total force. Around 1200 on Christmas Day, the Japanese attacked the regimental scouts along the northern bank of the Agno, and by the early evening had forced the troopers back to the river itself. The 2d Squadron had already established a defense on the other bank and allowed the scouts to pass through before blowing the bridge. The Regiment knew the river banks were too muddy for enemy tanks to cross, so they continued to harass the enemy as they tried to repair the bridge. By the time the Japanese had repaired the bridge enough to allow some troops to cross, they found that the 26th Cavalry had vanished. They had, just minutes before, pulled out at a trot. The maneuver was best summed up by Lieutenant Colonel Chandler who said, "It was a beautiful exhibition of careful planning, timing, and execution by dis-

ciplined troops, permitting the last moment of delay to be extracted from the operation."

Since the main defending units had now reached the D-3 line, Colonel Pierce found that there was no point in remaining forward of that line, and started moving toward Umingan, and safety. On the way, the cavalrymen played havoc with the Japanese advance by destroying eight bridges between Tayug and San Quintin. Two troopers were lost. The Japanese admitted, later, that their attempt to cut off the defending forces before they could move onto the Bataan Peninsula was a complete failure, due mostly to the delaying tactics of the 26th Cavalry. One Japanese officer said it was like fighting "spirits and devils." In fact, the delay had been so successful that General Wainwright ordered the 26th Cavalry to move to Santa Rosa to become the Northern Luzon Force reserve. When the regiment arrived at Umingan at 0600 hours on 26 December, Colonel Pierce learned of the new orders. He realized that Santa Rosa was just too far for tired men on horseback to reach without marching day and night and the current physical state of the men and horses would make it impossible. He put the unit in laager and went to visit General Wainwright, who was gone, but his

"The door had been slammed in the faces of the enemy, but for the 26th Cavalry it was the beginning of the end."

chief of staff approved a change of location. Their new bivouac site would be the town of Mexico, well behind phase line D-5. Since the horses and men were in such bad shape, the regiment was told to take its time reaching the new rest position.

Colonel Pierce also received the good news that Troop G would rejoin the regiment at Mexico, and the scout car section would rejoin the unit before it reached Mexico.

Except for Troop C, which was still in the northern mountains, the regiment would be back together for the first time since before the war. The regiment left Umingan at 1900 hours on 26 December, and did not reach Mexico until 0130 hours on the 29th.

Colonel Pierce told Colonel Vance as they watched the troops close on their new bivouac that, with just a little rest, the regiment would be ready again. Fate would intervene again as the Japanese made determined attacks against the D-5 line that ran along the Bamban River. Fearing an early breakthrough, General Wainwright ordered the 26th Cavalry north to Porac, 26 kilometers behind D-5.

Colonel Pierce immediately sent Lieutenant Colonel Chandler to plead with General Wainwright's headquarters for a few days delay. A 24-hour delay was approved and the regiment left Mexico at 1900 hours on 30 December. They marched over 60 kilometers and reached Porac by midnight. The regimental reorganization was as follows: Troops E and F were combined into one troop, and along with Troops A and G, were horsemounted and under the command of Major Trapnell. Troops B and the machinegun troop were mounted in trucks, buses, and even some British Bren carriers (armored, track vehicles) that had been found. This composite troop was commanded by Captain Joe Barker, Jr.

On 1 January 1942, the Japanese attacked D-5 and, by the end of the day, the door to Bataan was held open by only two badly battered Philippine Army Divisions—the 11th on the left and the 21st on the right. The 26th Cavalry was determined to hold the center. Fortunately for the 26th, the attacks on D-5 slowed and then stopped as the Japanese realized that the city of Manila, only 24 kilometers away, was wide open. The Japanese commander raced to the city

for he believed that when Manila fell, Bataan would fall in only a few days. Instead, it took 4 more months.

The blow fell on 4 January when fresh attacks broke the line of the 21st Division which, in turn, forced back the 11th Division. By now, the gateway to Bataan was only 20 kilometers wide and closing fast. The 26th Cavalry passed troops through both divisions and covered their withdrawal to Danpe, executing a delay until reaching Danpe around midnight. Early on the morning of 5 January, Colonel Pierce told General Wainwright that the withdrawal would have to be accomplished soon, for he did not know how much longer the gate could be held open. General Wainwright ordered the final withdrawal around 1000 on the 5th.

The 11th and 21st Division quickly fell back on, and began crossing, the Layac Junction bridge. The 26th suffered heavily all day under air-directed artillery fire, losing about 10 men and 25 horses, but they held. Finally, at 2330, the 21st Division finished crossing, and the 26th Cavalry began crossing the bridge. As they reached the other side, the weary troopers were met by General Wainwright, who thanked them for their efforts. At 0100 the rear guard, with Colonel Pierce crossed, and then the few remaining tanks of the 192d Tank Battalion (who had been overwatching the scouts) rumbled across—the last Americans to do so. General Wainwright then asked Colonel Pierce if all the troops were across the bridge. After a barely audible "yes" was heard, General Wainwright gave the signal and the bridge was blown up, sealing the Bataan Peninsula. The door had been slammed in the faces of the enemy but for the 26th Cavalry it was the beginning of the end.

After the withdrawal on 5 January, the regiment moved to a concealed bivouac on the left flank of the 31st Infantry, a regular U.S. Army unit, which was on the left of the Layac Line, around Kulis. The regiment arrived at 0330 on 6 January. Late in the day due to enemy air activity and artillery bombardment the regiment moved about 2 kilometers farther west. Due to threat of infiltration by special Japanese shock troops, the 26th Cavalry was fired upon by nervous soldiers from the 31st Infantry when they tried to

"Most historians believe that the delay tactics of the 26th Cavalry were directly responsible for the upset of the Japanese timetable and the removal of their Commander-in-Chief, General Homma."

regain contact with their flank. Attempts to make contact were stopped until daybreak. At 0230 the regiment received an encoded radio message that could not be decoded. The code key list had changed at midnight, and no one had informed the 26th Cavalry! Patrols soon reported that it appeared as if the 31st Infantry had abandoned their positions and withdrawn. They had indeed withdrawn. This was the message that the 26th Cavalry could not decipher. Colonel Pierce knew the Japanese had probably already started moving forward and might have bypassed them by this time. He immediately ordered the scout car section out by the only route possible—down the road through the position that the 31st Infantry had held. At 0430 Colonel Pierce was informed that the scout car section had been ambushed, and three out of the four cars were destroyed. Now it was confirmed that the only way out was crosscountry over very mountainous terrain. The trip was agonizing for the regiment, for the troopers had neither food nor water for themselves nor their animals.

General Wainwright feared the worst when he learned that the 26th Cavalry had been cut off. While some of his staff assumed that the regiment had been destroyed, he re-

fused to believe that Curt Pierce would not bring the troopers through.

And bring them through Colonel Pierce did, reappearing at Bagac around midnight on 10 January.

The last mounted action of the US Cavalry took place in the village of Moran on the west coast of Bataan on 16 January 1942. The composite Troop E-F was sent on the 15th to the vicinity of Moran to relieve Troop G which had been there since 11 January. Early on the 16th, the Japanese attacked and seized the village of Moran, and not even repeated counterattacks could dislodge them.

There were about 300 Japanese infantry in and around Moran. Captain Wheeler, Troop E-F commander, knew his troopers would have to close quickly with the enemy to get out of their machinegun-killing zone as fast as possible. Since speed was important, a mounted attack was the only way. The one suitable place to initiate the attack was from the point where the road entered the southern edge of the village and the 26th charged in 4 man waves. "First, there was the sound of pounding horses running very fast; then four horsemen abreast with drawn pistols came into view," said an observer. "They were already disappearing when another wave came in sight, followed by another and

"My great respect and deep thanks go to the old horse regiment and its few survivors, and to the glorified dead of that band of horsemen goes the salute of a nation for a task well done." (General Jonathan M. Wainwright)

another—until the whole troop had thundered by. The Japanese thoroughly surprised, had not fired at the first wave or two, but then fire came from all directions. Groups of four horsemen, yelling and firing their pistols, turned off the road and charged into the enemy. Japanese were running everywhere trying to get away from the horses. Most of the cavalrymen dismounted and fought on foot right in the midst of the enemy."

It was a very hard fought battle. Captain Wheeler later described it: "Moran was a hail of bullets that never stopped. There were so many in the air that if you had put out a sheet of cloth in five minutes it would have been riddled. We were, however, outshooting them, as we could any day . . . we fought all day . . . the scouts were loyal to the *nth* degree and fought like devils." The 26th Cavalry, in its last mounted action, was successful in driving the Japanese out of Moran and inflicting heavy casualties on them.

Late on 16 January 1942, the regiment was ordered to dismount and the horses sent to Mariveles. The regiment joined sailors, marines, airmen, and other soldiers as line infantry. The end was near, and the defenders knew it. Their feelings were best summed up by the favorite verse of the times:

"We are the battling bastards of Bataan,
No mamma, no pappa, no Uncle Sam;
No aunts, no uncles, no cousins, no nieces;
No pills, no planes, no artillery pieces;
And no one gives a damn."

While the men of Bataan continued to fight and die, starvation further weakened the defenders. Finally, the end came for the Cavalry when General Wainwright, on 15 March, ordered the last horses slaughtered for food and 250 horses and 48 baggage mules met their end. Less than 6 months later, on 9 April 1942, Bataan surrendered. The survivors of the regiment would now face almost 4 years of imprisonment but first they would face the inhuman torture of the Bataan Death March.

No records of the regiment exist; however, it is believed that total losses were as follows: 20 out of 28 American officers were killed or missing in action; about 80 percent of the enlisted men were killed or missing in action; and all animals and equipment were lost.

The campaign fought by the 26th Cavalry was a classical use of horse cavalry: Long-range reconnaissance, delaying operations, and violent hit-and-run attacks. Coupled with well-trained and disciplined troopers, these tactics cost the Japanese invaders heavily. Most historians believe that the delay tactics of the 26th Cavalry were directly responsible for the upset of the Japanese timetable and the removal of their Commander-in-Chief, General Homma.

The saga of the 26th Cavalry is more than the story of a single campaign, or even of a single unit, but, rather, tells the end of a whole way of warfare. The American cavalrymen, with less than 200 years existence, never had the lengthy traditions of European cavalry, and it can be argued that the American horsemen were never really pure cavalry at all, but rather only mounted riflemen. But the glory of American cavalrymen was always found their horsemanship, pistol marksmanship, and their extraordinary courage in pressing home the attack.

The epitaph of the 26th Cavalry was written in 1946, in a letter from General Wainwright to Brigadier General Pierce (he was promoted during the final days of Bataan) which stated: "From December 22, 1941, until about January 16, 1942, this devoted little band of horsemen were in action almost daily, always gave a good account of themselves, and suffered heavy casualties. During these trying days, it was the most reliable unit under my command and so remained during the defense of Bataan where after being dismounted, it carried on its fine tradition of combat excellence, first on the west coast and then on the east coast, especially during the last bitter days before capitulation. My great respect and deep thanks go to the old horse regiment and its few survivors, and to the glorified dead of that band of horsemen goes the salute of a nation for a task well done."

So now the history of the American horse cavalry is complete. Now the horseman's hall of heroes has new names: Wainwright, Pierce, Vance, Chandler, and Trapnell and they are enshrined alongside the likes of Stuart and Patton. It is so important for us to never forget the gallant 26th Cavalry—for they deserve better as America's last horsemen.

Information for this article was obtained from interviews with members of Defenders of Bataan and Corregidor; articles by Captain Whitehead and Colonel Chandler; from a biography of General Wainwright that included his after action reports; after action reports of unit commanders, and from the Official History of World War II. J.W.W.

CAPTAIN JEFFREY W. WOODALL

was commissioned in Armor from Kansas State University ROTC in 1974. He has served with the 82d Airborne Division, and the 24th Infantry Division (M) in various staff and line positions. He is a 1980 Commandant's List graduate of AOAC, Fort Knox, KY and is presently assigned with the Readiness Group, Fort Douglas, Utah as a member of the Armor Assistance Team.



Attacking a Strongpoint

by Major Robert W. Kovacic

Attacking a strongpoint is probably the most difficult, time-consuming, and risk-filled task for a maneuver force. It requires bold action, aggressive leadership, detailed planning, close coordination, guts, and some plain, old-fashioned, good luck.

It is a known fact that well-emplaced fighting positions that are camouflaged and supported by obstacles and indirect fire, are extremely difficult to capture or destroy. Such defenses have evolved from castles and forts to foxholes, bunkers, and dug-in weapon positions.

A successful attack requires a larger force than the defense, the use of more and better weapons, a flexible plan—and time. Also required are well-trained, physically fit, and ably-led troops. Equipment and weapons must be first class, and ammunition must be plentiful. Knowledge of the enemy force is another vital factor, and the attacker's coordination must be as timely and as accurate as possible.

The techniques of attacking a strongpoint are not discussed in sufficient detail in our current How-to-Fight manuals. This deficiency is being remedied by the Armor and Infantry Schools and many "forgotten" methods will appear in the revised manuals. Until the updated manuals become available, this article may provide some "how to" ideas on attacking a strongpoint. Since an attack on a fortified, or strongpoint, position is laden with risk, you may well ask: "Why attack such a position since it is certain that today's highly-mobile ground and air vehicles can easily bypass it?" The responsibility for the decision to attack such a position lies at brigade, division, or corps level and the reasons for doing so might be based on the following factors:

- The position is on decisive terrain. That is, the higher command requires that particular piece of ground to continue the overall attack; or, that piece of ground controls the surrounding terrain.
- A series of attacks have failed, and in order to destroy all or part of an enemy force, the attack must be made on the fortified position.
- To mop-up a bypassed position.

Just what is a fortified position? A fortified position is dug-in, has overhead protection, and is supported by obstacles and indirect fire, including tactical air support. Positions can be constructed of logs, concrete, bricks, or whatever is available. Direct-fire weapons are placed to deliver accurate fires along all likely avenues of approach for vehicles and infantry. It is a hard nut to crack under any circumstances, and can seriously delay an offensive operation if its defenders are determined to hold their position.

A classic example is the 1st Free French Brigade's defense of the Bir Hacheim strongpoint during the May-June 1942 battles in North Africa. The French held out for 12 days against determined German and Italian assaults that were heavily supported by *Stuka* bombings. Their defense seriously disrupted Rommel's other attack plans and the Germans later testified: "... in the whole course of the desert war we never encountered a more heroic and well-sustained defense."

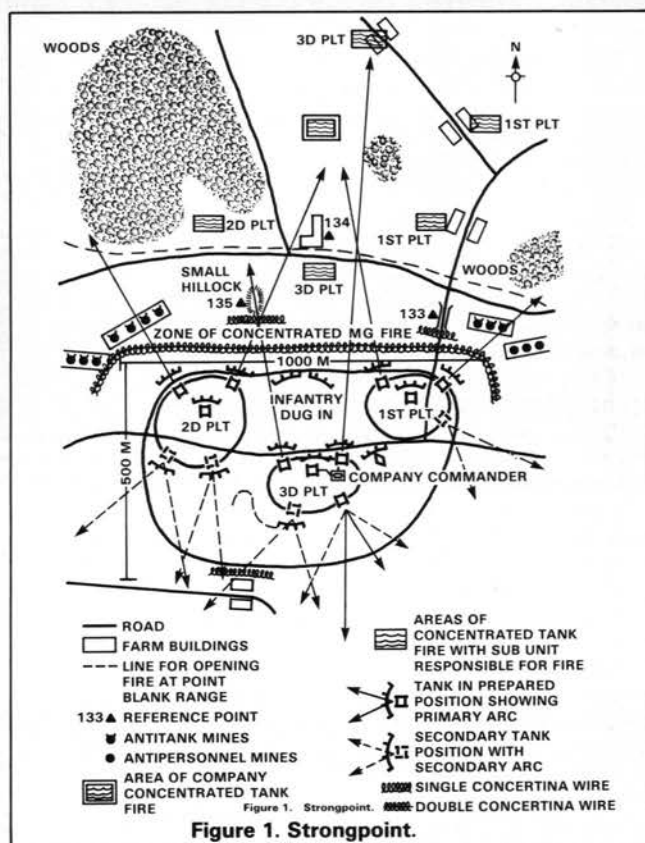
Normally, a strongpoint is built on terrain such as a saddle or defile that is not easily bypassed by mechanized forces, and obstacles are emplaced out to the maximum effective range of the strongpoint's direct-fire weapons systems.

These in-depth obstacles become more numerous as you approach the first trench line. Antitank and antipersonnel obstacles become more numerous about 400 meters from the first trench line and are covered by direct and indirect fire.

The size of the strongpoint depends upon the situation, terrain, weather, and forces available. A motorized rifle company may occupy a strongpoint up to 500-meters wide (1,000 meters under nuclear conditions) and 250-meters deep (500 meters under nuclear condi-

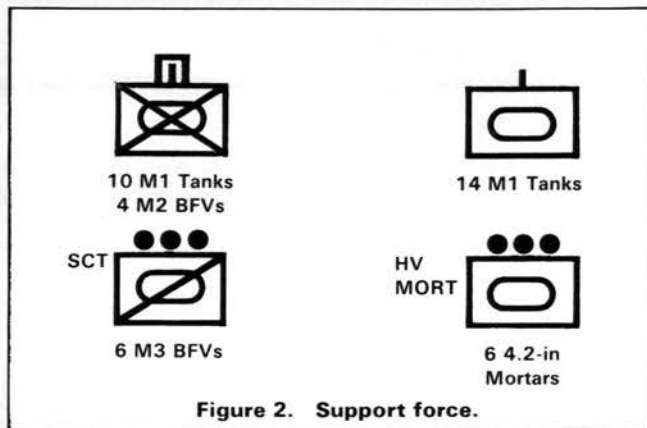
tions). Normally, all three platoons defend on line. When employed "two up and one back," two rifle platoons usually occupy the first main trench, while the third platoon occupies the second main trench.

A secondary trench, located 50 to 100 meters behind each main trench, is occupied by the third squad of each platoon, the platoon command post, and any attached antitank weapons. The company strongpoint is normally centered on the platoon in the second main trench. The weapons are placed to cover the entire company front and have interlocking fields of fire with adjacent units. The position is organized for all-around antitank defense and has coordinated barrier and fire systems of organic and attached weapons. Ranges to terrain features and obstacles are measured and aiming reference points established. For training purposes it is recommended that units construct and organize their "enemy" strongpoints similar to the one shown in figure 1.



Now we can discuss the "how to" aspects of attacking a strongpoint. The attacking force is organized into three maneuver elements, each with a specific task. These maneuver elements are the support force, the breaching force and the assault force.

The Support Force. This force should consist of tanks, mechanized infantry, and improved TOW vehicles or dismounted TOWs. Their primary mission is to identify and engage enemy forces occupying the strongpoint. The support force takes advantage of their long-range cannon and TOW missile capabilities. A support force for a Division 86 tank-heavy battalion task force could be organized as shown in figure 2. Because there are four companies in a Division 86 tank or mechanized infantry battalion, the battalion task force commander



may use one, two, or even three companies (or company teams) for the support force.

The Breaching Force. This force should be a combination of tank and mechanized infantry, with engineers attached. The breaching force closes with, neutralizes, and destroys enemy obstacles and forward dug-in positions. Once this is accomplished, the breaching force widens the breach by assaulting objectives flanking the breach. A breaching force of a Division 86 tank heavy battalion task force could look like the one shown in figure 3.

The force's XO performs not only as second in command, but can also be its liaison officer. He may have to move back to give the following assault force commander an update. This task is vital at four particular stages:

- When the breaching force deploys across the line of departure/line of contact (LD/LC).
- When the breaching force hits an obstacle.
- When the breaching force is clear of an obstacle.
- When the breach is secured.

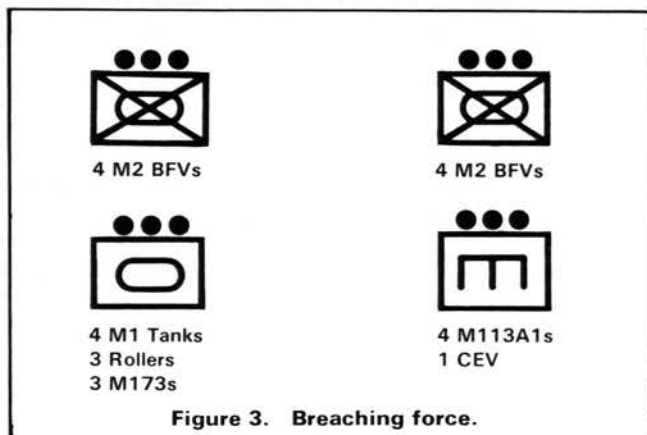
Due to effective enemy electronic jamming and/or inoperable radios, it may be necessary for the XO to personally deliver this information. The breaching force XO must know specifically:

- The location of the lanes through any obstacle.
- The breach location.
- The location of all breaching force platoons and attached elements.

The breaching force's ISG leads the team's combat trains. The ISG and XO monitor the team command net and the battalion task force admin/log net. Platoon requests for maintenance, medical, or recovery assistance are passed on the team command net. The ISG travels at the head of the trains. He keys the train's movement based on the trail platoon and from information received on the team command net. When necessary to halt, the trains form a herringbone and, if necessary, establish local security.

Equipment and demolitions for the breaching force should include:

- Mine clearing rollers



- M173 rocket-propelled line charges
- Bangalore torpedoes
- Satchel charges and hand grenades
- M202 flame rockets
- Additional hand grenades
- Additional wire cutters and protective gloves
- M203 high explosive (HE) and smoke rounds

The Assault Force. As its name implies, this force follows the breaching force, passes through the breach and attacks a clearly defined objective. The assault force could be organized as shown in figure 4.

Although each of these forces (support, breach and assault) has a critical task to perform and while they may operate somewhat independently during planning and preparation, they *must* work as a team when the fighting begins.

The attacker's support forces must place their units in covered and concealed positions. Mechanized infantry platoons of the support force and battalion task force scouts should maneuver as close as possible to the enemy. From here, these forces observe and report information. The elements in contact must gain as much information as possible. This is a critical task.

The battalion task force XO normally controls the support force. Once these units are located, the XO should proceed to the support force commanders' locations, give them a fragmentary order and select a vantage point from which all support force units should conduct a reconnaissance. Meanwhile, ISGs replenish fuel and ammunition in their units, and the support force platoons immediately establish local security and begin to prepare defensive positions.

The task force commander begins his troop leading procedures while the task force XO and support force company and company team commanders are reconnoitering. The battalion task force commander quickly analyzes the factors of mission, enemy, troops available, terrain and weather (METT), and conducts his own reconnaissance. After assessing the situation, and discussing his intent with the battalion task force XO and S3, the commander calls together his orders group and issues his orders.

After the briefing, the company team commanders and task force staff officers return to their units and brief their troops. Since all the details have not yet been given to them, they can give only minimal guidance to their units. Each commander and staff member, depending upon how much time is available, conducts his own ground reconnaissance with his subordinate leaders. If enough time is not available, leaders conduct a map reconnaissance.

Sometime later, at a second orders group briefing, the task force S3 issues the attack order. It details how the task force will accomplish the mission. After receiving this order, subordinate leaders and staff members return to their units to prepare and issue their orders. Platoon leaders, squad leaders, and vehicle commanders then issue their orders to the troops and the action begins.

This is how the battalion task force commander's scheme of maneuver and fire support plan might look:

At dusk, the *breaching force*, supported by artillery, mortars, attack helicopters, and close air support, crosses the LD/LC and attacks along a selected axis, breaches or bypasses obstacles enroute, and creates a 50- to 100-meter-wide breach at a selected point or identified weakness on the flank of the enemy position. The breaching force will take mine rollers and M173 rocket propelled line charges.

The *assault force* follows the breaching force and, on order, assaults through the breach to destroy the enemy within the strongpoint. The assault force consolidates the strongpoint and to repel any counterattack, establishes defensive positions, oriented along likely enemy avenues of approach. The assault force will also transport and use, if necessary, the M173.

The *support force* provides overwatching fires, engaging all known or suspected enemy positions. The attached engineer company (-) detaches one platoon and one combat engineer vehicle (CEV) to the breaching and assault forces, respectively. The engineer company commander takes armored vehicle launched bridges (AVLB) and moves initially with the task force combat trains. On order, he recon-

nointers and breaches tank ditches and other obstacles on the flanks or rear of the enemy position. This is to allow the unimpeded movement of follow-on and support forces to continue the attack.

The scouts will normally screen a flank and, on order, reconnoiter likely enemy counterattack routes.

The task force combat trains will follow the assault force and establish a trains location 4 kilometers distant from the strongpoint.

Task force command post (CP) follows the assault force and, after consolidation, establishes a position on the strongpoint.

The battalion task force commander accompanies the assault force. The battalion XO controls the support force. The S3 and fire support officer (FSO) remain at the CP. The commander, headquarters and headquarters company (HHC), S4, and battalion maintenance officer (BMO) locate at the combat trains. The support platoon leader and command sergeant major initially operate from the field trains.

The commander, S3, and FSO develop a fire support plan using target reference points (TRP) and assign priority targets to the breaching and assault forces. In addition to artillery HE and smoke, the commander requests attack helicopters and close air support (CAS).

CAS is effective against dug-in, fortified positions. In addition, CAS can divert the enemy's attention while the attack forces close in. Some final considerations are the use of napalm and nuclear weapons with restrictions on the use of both. The devastating effects of nuclear weapons can destroy enemy strongpoints or groups of strongpoints. Napalm can be used to reduce obstacles and cause confusion. If conditions permit, commanders assaulting a strongpoint, especially at night, should consider the use of these munitions.

Normally, the breaching force commander shifts fires as his element closes with the enemy. Using radio, he accomplishes this shift through his fire support team (FIST). If that does not work, the breaching force commander and FIST should fire star-clusters to shift the fires.

During this operation, the breaching and assault forces must be prepared to bypass and/or breach obstacles. Tank ditches and abatis can usually be spotted and bypassed. Minefields cannot. *Always assume the enemy has every obstacle covered by direct and indirect fires.* Roller tanks should be in front of the breaching force. The force's XO may be placed in command of the roller tanks and other breaching equipment.

Upon encountering an obstacle, say a minefield that is covered by enemy direct and indirect fires, each vehicle should immediately return fire, fire on-board smoke, and drive to an available covered and concealed position and continue engaging the enemy. Infantry should dismount only if adequate cover is available. The breaching force must report the situation and the force's location. As a matter of SOP, the Fire Support Officer (FSO) should direct screening smoke be fired a set distance forward of the breaching force's reported location. The breaching force commander can then adjust or call for HE on enemy positions.

Breaching enemy obstacles normally starts with simultaneous actions by the breaching force commander and his XO. The commander should position his forces in covered and concealed positions to fire on the enemy. He can position his platoons (companies) using radio, hand and arm signals, or bursts of machinegun fire from his tank or APC. It is critical that this be done quickly. His elements must disperse quickly and may have to occupy positions by backing into them. Some "clustering" is unavoidable, but too much will allow the enemy to destroy this force.

While the breaching force commander positions his forces, the XO leads the roller tank, *M173s*, and any attached engineer equipment into the minefield or obstacle. It will take the XO time to assemble this equipment. By the time he is prepared to conduct the breach, the breaching force must be positioned to provide overwatching fires.

Tanks or APCs pulling the *M173s* begin clearing the minefield. Two lanes should be cleared. After detonation of the charges, roller tanks rapidly proof each lane. Normally, if a roller tank hits two mines, another *M173* is fired and the roller tank continues to proof the lane. During this process, artillery and mortar smoke must be continuous and provide a screen between friendly and enemy forces.

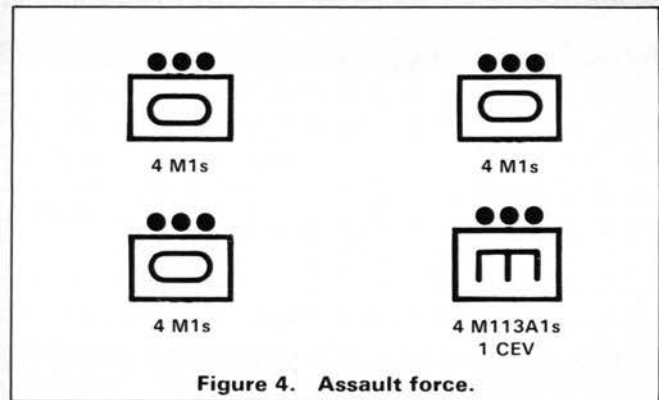


Figure 4. Assault force.

After the roller tanks report securing the far side of the obstacle, other tanks and CEVs (if available) follow behind and seek cover. Then the breaching force commander directs his remaining elements through the lanes. The engineer squads follow and mark the lanes by placing wooden stakes with white engineer tape tied onto each stake on both sides of each lane. In addition, they tape a filtered flashlight, facing toward the friendly forces, on every stake if possible, but only on one side of each lane as in figure 5.

Time and equipment permitting, each stake on both sides of the lane should have a light, especially at night and during periods of limited visibility. Lastly, the engineer squads leave two men, with weapons, equipment, radio, and flashlights on the near side of the minefield to act as guides. The breaching force commander reports this to his commander.

There may be times when the breaching force must temporarily halt and then resume the assault. Recognizing this and planning for it, commanders should include in the SOP a signal that indicates "continue the attack." When necessary, the breaching force commander should give this signal.

When the lead elements approach the enemy trench line, the breaching force commander, using radio or pyrotechnics, must shift the indirect fires. After the fires shift, the breaching force commander, using either radio or pyrotechnics, orders his elements to assault.

The lead elements respond by forming a line and assault while firing on the move. These elements continue assaulting until forced to stop and shoot it out.

At this point, the commander may order mechanized infantry and engineer elements to assault dismounted. Note here, no distance is given. This activity is totally situation dependent. The point here is that assaulting elements must remain mounted until they are as close as possible to the enemy force, provide a base of fire, and continue assaulting with other team elements.

The final rush to the enemy trench line is again situation dependent. Armed with bangalore torpedoes, wire cutters, LAWs, *Dragons*, machineguns, rifles and *M202* flash weapons, the dismounted soldiers use fire and movement and in most cases crawl into the wire and minefields, breach them, and continue to move forward. This dismounted assault is overwatched by *M2*, tank and CEV fire. The dismounted elements mark enemy locations with *M202* flash rounds (66-mm flame) and red smoke grenades from their *M203* weapons. The dismounted soldiers will encounter a variety of enemy positions,

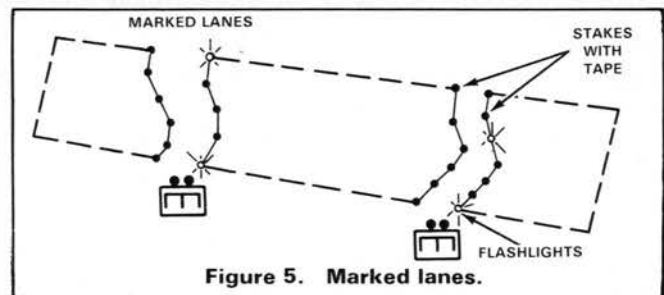


Figure 5. Marked lanes.

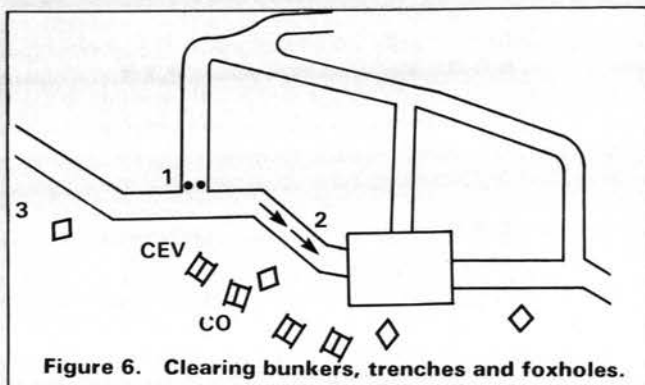


Figure 6. Clearing bunkers, trenches and foxholes.

including tree lines, hedgerows, trenches, ditches, foxholes and bunkers.

Tree lines and hedgerows have a vulnerable point—the *forward edge*. In this instance, the dismounted infantry, with overwatching *M2s*, APCs, and tanks, assault and crawl to the edge of the treeline. Once there, they shift the overwatching fires, using smoke or flash rounds. Then they assault, using rifles, machineguns, bayonets, hand grenades and hand-to-hand fighting to eliminate or drive off the enemy.

Dismounted forces use a similar technique for clearing ditches and trenches but add indirect fires. Once within "danger close" distance, they shift the fires, enter the ditch and destroy the enemy. Similar techniques are used to clear fox holes.

Platoon and individual soldier actions in the trenches and bunkers are characterized by close-in fighting and movement in squad- and team-size elements.

Dismounted infantry, supported by IFVs and tanks, clear bunkers, trenches, and foxholes by firing and moving within the trench, or between bunkers and foxholes. Figure 6 indicates one possible technique. At point 1, dismounted infantrymen overwatch a connecting trench to prevent enemy counterattack. Point 2 shows the advancing elements assaulting an enemy bunker while at point 3, IFVs, tanks and engineer vehicles provide overwatch. The breaching force continues this procedure until the breach is secured and widened.

Normally, from the time the breaching force crosses the LD/LC, the assault force is right behind them. The assault force commander elects to move in, using traveling overwatch in a column formation with the company's lead vehicle at least 1,000 meters behind the breaching force's combat trains. The assault force commander leads for two reasons:

- The breaching force liaison can easily find him.
- The assault force commander can ensure that his unit does not run into the breaching force.

Thus, the movement of the assault force may be erratic. Sometimes it will move continuously. At others, it's movements will be stop and go. Each time the assault force halts, it forms a herringbone formation and posts local security.

The breaching force XO can lead the assault force to the breaching forces' combat trains location, normally outside the strongpoint. From there, the assault force continues in column formation up to the breach. Breaching force personnel should mark the limits of the breach with flickering, filtered flashlights, strobe lights, or trip flares.

After passing through the breach, the assault force must attack rapidly in wedge formation using traveling overwatch until it receives enemy direct fire. Enemy direct fire provides the signal to form a company line. It is at this time the indirect fires and CAS are shifted onto the assault forces' objective.

As the assault force approaches the near edge of its objective, enemy direct and indirect fires will normally become more intense. Assault force elements should continue to move forward using fire and movement while maintaining their line formation. Eventually, company elements enter the objective area and complete the destruction of the enemy, or force him to retreat. If radio communications are still available, the assault force commander should shift indirect fires

onto the retreating enemy. If the radios are out, another means must be used to shift indirect fire.

Maintaining control of the attacking elements is the assault force commander's prime concern. Although he should plan an axis of attack for this operation, the terrain or enemy do not always permit the assault force to use this exact route.

It is the commander's responsibility to keep his unit on-line and moving and he must communicate to do this. His first choice would be radio. A second choice could be using white phosphorous rounds to mark the enemy position. The platoons should immediately attack that location. Then, when platoon leaders see the other platoons, they must spread out and form an assault line, fire on the move, and keep moving.

Once on the objective, the elements assault their individual objectives. Units should train and rehearse their actions so that upon consolidating objectives, they establish hasty defensive positions. Platoon leaders establish target reference points and post local security.

During this operation, attacking elements must remain under the constant overwatch of the support force. The battalion task force XO assigns the TRP orientation. He assigns TRPs to achieve crossing fires between the support force elements. Because support forces will move only infrequently, the commanders can be "hot-looped" to their elements. Support force commanders should "hot loop" to each other and to the battalion task force XO, if possible.

The control of overwatching fires is coordinated through the battalion task force XO and by support forces' understanding of SOP pyrotechnic signals. Support forces should be in a position where they can place direct fires on the planned breach location. Then, either by radio, wire, or pyrotechnic signal, shift their fires onto targets in depth or to the flanks of the strongpoint. This same procedure is used when the assault force overruns the objective. There may come a time when, due to proximity of friendly forces, the support force can no longer fire onto the objective. At this point, and depending on METT, the support force may be used to:

- Reinforce the assault force
- Maneuver around the strong point to attack an enemy counterattack
- Move through or around the strongpoint and pursue the retreating enemy

Summary. Battalion commanders, company commanders, and platoon leaders must carefully consider the following:

- This operation will require task/team organization and attached engineer support.
- Breaching obstacles and clearing trenches, bunkers, and foxholes will be a time-consuming, difficult, and exhausting task. Troops, and especially leaders, must be physically fit.
- Plans must permit rapid changes.
- Expenditure of ammunition and demolitions will be high and additional Class V support should be planned.
- The attack must emphasize the principle of *mass*. Attacking along a broad front will result in the piecemeal defeat of the attacker.
- Training for this operation must be carefully thought out and progressive in nature.

MAJOR ROBERT W. KOVACIC was graduated as a distinguished military graduate from John Carroll University, Ohio and holds a master's degree in systems management from USC.

He has served as platoon leader, XO and company commander in CONUS, Europe and Vietnam. He is currently assigned to Command, Staff and Doctrine Dept., USAARMS, Fort Knox, KY.





Historical Military Cycles

by Clifford Bradley

The challenges facing military vehicle developers are changing, and so the solutions must change. Just as the tactics and doctrine for one era are not suitable for the one that follows and must change, so must the materiel—hopefully in an evolutionary way. Battlefield threats are changing rapidly and if the period between the introduction of new combat vehicle systems is too great, the design changes to meet this new threat may have to be revolutionary. This basic fact, literally an apocalypse, has not been widely understood nor accepted. Noteworthy, also, is the fact that few people in the development community or the usually articulate critics of Army-vehicle development programs, have expressed their views on this, at least not in a constructive way.

This needed change in the approach to basic fundamentals in combat vehicle design has been trying to surface for 10 years or more with the need becoming more urgent in the last 3-5 years. This just happens to be the period in which the M1, M2, and M3 were completing development and entering production. This may account for some of the criticisms these vehicles have received. The uncomfortable feeling regarding recent in-house design concepts for the M1, M2, and M3 follow-on have also added to doubts about the old approach. The recently completed first phase of the Future Close Combat Vehicle (FCCV) studies by four industry teams have confirmed that a new approach must be taken for the next family of close combat vehicles.

This article, written from a historical

viewpoint, is in part a result of the author trying to gain a better understanding of the challenges facing developers, and hopefully will cause others to explore new approaches to understanding the problems. C.B.

The cyclical nature of the world we live in is generally accepted by everyone—even though few of us really understand the contributing factors and the effects of the cycles on our lives. In fact, all aspects of our lives, including those of us in the military-vehicle development community, are affected to some degree by most of these continually recurring cycles.

Three rather simple conclusions can be drawn in assessing the cyclical nature of the world in which we live. First, most of the cycles have been happening for many years and will continue to do so for the foreseeable future. Second, there is very little that we have been able to do to change or even significantly influence the cycles. Third, and on a more positive note, we can study, chart, and analyze these cycles in order to better understand them and thus try to use the information for planning the future.

With this third conclusion as a goal, let us explore this cyclical phenomenon in terms of historical military events, and see what we can learn from the past to help us prepare for the future. In particular, one can seek to determine if there are some significant trends that can benefit us in terms of choosing options and alternatives in the development and employment of future military vehicles.

Throughout history, the fate of fiefdoms, kingdoms, and nations has been strongly

linked to the size and capabilities of their military forces. The capabilities of these forces, in addition to the classic military values of leadership, tactics, training, and discipline, have also been closely coupled with understanding and using new technologies that contribute to improved weapons of war.

Over the years, military technological developments have tended to fall into the categories of the enhancement of weaponry and the survival against weaponry; thus contributing to the age-old military contest of offense versus defense. While technological developments have tended to benefit both the offensive and defensive capabilities of armies, these technological innovations have emerged in a cyclical pattern. In fact, a technological discovery enhancing the capability of one has tended to drive the introduction of a counter capability for the other. Thus, technology has been the major factor in the age-old and still continuing one-upmanship game between offensive and defensive capabilities of the world's armies.

The Pendulum Analogy. To create a more vivid mental picture of the events taking place, the cyclical nature of events have often been compared to the swing of a pendulum. The extreme end points of the pendulum's swing can be labeled as the competing factors being studied, and the time of the pendulum's swing as the time for a change, or swing, from the dominance of one extreme to the other. Also, and equally important, the swing of the pendulum can be temporarily stopped for analytical purposes to explore the impact of the events along its arc.

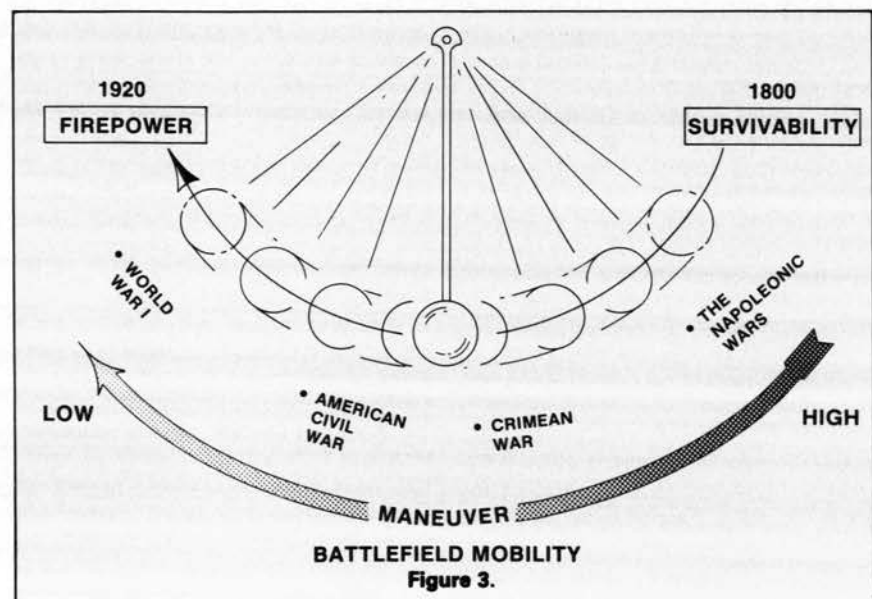
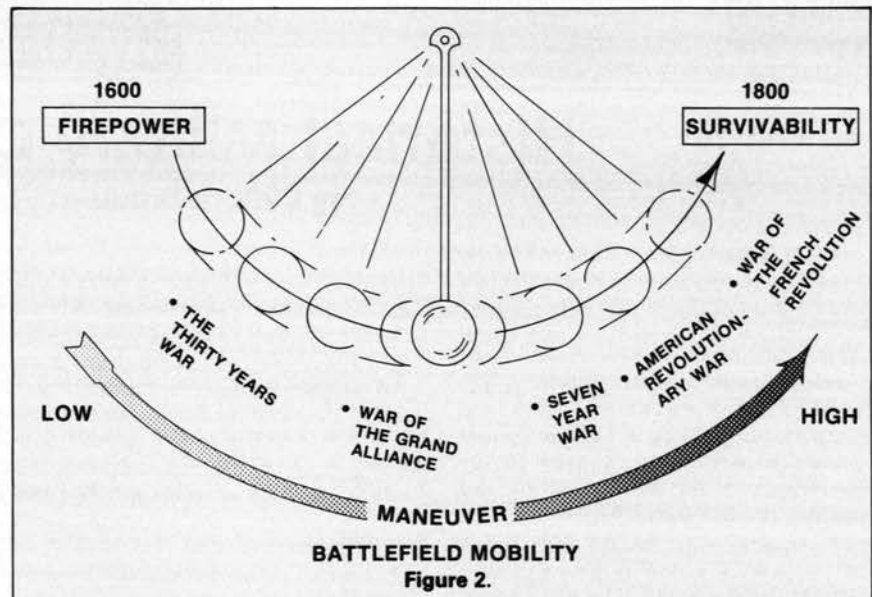
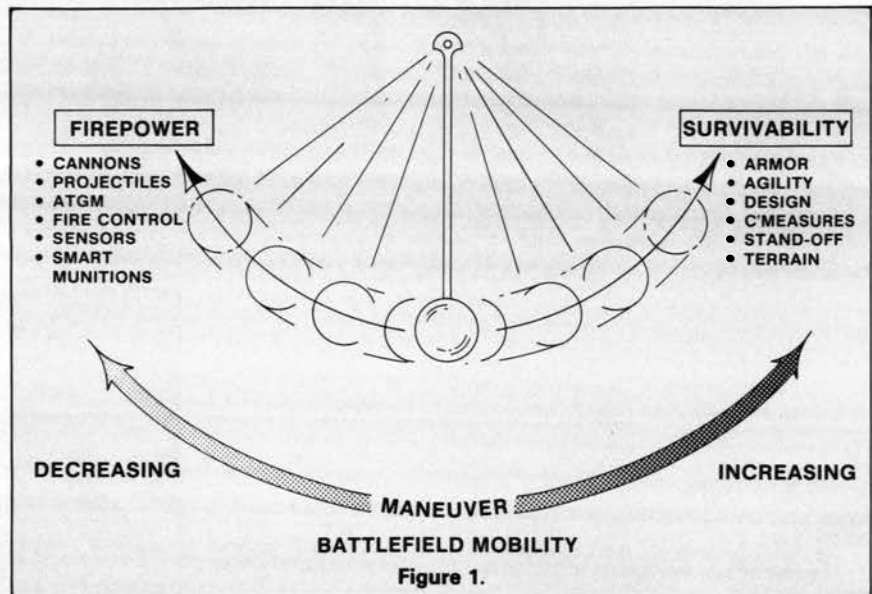
For purposes of illustrating the above, and to conduct an exploratory entry into how we might learn from studying the cyclical nature of military history, let us portray firepower and survivability on the opposite ends of the pendulum's arc. Then, for purposes of clarification, let us include additional information. For example, under firepower we will include such subfactors as sensors, cannons, projectiles, antitank guided missiles (ATGM), "smart" munitions, and fire control (which also includes battlefield surveillance)—all of which can be favorably enhanced by advancing technology. On the other side, under survivability, let us list such subfactors as armor, agility, terrain, system configuration, stand-off, and countermeasures, with these factors also capable of being favorably influenced by advancing technology. Having described each end of the pendulum let us show the ability of a force to maneuver as a variable, with advancing maneuvering ability occurring as a result of the influence of survivability, and decreasing maneuvering capability as the result of the influence of firepower. The ends of the pendulum could also be described as freedom of action on the battlefield versus denial of this action, with the ability to maneuver again as a variable (figure 1).

In order to learn something from the cyclical relationship between firepower and survivability and the maneuver capability as a derivative of that relationship at any particular time, let us select some historical, military events and locate those events in their proper position along the arc of the pendulum.

1600-1800. Let us begin with the period 1600 to 1800 A.D. (figure 2). This era has been selected because in its beginning, firepower was the dominant factor. By the end of the period, however, maneuver had become the principal factor.

The firepower emphasis established by the Swedish ruler and tactician, Gustavas Adolphus, in the early 1600's set the trend for future military leaders for the next 100 years or more. In combining firepower (with the pike and missile) with shock, Gustavas put the principal emphasis on firepower. He employed the Spanish "countermarch" concept in which front rank musketeers moved to the rear to reload after firing. Since he had improved the loading process, he was able to have two ranks of musketeers fire simultaneously before countermarching. Further, the countermarch was so executed that the formation moved forward. The fire was in effect a small arm's rolling barrage.

Although Gustavas ruled in what has been historically a firepower-oriented era, the contributions he made to warfare certainly helped to start the pendulum moving toward the other extreme. He combined cavalry, musketeers, and artillery in a unique way. He gave to infantry and cavalry the capacity for offense; he increased firepower and made it the preliminary for shock; he made artillery mobile; he made linear formations more flex-



ible and responsive to the commander's will; and he solved the problem of combined arms to maximize the role of firepower in battle. His new principles were successful and were imitated for more than a century.

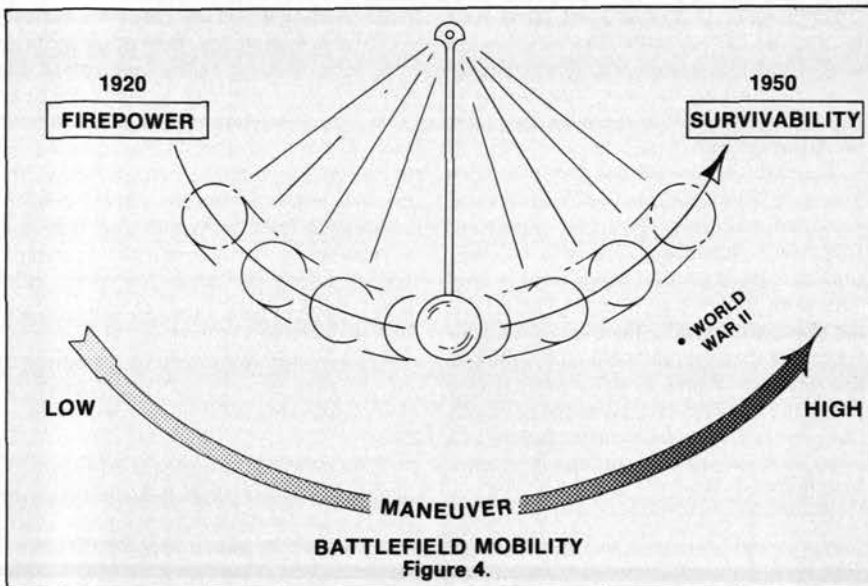
In the period of 1750 to 1800 A.D., maneuver, the tactical manipulation of fire and movement on the battlefield, emerged as the major characteristic. This was due in part to mobility improvements in weaponry, but it mainly evolved through the genius of three of history's great leaders; Frederick the Great, George Washington, and Napoleon Bonaparte. The trend toward maneuver progressed through the three major wars of the period involving these leaders; the Seven Year War (1756-1763); the American Revolution (1775-1783); and the French Revolutionary War (1791-1800). These conflicts embraced not only Europe and North America, but through colonial empires involved the rest of the world.

During this period of growing maneuver dominance, infantry tactics were refined through discipline and control. The result was a mobile infantry that could be shifted and massed to obtain maximum effect from firepower and shock action. The rifle was refined in the U.S. by German craftsmen in Pennsylvania who began turning out the forerunner of the rifled musket. Frederick the Great restored cavalry to its original functions of shock action on the battlefield and reconnaissance off the battlefield. It was also during this period, largely through the effects of the French, that artillery became highly refined, with tubes lightened, bore sizes standardized, and carriages strengthened.

Also, changes in maneuverability on the battlefield mainly evolved through the new and disciplined use of the tools of warfare, rather than from major technological changes. However, toward the end of the period, two inventions were to radically affect warfare and bore ominous portent. In 1784, Lieutenant Henry Shrapnel, a British officer, invented the artillery shell that would bear his name. It was a canister filled with lead bullets surrounded by a bursting charge, which would prove lethal to troops in the open. In 1798, Eli Whitney, a New England inventor of the cotton gin, turned his genius to making small arms. He began to manufacture rifles with interchangeable parts, thus introducing mass production of weapons. It is at this point in history that we see technology start to act in a more decisive way to affect the degree of maneuver possible on the battlefield because of the potential for improving firepower that was inherent in this change in weaponry manufacturing.

1800-1920. The period of high maneuver capability draws to a close and the pendulum starts to swing slowly at first, but inexorably toward firepower dominance on the battlefield (figure 3). A century would pass before the swing was complete.

In the early 1800s, under the direction and stimulus of Napoleon Bonaparte, the

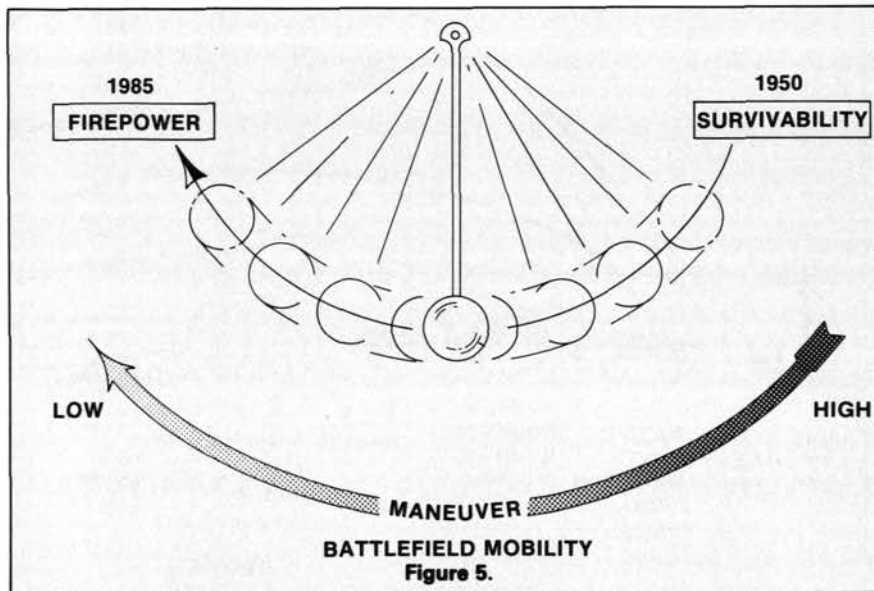


weapons of the age of gunpower were assimilated into consistent patterns of military theory and practice. After centuries of experimentation, the tactical means of employing weapons in combination with each other and with cavalry had been refined to the point where a skillful commander could exploit the full potential of his weapons and his various arms to achieve decisive results with minimum cost.

During this period, great strides were achieved in ordnance development. Arsenal and foundries were creating innovations and improvements in cannon manufacture that heralded a revolution in the science of gunnery. These technological innovations, coupled with the beginning of the Industrial Revolution, were to set in motion unprecedented changes in warfare. The new technological means for waging and supporting warfare meant that for the first time, the concept of a "nation at war" was possible. Thus, the stage was set for the American

Civil War to become a historical milestone—the first truly modern war and the first "total" war, in the modern sense.

Firepower was to emerge once again as the dominating factor on the battlefield. Improvements in the design and manufacture of cannons and the introduction of elongated, streamlined shells with explosive charges spelled certain death for troops in the open. In small arms, the range, accuracy, and volume of fire of individual weapons were increased. The machine gun was emerging as an important weapon. Field mines and booby traps were used, and modern prototypes of trench mortars and hand grenades were used by both sides. Thus, in the Civil War, man's ability to kill on the battlefield at rapid rates at extended ranges reached a new high. However, strategists and battlefield tacticians failed to fully realize the awesome potential of these "modern" weapons to kill; and, although there were some noteworthy exceptions, tactics did not keep pace with technology. The



frontal attacks in well-ordered ranks were horrendous. The horrible casualty rates in Civil War battles are a sad testimonial to this fact. Simply put, the new weapons introduced an entirely different order of firepower on the battlefield.

The costly lessons learned during the Civil War were slow to sink in, both in Europe and the United States. The full impact of firepower's dominating role was not fully understood by military planners and strategists. To this must be added the fact that the development and refinement of weapons continued at an ever increasing rate. This set the stage for World War I to unfold in a period of firepower's total dominance of warfare. The pendulum had reached the end of a swing that had started right after the French Revolutionary War.

The deadliness of modern rifles, machine guns, and artillery in WW I played havoc with frontal assaults and ended forever the shock value of cavalry. The obvious result of this awesome weapon effectiveness was to dig in. Trench warfare, barbed wire, and fortification were the order of the day. Battlefield mobility was not possible.

Thus, the stage was set for the introduction of one of the most important developments of this century, the tank. The first tank was a combination of the internal combustion engine, caterpillar tracks, and naval boiler

plate. Although initially conceived early in WW I solely as an anti-machinegun vehicle, it was destined to be the instrument that would restore mobility to the battlefield. Thus, the pendulum would start swinging back toward survivability and increasing maneuver. Toward the end of WW I, the original anti-machinegun vehicle concept evolved, at least in the minds of some farsighted persons, into an offensive combination of mobile, protected, firepower, and a new means of imparting shock to the enemy. In the Battle of Cambrai on 20 November 1917, 474 tanks were used by the British in an offensive action employing massed armor, a milestone in the history of armor warfare.

1920-1950. Initially conceived to provide mobile firepower support to infantry, the tank was slow in growing into the total offensive machine it was to become (figure 4). Between WW I and the late 1930's, the tank's slow evolution was due mainly to the lack of imagination on the part of military leadership. However, a few farsighted people in the United Kingdom and Germany had foreseen the real potential of the tank for offensive warfare, and that the tank was destined to become the centerpiece of land combat. Tactical aircraft, another new innovation, were also destined to play a major role in the changing battlefield.

WW II became known as the war of maneuver. Technological progress had made possible vastly improved mobile ordnance, fast tanks and other crosscountry vehicles, including armored, infantry carriers. These new systems, coupled with imaginative and effective use of tactical aircraft, combined to produce a doctrine of mobile warfare at speeds heretofore impossible. Maneuver was at its zenith.

1945-1985. Although the tank with its uniquely combined firepower, mobility, and protection had emerged from WW II as the king of the battlefield, technological forces were already at work that would cause some to wonder if the future of the tank was limited (figure 5).

During the late 1950's, considerable progress was made in metallurgy that led to greatly improved cannons and projectiles. The relatively ineffective *bazooka* of WW II gave way to more accurate and longer-range, shaped-charge antitank weapons for the infantry. Improved rockets and first-generation antitank missiles appeared in the late 1950's and early 1960's. The fullbore tank cannon projectile was replaced by the high-velocity and very effective armor-piercing, discarding-sabot (APDS) projectile. The accelerated progress in electronics and, finally, the laser have provided vastly improved hit probability against armored targets. By the

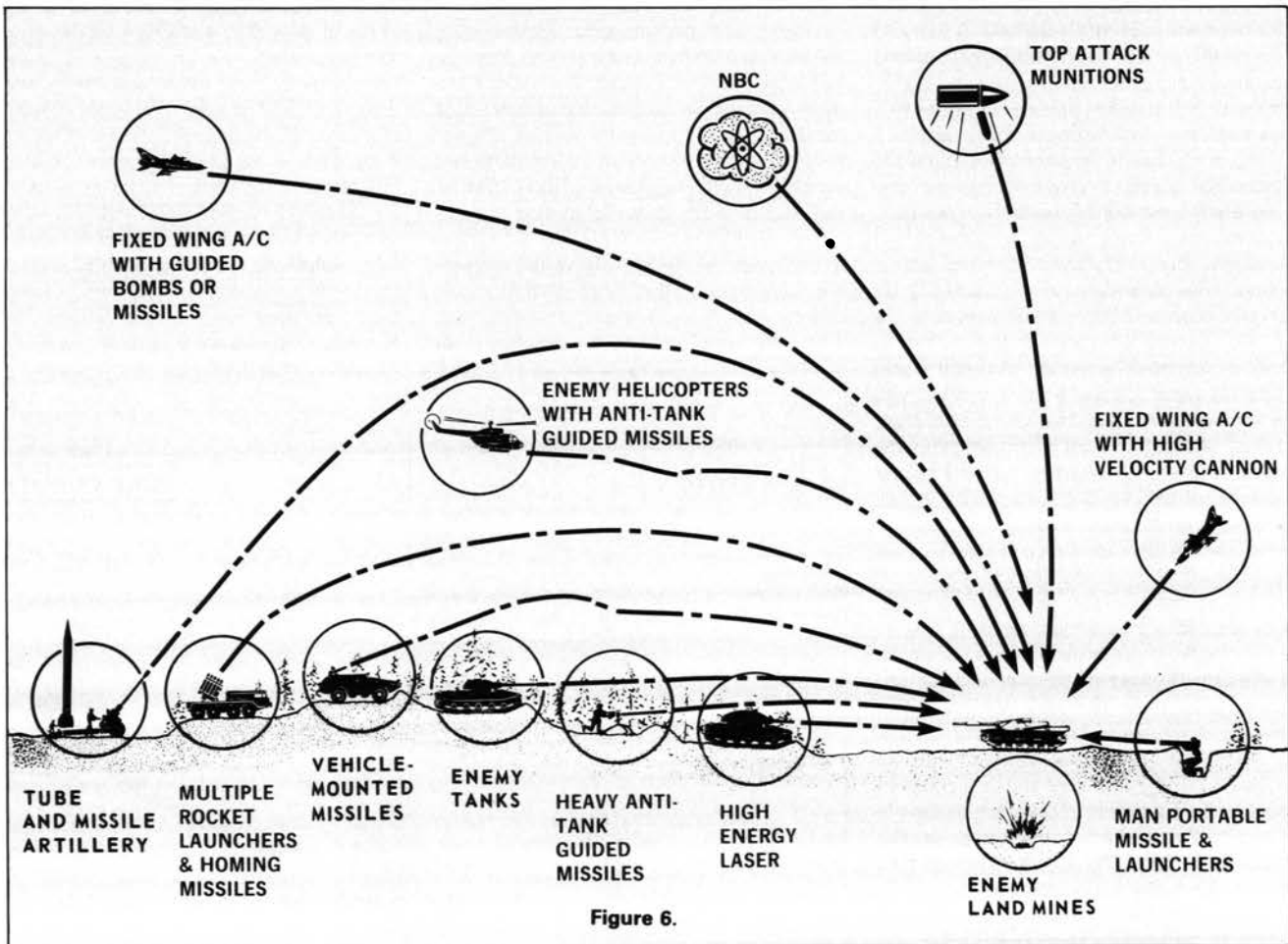


Figure 6.

late 1960's and early 1970's, highly-accurate, second-generation, antitank missiles, capable of killing tanks at extended ranges, were entering the scene. These missiles are soon to be replaced by systems even more effective in range, accuracy, and lethality. These third-generation missiles can be employed from attack helicopters which adds a new dimension to the antitank threat on the battlefield.

In the mid to late 1970's, a new and vastly more effective kinetic energy, armor-piercing projectile, longer in length and made from new material, appears to be capable of penetrating any practical level of armor. Terminally guided missiles and artillery rounds are also now entering the battlefield. It thus appears that the technology contributing to methods of killing the tank is advancing at a much faster rate than technology contributing to the survivability of the tank. Protecting the frontal 50-60 degree arc of a tank will become less and less effective in the highly fluid battles projected for the future.

A most knowledgeable and highly-respected senior Army officer is reputed to have observed shortly after the 1973 Yom Kippur War, "On today's battlefield, if your tank can be seen, you can be hit, and if hit with modern tank and antitank weapons, you can be penetrated and killed."

For the tank, the widening gap between offensive and defensive technology promises to continue at least throughout this decade. Thus, the question that must be faced is: Has the pendulum moved full swing again from WW II, and does firepower once again dominate the battlefield with resultant adverse consequences for maneuver? The awesome array of threats that face armored combat vehicles is shown in figure 6.

"On today's battlefield, if your tank can be seen, you can be hit, and if hit with modern tank and antitank weapons, you can be penetrated and killed."

What Does It Mean? If the preceding analogy is acceptable, at least in principle, what does this mean now to tacticians, weapon system developers, and Army planners? Are we truly entering a firepower-dominated era? All the indicators must be closely analyzed and assessed. An important consideration is that the current ascendancy of the firepower threat may pose an entirely different challenge to the employment of armored formations than did the firepower threat faced by troops in the open during the Civil War and WW I. For example, barring a nuclear attack, it is unlikely that we will see tanks killed *en masse* as were troops in the open who faced the concentrated artillery and automatic weapons fire of the wars just mentioned. What we are more apt to see is individual tanks or relatively small tank formations

faced with any one or several of the array of weapons in figure 6. Therefore, this contingency, and other considerations and their impact on tactical doctrine, must be factored into the overall assessment of cyclical military history.

"This oneupmanship approach was destined inevitably to bring us to the M1, but that may be the end of the line. It just will not work forever."

There may be something to be learned from this analogy for those planning future tactics and doctrine. Just as the tactics from the Napoleon era were not suited for the firepower dominance in the Civil War, the tactics from the maneuver era of WW II may not be suited for the firepower-dominated era we are now entering. It is apparent that the options or choices for tactics must reflect an awareness of the position of the pendulum and of the degree of maneuver that may be possible on the battlefields of the next decade or so.

Thus far, the quantitative relationship of the opposing armies have not been addressed. However, it would seem that the high or advanced maneuver side of the pendulum arc, with superb generalship possible, would tend to permit bold tactics and superior leadership to offset enemy numbers. On the other hand, it is equally appropriate to think that in an era dominated by firepower, the side that is outnumbered and possesses only matching firepower per unit of strength is in a very untenable situation for which there are at least two theoretical solutions. The outnumbered side can try to significantly increase their firepower per unit of strength to the point where, although outnumbered, their firepower is superior; or, they can focus all their technological resources on developing countermeasures, or anti-firepower systems, in order to move the pendulum back toward a more tenable situation.

The firepower side of the pendulum offers engineers and scientists an opportunity to demonstrate their leadership, perception, and innovation. For example, if rapidly advancing firepower technology is threatening the dominance of the tank, then the side that has the greater number of tanks has no real advantage over the one having fewer tanks. It would seem that the side having fewer tanks should concentrate all the technology possible toward making the greater number of the enemy's tanks obsolete rather than trying to improve the quality of their fewer tanks, which may be matched by the enemy because he must play the tank game in order to perpetuate his numerical advantage. So, if we are in a firepower-dominated era, let's get on with what must be done to reduce the enemy's advantage. The answer must come from innovative technology directed toward

killing tanks rapidly and at extended ranges beyond the direct fire zone, (see "Airland Battle's Power Punch," Sept-Oct. 1982 ARMOR) and improved means of neutralizing their firepower at extended direct-fire ranges.

The pendulum has been swinging from side to side for hundreds of years, and will continue to do so. With the increasing influence of technology on military weapons, and the rapid rate at which technology itself is changing, the periods of the pendulum between offense and defense dominating the battlefield are getting shorter. This has an ominous message for system developers. It means that a way must be found to shorten the development cycle for military vehicles and to reduce the time required to insert new technology in a product improvement program.

Combat vehicle design philosophy states that combat vehicles' performance can be significantly enhanced by increases in armor, firepower, and mobility, judiciously blended in a skillful and harmonious way. This sounds simple, but it worked because of affordable technological growth in the "building blocks." This oneupmanship approach was destined inevitably to bring us to the M1, but that may be the end of the line. It just will not work forever.



CLIFFORD D. BRADLEY

served as Chief of the Exploratory Development Division, Tank-Automotive Concepts Laboratory, Tank-Automotive Command (TACOM) preceding his retirement in May 1982. He joined TACOM in 1951 after receiving his BS degree in mechanical engineering from Wayne State University. Before entering college, he served in the U.S. Army from 1940 to 1945 with the 7th Cavalry Brigade and 1st and 4th Armored Divisions. Following a 15-month engineering training program at TACOM, he was associated with advanced military vehicle concepts for his entire career, and participated to some degree in all major vehicle development programs initiated at TACOM.



Upper left. Mine-clearing rollers on an M60.



Lower left. Sharply-angled mantlet add-on armor and wedge-shaped slabs on top of hull storage boxes show clearly on this Centurion.

Center. Note distinctive mantlet armor with port for coaxial machinegun and extra-capacity smoke grenade launchers

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One of the more fascinating, if by press day wholly unproven, aspects of the Lebanon operation is that it may have marked the first fielding by any army of a form of active armor to defeat shaped-charge attacks on main battle tanks. The alternative, that the add-on and readily detachable protective arrays seen on Israeli M60s and Centurions contain ceramic tiles (though not of a kind to be found in any bathroom), would also mark a first in terms of operational deployment. The possibility cannot be excluded that armor of both kinds is involved.

While no answers are to be found in external appearance, the configurations, as seen in the accompanying *Defence Attacheé* photographs, show obvious differences in the thickness and shape of the packs provided for M60 and Centurion respectively. The Centurion's additional armor is mainly in the form of quite shallow panels fitted

to the brow of the turret and thicker pieces to the glacis and the mantlet either side of the main gun; a hole is included in the left-hand piece (looking forward) to permit the firing of the coaxial machinegun. Wedge-shaped packs are mounted on top of the storage boxes fitted forward above the track guards.

The M60, partly because it lacks whatever protective values come with the Centurion's storage bins, has been provided with a considerable amount of add-on armor around the turret. Here the packs are thick and vertically deep, with smaller and thinner sections patched in—with no great concern for aesthetics—to the upper surfaces which, because of the turret's curvature and varying angles to the perpendicular, not to mention obstructions such as lifting eyes, cannot be covered by the main boxes. As with the Centurion, panels are fitted to the front of the turret roof and to the glacis; in the latter case, because the M60's basic glacis is curved, it has been necessary to fit a straightening frame to which the packs

The Puzzle of Isra

can be attached. The M60's installation is completed by the fitting of wedge-shaped or angled sections either side of the driver's hatch to help protect the vulnerable area where turret meets hull, with further angled sections each side of, and thinner plates above, the mantlet.

Although it can be stated with a fair degree of certainty that the add-on arrays are intended to help defeat shaped-charge high-explosive antitank (HEAT) attack, any discussion of what the packs and panels consist of must, in the absence of any word of guidance from the Israelis—who on the contrary are happily watching, if not promoting, the circulation of a number of often fanciful and frequently mutually exclusive "solutions" to the puzzle—fall short of a definitive answer. While one source suggested that the boxes were empty (and the large ones on the M60 do sound quite hollow when thumped) the probability is that there is more to



on each side of turret on this Israeli Centurion.

Upper right. Wedge-shaped side add-on armor blocks, distinctive mantlet add-on slab and frontal slabs show clearly on this Centurion. Gaps probably indicate displacement.

Lower right. Esthetics had no part in this arrangement of add-on armor slabs to this M60.



eli Add-on Armor

it than that. In view of solutions that have been adopted elsewhere, though usually in the context of new-build tanks, it seems quite likely that the Israelis have developed their own ceramic tiles and that the boxes are partially filled with them.

The alternative of a form of active armor is suggested more by the vehemence with which several sources in Israel stated this to be the case than by any objective evidence. A number of different types and configurations of active armor are possible. An example is a sheet of explosive—laid on top of a steel plate, with a covering for environmental protection on top—which detonates when hit by the incipient jet of a shaped-charge warhead and in the process disrupts the jet's further formation. If the Israelis are indeed deploying a form of active armor, such a fact would carry the implication that they have sufficiently overcome the formidable difficulties that seem to have pre-

vented larger and better-endowed countries from doing likewise; the United States and Soviet Union are among the nations that are known to have been engaged in related research and experimentation for many years.

Not the least of these difficulties lies in ensuring that the explosive is not detonated by hits other than a shaped charge, e.g., by a bullet. The explosive must therefore embody an adequate energy strike threshold while remaining sensitive enough to be activated without the involvement of a separate detonating agent. The panels in the array must also be so designed that when one or perhaps two detonate in response to a shaped-charge jet, the others in the array do not go off too. Other kinds of active armor have this difficulty and additional ones. Among the earliest kinds experimented with (and one offering considerable attractions in theory) was an array of miniature shaped-countercharges. A major problem here is that unless the shaped countercharge detonates on the axis of the incoming jet, it will not have much

more effect than a flat sheet of explosive.

Other points observed on [Israeli] Centurion and M60 tanks include the addition of banks of smoke dischargers either side of the turret. These appear to be fixed and forward-facing, thus indicating a probability that they are intended for offensive rather than defensive use. Many M60s and Centurions were seen with a .50 caliber machine-gun, mounted on the mantlet above the barrel of the 105-mm main armament and in alignment with it, for ranging, though doubtless it can also be used separately. As the .50 caliber machine-gun appears, certainly in the case of the M60, to be out of comfortable arm's reach (and would be extremely hazardous to operate in battle) it is assumed that it is remotely fired by the gunner. A similar arrangement has been applied to the M109A1 for aiming in direct-fire engagements. An addition to some M60s deployed in built-up areas was a light mortar (52-mm or 60-mm) fitted to the right of the turret and operated by the commander.

Tank Modernization

by Gerald A. Halbert

(The following article represents the views of the author and not necessarily those of the Department of the Army.)

Tank modernization can be defined simply as the modification of older tanks to make them competitive with newer tanks. Three ways to achieve this modernization will be addressed here. First, the changes made on the assembly line during production; second, the changes made after production has been completed and the tank has been fielded; and third, the changes made in the field by purchasing allied countries to suit their individual needs.

Modifications on the assembly line. All tank-producing countries extensively practice this mode of modernization. These changes may be minor modifications as a result of original design deficiencies, major modifications required to keep pace with improvements in potential adversary tanks, or modifications made to incorporate improvements innovated as a result of technical advancements achieved while the tank was still in production. Examples of such changes are numerous. One example is the German tanks during World War II which were extensively modified to keep pace with Soviet tank developments.¹

During WWII, the US made extensive changes during assembly line work to improve their capabilities. Beginning in August 1942, the *M4 Sherman* was modified to incorporate a 76-mm gun to replace the 75-mm gun.² This was just the beginning of many major modifications made to the *Sherman* tank that resulted in it becoming the most modified tank in the world.

If the *Sherman* was the most modified tank, the *Centurion* and the *T-34* must be close runners-up. The *Centurion* had 13 marks, or major factory modifications, not to include variants such as bridgelayers, engineer, or recovery vehicles. *Centurion* main guns have included the 75.2-mm 17-pounder, the 83.4-mm 20-pounder, and the L7 105-mm gun. Extensive changes have been made in armor, night vision equipment, and other modifications.³

The *T-34* had at least three major modifications between 1940 and 1943, retaining various forms of a 76.2-mm gun until 1943 when it was modified to carry an 85-mm gun. In addition, the *T-34* chassis was used to produce self-propelled guns mounting 100- or 122-mm guns.⁴

Modern tanks also came in different varieties. The *Chieftain* has had 12 major marks and several minor changes.⁵ The *M60* tank has had four major modifications: the original *M60* with the *M48*-style turret; the *M60A1* with improved turret; the *M60A2* with the Shillelagh missile; and the *M60A3*, a product-improved *M60A1*. Almost all other tanks could be listed as being modified or product-improved in some way during their production runs.

The advantage of product-improving during the production run is that increased capability can be built into the equipment at a relatively low cost.⁶

Modifications after production. By contrast, cases when the tank is modified after production have been relatively less frequent. Until recently, when a country stopped production of an old tank and began production of a new tank, the older model tanks were retained, but not modernized and were kept in service only until they could be replaced. Rising tank production costs have precluded the complete replacement of one model tank by a new model. Instead, major tank-producing world powers began to replace only about one-half of their existing tank fleet with new tanks. Table 1 lists the tank inventories of several countries. As can be

seen, very few large countries have only one type of tank in service; therefore, it has become an economic necessity to improve existing tanks. The basic tank may be obsolete or obsolescent, but frequently it can be rebuilt to increase its capability to cope with more modern tanks to improve mobility, to reduce maintenance costs, or any combination of these, for just a fraction of the cost of a new tank.

The Soviet Union has the largest tank improvement program of any major world power (40,000-50,000 tanks at current estimates) and the Soviets have never had only one type of main battle tank in service at any one time. The *T-54* and *T-55*-series tanks are probably the tank series with the largest number of modifications. Over the years, most *T-54s* and *T-55s* have been retrofitted with external improvements to include infrared night vision equipment and bore

Table 1
Tanks in Service in Major Countries

Country	Type of Tank
US	1825 <i>M48</i> , 9480 <i>M60</i> , 152+ <i>M1</i>
UK	900 <i>Chieftain</i>
USSR	50,000 <i>T-54/T-55/T-62/T-64/T-72/T-80</i>
France	1220 <i>AMX-30</i>
FRG	1289 <i>M48</i> , 2437 <i>Leopard 1</i> , 100+ <i>Leopard 2</i>
Greece	350 <i>M47</i> , 800 <i>M48</i>
Iran (prewar)	875 <i>Chieftain</i> , 400 <i>M47/M48</i> , 460 <i>M60A1</i>
Israel	1000 <i>Centurion</i> , 650 <i>M48</i> , 810 <i>M60</i> , 400 <i>T-54/T-55</i> , 150 <i>T-62</i> , 100 (?) <i>Merkava</i>
Italy	550 <i>M47</i> , 300 <i>M60</i> , 745 <i>Leopard 1</i>
Netherlands	468 <i>Leopard 1</i> , 340 <i>Centurion</i>
Turkey	3000 <i>M47</i> , 500 <i>M48</i>
Sweden	300 <i>Centurion</i> , 300 <i>S-Tank</i> , 200 <i>IKv-91</i>
Switzerland	320 <i>Centurion</i> , 150 <i>Panzer 61</i> , 330 <i>Panzer 68</i>

(Source: "The Military Balance 1980-81," The International Institute for Strategic Studies, London, 1980.)

Table 2
Penetration of 100-mm Tank Gun Projectiles

Projectile	Penetration (mm of RHA at indicated degrees of obliquity at indicated range)	
	1000M	2000M
	0/60 Deg	0/60 Deg
<i>BM-8</i> (APDS)	264/100	239/90
<i>BR-412D</i> (APC)	175/71	156/63
<i>ZBK-5M</i> (HEAT)	390/150	390/150

(Source: p. 33, "Chinese Armored Vehicles," "Armies and Weapons" No. 50, January 1979.)

evacuators.⁷ It can be presumed that two-plane stabilization and other internal modifications also have been made.

The most important modification made to the *T-54/T-55* tanks has been the fielding of an APDS round for the main gun. While some may argue that a new round for the main gun does not constitute a modification to the tank, it requires that the gunner's sight must also be modified by a new sight reticle to enable the round to be fired accurately. The fielding of the *BM-8*, 100-mm APDS projectile with its 1,415 meters per second (m/s) muzzle velocity gives the *T-54/T-55* main gun a much better performance over the old *BR-412* APC-T

projectile which had a muzzle velocity of only 916 m/s.⁸ The penetration of the two kinetic energy projectiles as well as the ZBK-5M HEAT projectile as shown in table 2 reveals their increased lethality. While some may argue that *T-55* modifications are not an example of this second mode of modification since the *T-55* actually did not go out of production in the Soviet Union completely until 1980,⁹ the fact that the *T-54s* have most *T-55* modifications merits inclusion in the second case. The latest Soviet tank modification seen is a probable laser rangefinder mounted on the mantlet of *T-55* and *T-62* tanks. The use of this rangefinder should improve probability of hit (Ph) at longer ranges.¹⁰

The U.S. completed conversion of 2,064 *M48* tanks to *M48A5* standards in 1980. This conversion basically included adding diesel engines to *M48A1s* and adding 105-mm guns to the turrets of *M48A1s* and *M48A3s*. Numerous minor changes were also made.¹¹ This program followed the one started in February 1962 when 1,200 *M48A1s* were converted to *M48A3s* by adding diesel engines to the basic *M48* hull.¹² The addition of the diesel engine required rebuilding of the engine compartment.

Modifications by Allied countries. Conversion of tanks by other than the producing country is a program adopted by many countries to meet either political or fiscal constraints. This allows a country to field tanks meeting current standards for first-line equipment. The masters of this industrial wizardry are the Israelis.

The first Israeli Army tanks were scrapped, demilitarized tanks.¹³ The first *Sherman* tank acquired by the Israeli Army in 1948 had no engine, track, gun, or optical systems. Initially, a 20-mm gun was fitted, followed by a salvaged 75-mm gun.¹⁴ Between 1948 and 1951, the Israelis selected the *Sherman* as their main battle tank and a mixture of various *Sherman* models were acquired. Some had the original 75-mm gun and some had Swiss surplus Krupp 75-mm M1911 field guns. In 1956, France supplied a number of *M4 Sherman*s, mounting 76.2-mm guns. These were designated *M1* or *Super Sherman* by the Israelis.¹⁵ The Israelis realized the problems of fielding a tank fleet with a heterogeneous collection of main guns. They were faced with the Egyptian Army's armor fleet which included *T-34s* and *SU-100/SU-152* assault guns. At this time France had fielded the CN 75-50 75-mm gun in the *AMX-13*. Boasting a muzzle velocity of 1,000 m/s, the gun was a major improvement over the standard 75-mm gun on the *Shermans* and in 1954, the Israelis began a program to modify the *Sherman* to mount the French gun necessitating a redesigned turret. By 1959 the first battalion of modified tanks designated the *M50*¹⁶ was delivered. The Israelis, however, were still using several different types of engines to power the *Shermans*. Beginning in 1960, the Israelis began a program to fit Cumming's diesel engines in modified *M4A3* hulls.¹⁷ While these modifications resulted in improved tanks, the Egyptians had begun to receive *JS-3* heavy tanks with 122-mm guns and thicker armor. The Israelis began to seek a way of countering the *JS-3*, and their answer was to adapt another French gun to their tanks. This time they adapted a modified version of the 105-mm CN 105 F1 gun fitted on the *AMX-30*. Due to the high recoil of the CN 105 F1, a shortened barrel was adopted, designated D1504. The new gun had a muzzle velocity of 800 m/s instead of the 1,000 m/s of the CN 105 M1. (The same projectile was fired by both guns.) Tanks equipped with this gun were designated *M-51*. They were converted from *M4A1 Sherman* tanks by installing the new gun, Cumming's 460 horsepower (hp) diesel engine, the E8 HVSS suspension system, and other minor modifications. The resulting tank had a top speed of 45 km/hr and a cruising range of 270 km.¹⁹ Both model tanks served well in the 1967 and 1973 wars.

However, as tank technology advanced and Israel received more modern tanks, many of the older *Sherman* tank variants have been converted to self-propelled artillery or other specialized uses.²⁰

Israeli tank modification has not been limited to the *Sherman*. In 1960 Israel began to receive *Centurion* tanks equipped with the 83.4-mm 20-pounder gun. These *Centurions* had definite reliability problems and the main gun proved difficult to keep in zero. They therefore converted the tanks to carry the British L7 105-mm gun and their crews were retrained to improve gunnery and maintenance procedures. While the *Centurion* became an effective tank, the low cruising range and maintenance requirements of its gasoline engine were still unsatisfactory, and the decision was made to completely modernize the *Centurion*. A Continental AVDS 1790-2AC 750 hp diesel engine and Allison transmission were installed and other changes made to make the tanks more reliable in desert operations. About 250 of these modified *Centurions* were ready for service in the 1967 war and performed well in both the 1967 and 1973 wars. A total of 900-1,000 *Centurions* are believed to be in Israeli stockpiles.²¹

In 1955 the Israelis had purchased *AMX-13* light tanks, but because of their poor performance and heavy losses suffered against the Egyptian *T-54s* in the 1956 war, they were removed from Israeli armor battalions and limited to reconnaissance use. Between 1960 and 1964 Israel received approximately 200 surplus *M48 Patton* tanks from West Germany in accordance with an agreement negotiated between Israel and West Germany after the onset of production of the *Leopard 1*.²³ Most of these still had the 90-mm gun but one tank company had modified these *M48s* by adding a diesel engine and a 105-mm main gun.²⁵ These were designated the *M48A3* and were in service by the 1967 war. By the 1973 war the Israeli Army had modified all of their *M48* tanks to *M48A3s*. The *Centurions* and *M48s* in Israeli service now had the same engine, transmission, and main gun, which greatly reduced maintenance requirements.

Modification of *Centurion* and *Patton* tanks has not stopped. Recently published photographs taken in 1978 show *Centurion* tanks with Xenon searchlights fitted and small studs located on the turret glacis plate.²⁶ Similar type studs are seen on Israeli *M60A1* tanks in several illustrations in the October 1980 issue of the Japanese magazine *THE TANK MAGAZINE*.²⁷ These studs are not present on any tanks photographed during the 1973 war. While there is no acknowledgement by the Israelis of the studs' function, *Centurion* and *M60A1* tanks photographed during the 1982 invasion of Lebanon show them fitted with applique armor.

The West Germany Army has fielded an applique armor kit for *Leopard 1A1s*. Tanks so converted are designated *Leopard 1A1A1*. The German applique armor is said to increase protection by 30 percent.²⁸

The Israelis are not the only country to extensively modernize armor. Brazil has taken *M3* and *M3A1* light tanks from WWII and modernized them. At least 80 *M3A1s* were converted to the *X1* tank. The major modifications on the initial prototype included a new diesel engine and the French 90-mm D-921 A-90 F1 gun in a new turret. After completion and testing of the prototype, two new series of tanks were built, using the *X1* as a starting point. The *X1A1* is for the Brazilian Army and uses the *M3A1* chassis. The *X1A2* chassis is new production, that is totally made in Brazil. Both the *X1A1* and the *X1A2* use the Engesa 90-mm gun, a modified Cockeril design.²⁹

Norway developed a conversion program to modernize its *M-24* light tanks. The modernization included fitting a new French 90-mm low pressure gun, diesel engine and automa-

tic transmission.³⁰ Norway has converted 72 M24 tanks to the NM-116 standard. The conversion costs about one-third of what a new tank would cost.³¹

West Germany is also upgrading M48 Patton tanks. West Germany converted at least 650 M48s by adding a 105-mm gun and improved fire control.³²

Spain has had an ongoing program to modernize its M47 medium tank fleet. More than 300 M47 tanks were converted to diesel power and provided a 105-mm tank gun. The conversion included rebuilding the engine compartment and adding the equivalent of an M60A1 add-on stabilization fire control system.³³

Tank modernization has grown in importance to the point where the market offers such good opportunities that several foreign and domestic companies have developed modernization packages for export. Israel has a program to modernize M47s with Israeli Military Industries (IMI) installing a diesel engine and 105-mm main gun. Since Israel has few M47s, the modification program is for export only. The cost of all modifications, including laser rangefinder and NBC equipment is reported to be about \$500,000.³⁴

A US manufacturer has developed or licensed several packages for the M24 and M41 light tanks and M4 and M48 medium tanks. The conversions require very few costly modifications to be made to the engine compartment.³⁵ Several corporations offer improved fire control systems and night vision gear for fitting to all the previously mentioned tanks plus the T-54/T-55 and T-62.

Modernization of tanks is now an important consideration for many armies. As newer tanks enter the inventories of major powers, the need to modernize older tanks increases.

Newer tanks, such as the British *Challenger*, US M1, West German *Leopard 2*, and Soviet T-64, T-72, and T-80, all feature improved mobility, firepower, and protection. Tanks designed 20 years ago may not be able to survive on the battlefield against them.

Most emphasis on modernization has focused on improved powertrains (engine and transmissions), fire control, night vision equipment and guns. Very few improvements in armor protection have been made (excluding some Israeli and West German tanks). A major modification program to the M60 series tanks to include a 1,200 hp engine improved transmission, better fire control, and a hydropneumatic suspension system and a spaced applique armor to be added to the hull and turret has been proposed by private industry.

The US Army looked at similar suggestions for the M60A1 but ruled them out because of the high cost.³⁶

In the case of the M60, the US Army simply cannot, at this time, afford to start any major new programs. There are many other programs requiring funding and the line has to be drawn somewhere. If the cost of the conversion is \$500,000 per tank, such as the M47 upgrade mentioned above, then the cost of converting 1,000 M60s would be \$500,000,000. Almost three armored divisions could be equipped with the proposed up-armored M60s at that cost. When that cost, however, is added to the original cost of a M60A3 (with thermal sight) of \$953,216, in 1977 dollars, it is more expensive than an M1 tank (given that both the M1 and M60A3 were produced in the same year). Thus, for many countries the choice must be to improve their tank fleet by modernization rather than by the purchase of the newest models on the market.

Footnotes

1p. 226-283, Heinz Guderian, "Panzer Leader," Zenger Publishing Inc., Washington D.C. 20015, 1979 (Reprint of the 1952 Dutton edition).

2p. 210-207, R.P. Hunnicutt, "Sherman, A History of the American Medium Tank," Tarus Enterprises, Belmont, California, 1978.

3p. 20-21, Stephen Tunbridge, "Centurion in Action," Squadron/Signal Publications, Warren, Michigan, 1976.

4p. 1-20, J.M. Brerton & Michael Norman, "Profile 47, Russian T-34," Profile Publications, Windsor, England, 1972.

5p. 46-48, George Fort, "Modern Combat Vehicles: 1 CHIEFTAIN," Charles Scribner's Sons, NY, 1979.

6p. 11, William H. Gregory, "Mods and Pods," Aviation Week and Space Technology, November 17, 1970.

7p. 142-143, "USAREUR Pamphlet 30-60-1, Identification Guide, Part One, Volume III, Armored Vehicles, Tanks and Self-Propelled Artillery," 15 February 1973.

8p. 176 & 289, DIA Projectile Fragment Identification Guide-Foreign (U), DST-1160C-029-80, 29 February 1980.

9p. 12, Soviet Military Power, Government Printing Office, Washington DC 1981.

10p. 1206, International Defense Review, 8/1978.

11p. 39, "Army Logistician," May-June 1980; & p. 33, "Army Reserve Magazine," Summer 1980.

12p. 13-15, "A 'New' Tank and the Block," "Armor," September-October, 1980.

13p. 5 & 9-10, David Eshel, "Israel's Armor in Action," Eshel Bramit Ltd, Masada, Israel, 1978 (hereafter cited as Israel's Armor).

14p. 21-24, Simon Dunstan & D. Eshel, "War Data No. 6, 'Sherman,'" Eshel GmbH, Koln, W. Germany, 1980. (Hereafter cited as Sherman.)

15p. 25-27, Sherman.

16p. 28-29, Sherman.

17p. 30, Sherman.

18p. 30-32, Sherman.

19p. 35, Sherman.

20p. 37-39, David Eshel and Simon Dunstan, "Centurion, War Data No. 1," Eshel-Dramit Ltd, Hod Hasharon, Israel, 1979. (Hereafter cited as Centurion.)

21p. 41-44, Centurion; p. 15, Steven J. Zaloga, "Armor of the Middle East Wars 1948-1978," Osprey Publishing, London, 1981. (Hereafter cited as Middle East Armor); p. 12, Irvine Conhen, "Rehabilitation" Still Israel's Prime Armor Source, "Armed Forces Journal International," December 1976.

22p. 25, Israel's Armor.

23p. 26, D. Eshel & S. Dunstan, "M-48/60 Patton Main Battle Tank, FV No. 4," Eshel Dramit Ltd, 1979 (Hereafter cited as Patton MBT); p. 23, Middle East Armor.

24p. 15, Middle East Armor.

25p. 27, Patton MBT.

26p. 46-47, Centurion.

27Cover, p. 3-9, "The Tank Magazine," October 80, Vol. 3 No. 14, Sensha Magazine Co. Ltd, Tokyo, Japan (Some information in this magazine is in English, the remainder of the magazine is in Japanese).

28p. Enrico Po, "Tank Retrofitting: New Life For Old Vehicles," "Military Technology," 22.

29p. 109-110, Ronaldo S. Olive, "A New Family of Tracked Armoured Vehicles From Brazil," International Defense Review (IDR), 1/1981.

30p. 957, IDR 6/1979.

31p. 114-115, Peirangelo Caiti and R.A. Riccio, Modern Armor, Squadron Signal Publications, Warren Michigan, 1978.

32p. 22, "Improvements to the German M-48," "Armies and Weapons" No. 48, November 1978.

33p. 33-34, "The New Face of Spain's M-47s," Ground Defense International No. 60, January 1980. (Note: Some other sources do not agree that 105mm guns have been installed on all the M-47Es produced.)

34p. 51-53, "Modernized M-47 on Trials," "Defense Attache" No. 1/1981.

35p. 309-315, Christopher P. Foss, "NAPCO Power Packs: A New Lease Of Life For Old Vehicles," "Jane's Defense Review," Vol. 2, No. 4, 1981.

36p. 9-10, "High Performance M-60A1 Developed" and p. 10-11, Sam Meyers, "No More PIPs for the M-60A1," "Armor," March-April 1981.

GERALD A. HALBERT

graduated from California State University—Fullerton in 1974. He served with the 101st Airborne, 9th Infantry, 82d Airborne divisions, I Corps (ROK/US) Group and XVIII Airborne Corps, 66th MI Group, and Hq, USAEUR. Prior to his retirement, he was assigned to Studies Division, Directorate of Combat Developments, USAARMS, Fort Knox, KY.





Training a Headquarters Company

by Captain William D. Hewitt

The mission of a headquarters company commander and a line company commander remain the same — train the troops, and do it well.

Commanding a company is the most satisfying job in the Army — ask anyone who has. Now you find yourself in command of a headquarters and headquarters company (HHC). Everyone tells you how truly rewarding it is to have this command; everyone tells you how fortunate you are, and wishes you the best of luck; and some honestly tell you that it is one of the most demanding challenges that you may ever have. But no one tells you how to train this company—ask anyone!

As the commander, you must understand the nature of the company. Most of the responsibility for individual training falls on your shoulders. Although training directives originate from higher headquarters, they are usually oriented toward a mission goal for that day and are not part of any organized program.

Recognizing that most of the daily efforts and energies in HHCs are not battlefield oriented, it is most essential that time identified for training is efficiently and effectively used only for that purpose. Staff responsibilities, conflicting priorities, and personalities put you in the middle of the biggest tug-of-war imaginable. With this in mind, the only assumption must be mentioned — that you enjoy a sufficient amount of support to get this job done. Without the support you should seriously consider another job before the resulting polarization destroys unit cohesion.

Fundamentals. Certain fundamentals are currently being stressed in the Army training program. They are sound, and for the most part hold true in a headquarters company. Some

modifications are required and will be explained when applicable.

- Performance-oriented (hands-on) training must be applied whenever possible. We cannot expect to succeed by issuing soldier's manuals and operator-level maintenance manuals to every soldier with an order to learn the contents.

- All training must be focused on either identified weaknesses or on those tasks yet to be tested. Do not retrain on tasks which have already been satisfactorily completed. Some commanders train and retrain on the same tasks while ignoring others because of personal choice or for professional gain.

- Train for the more crucial tasks before scheduling less important ones. Medical personnel may disagree, but applying a tourniquet usually should not be considered as important as marksmanship and weapons qualification.

- Once tasks are identified and prioritized, the instructor must be qualified, and be well prepared. Backward planning and lead time are key elements.

- Following instruction, the results must be recorded in the job book to complete the loop.

- Modified decentralization is required in a headquarters company. With eleven or more sections, the strain of managing a training schedule, of having the same training aids available for every section, and of having the expertise in every section to effectively teach a variety of tasks make total decentralization not only an implausible alternative, but also an administrative headache. Some argue that all NCOs should be experts at teaching all the tasks that their men must know. Let's face the realities of time, expertise, and training aids. The PSNCO cannot do his job and train his

71L, 71D, 75B and 19E soldiers! Remembering that it takes several hours of preparation for one hour of instruction you cannot expect this supervisor to invest the time required and still do his job right. Our Army has become too specialized even at the battalion level. Those who believe that a supervisor can do all this have lost touch with reality. They don't realize the enormous requirements placed on staffs by the higher echelons. Thus the question becomes, "How much decentralization, and when should it occur?" The answer lies in your training program and how it is implemented.

Individual Training. Individual training is composed of those tasks that a soldier needs to know in order to be tactically and technically proficient. These tasks can be divided into two groups—common tasks and MOS peculiar. This division also helps identify the "how and when" of decentralization. I refer to the division as "in section" training and "company training."

"In section training" requires that four tasks in each MOS be taught in the staff section by a qualified instructor. These tasks are duty MOS related and are listed by MOS on the training schedule. All the required training aids are found right in that section. Every soldier with that primary or duty MOS receives the instruction and evaluation on each of the four tasks. Retraining and re-evaluation may be needed, but the standard is: by close of business Friday a GO is earned on every task by every soldier. A NO-GO is not acceptable on these specified tasks. There is no prescribed time on the training schedule for this activity. At the discretion of the section NCOIC, there may be a designated time, or it can occur during "crack time" between staff requirements. A NCOIC is not limited to teaching and testing just those four tasks.

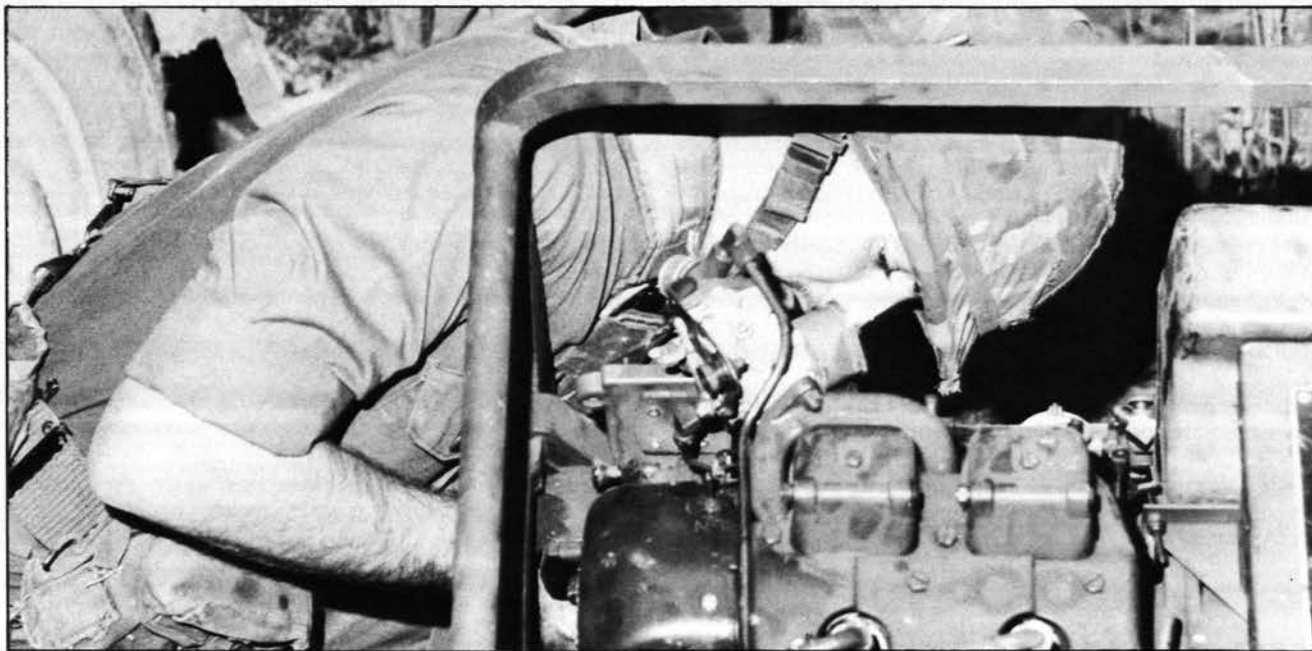
Day to day requirements may present opportunities for additional evaluation. A medic may treat an injured soldier in the motor pool or a communication specialist may need to splice some WD 1 wire. When this occurs, the supervisor must record the results in the job book. A NO-GO is acceptable here and is annotated in a similar manner. The supervisor should correct this deficiency as soon as possible, but not necessarily that week. In a section that has several MOSs, cross-training should occur. The 19E that works in the S1 section can have four books. An aggressive section NCOIC can train the 19E soldier in the four tasks which are identified for the 71L, 71D and 75B!

Soldiers should also receive credit for completed correspondence courses, successful use of learning centers, PNCOC, BNCOC, and expert field medical badge testing. In every case, when a soldier demonstrates expertise in a task, the results must be recorded.

Many of the common tasks such as PT, NBC, first aid, map reading, weapons qualification, and maintenance are usually scheduled, taught, and evaluated at company level. Although this relieves the section's NCOIC from these responsibilities, he is still responsible for recording the results in the job books. The results of this company-level activity are improved levels of instruction, increasing the number of evaluated tasks weekly and easing the strain on training aids and supervisor.

There are several methods that can be used for scheduling. I have tried the "everybody at one time with make-up periods later" method, which usually nets less than 25 percent of your enlisted personnel and even fewer of your NCO corps. The after-hours training has resulted in even fewer people and in more elaborate excuses. Experience has proven to me that splitting the company into two groups (Group A and Group B) is the best method. Most of the staff sections are divided into these groups with an equal number of NCOs and EMs in each group. Certain sections (HQ tank sections or commo platoon) may find it easier to have all personnel in the same group. This is acceptable as long as all critical sections are well-manned with an effective element during duty hours. The days of the week may vary but Thursday and Friday mornings are usually not as busy as the other days. This method can also be used for scheduling training holidays. You can get maximum participation while the staff section gets their "pound of flesh."

While we are discussing MOS individual training, let's not overlook the "special duty" types. Official and unofficial troop diversions, drivers, typists who are 19Es, and the myriad of soldiers placed in a 19E slot (but not on a tank) need to be trained in their MOS tasks as well. Why should you worry about these soldiers? Should it be higher on your priority list, or should it be down with the "if the boss doesn't mention it, I won't" topics? Let's look at some figures. In a tank battalion headquarters there are currently 36 19Es that are not working on tanks. In a brigade headquarters company in Germany there were well over 70 soldiers assigned or attached that were not working on their MOS



tasks. These numbers do not include the "unofficial" diversions. These numbers represent over one-half of a line company's 19E strength. The point to be made is that replacements may or may not be forthcoming at a time when replacements are needed, or serviceable weapons systems are ready to enter or re-enter the battlefield. At a certain time all personnel in a headquarters (minus the commander) become expendable. Thirty-six well-trained soldiers represent 12 ambush teams. In the European theater they can assist in creating ambush sites and choke points, buying time and refusing a flank. These soldiers also represent 9 tank crews. The training of this asset can not in clear conscience be overlooked. You will have earned your day's pay when the boss asks for them and they are ready!

The implementation of this program is not as difficult as it may seem. If you are in a tank battalion headquarters, the instructors are as close as your HQ tank section. In other cases, the instructors and training aids may be as close as another company in the same or adjacent battalion. You must make it happen, but it may take some high-power stroking. The 19Es in my brigade headquarters company were taught by the HQ Tank Section in the 1st Bn 33d Armor. The time for training is specifically designated on the training schedule and attendance is mandatory. For tankers, the tank crew gunnery skills test, the mini-tank range, and maintenance must be taught repetitively. For infantrymen, the annual EIB training period and SQT preparatory phases offer an excellent opportunity for training. Seek out other opportunities such as firing the LAW and throwing grenades.

When these programs are implemented, the benefits are multifold. The cumulative effect of every facet has a great impact on the combat readiness of your unit. For instance, with the PSNCO teaching his subordinates the four tasks for 71L, 71B, and 75B; and the 19E getting additional training by the HQ Tank Section along with the common tasks taught at company level, the soldiers will know their garrison duties as well as their combat duties. Additional skill identifiers and secondary MOSs can be awarded, everyone passes their respective SQT test, and because there are fewer "specialists" and more cross training, better service to the members of the battalion await them in the S1 shop. The soldier benefits; the Army benefits.

Maintenance. In many respects maintenance is an individual task, thus being individual training. It is also collective training—a series of individual tasks oriented toward a common end. There are many officers who like to make the distinction between maintenance and maintenance training. Wherever the differentiation exists, a maintenance program should incorporate both maintenance and maintenance training for operators, supervisors, mechanics, and motor officers.

Because of personnel turbulence and numerous staff requirements, the ever-changing list of operators in HHCs demands a repetitive, cyclical program. As the commander, you should first list the topics that you want to cover—don't forget PMCS on radios, generator maintenance, communication techniques, maintenance forms, seasonal driving, and licensing. With this maintenance training usually scheduled for Tuesday morning and actual maintenance scheduled for Wednesday morning, you then organize the topics in sequence and bracket the time on the calendar. The length of the cycle should fall out from these computations. Allow at least one week in every six to fall through the crack for "hot items" or "immediate requirements" in the staff section. Shorter cycles on needed tasks may be needed to fit the gap between and should be completed just before major training events. A short cycle may preclude necessary topics from being addressed while a long cycle may waste time or

allow an experience gap to develop between changes in operators.

The final type of individual training is called "training the trainers." The BTMS program is as effective and necessary in a headquarters company as it is in a line company. NCO and officer professional classes improve the supervisor and the subordinate. Training supervisors reduces the span of direct responsibility, improves the leadership, and ensures that your leaders are setting the example. You can not expect the soldier to care for his TA-50 if his supervisor cannot inspect it properly; you cannot expect an operator to take maintenance seriously if his supervisor doesn't know where the motor pool is.

Collective Training. This should occur after individual training. It encompasses any collective effort from tank crew drills through battalion ARTEP any time two or more soldiers perform different tasks which seek a common end. Ideally, the long-range plan focuses initially on individual training, then collective training at squad, platoon, or section level, and finally collective training at unit level such as an ARTEP or AGI. In a headquarters company it is important to stress that all levels of training occur simultaneously. Section OICs, platoon leaders, and the "boss" are continuously training their sections and staffs. It is their responsibility.

The maintenance sergeant still has the responsibility to evaluate his mechanic when he troubleshoots an electrical system on a vehicle; medics must still be evaluated while they conduct sick-call during the AGI. This multi-echeloned training re-emphasizes the need for all supervisors at all levels to constantly seek out training opportunities and evaluate their subordinates when training occurs.

The Training Schedule. One of the most important tools of the HHC commander is the training schedule. This sequence of events outlines the week's activities. As a commander in a HHC, you so seldom see your NCOICs that their priorities may push your requirements to the back of their minds. It is your operations order for this week and, when it applies, the training schedule becomes your hammer to hold over the heads of those that choose not to support you. An abbreviated schedule may look something like the following:

Monday		
Unit	Time	Topic
HHC (-)	0600-0630	Linen exchange
HHC	0630-0815	Standard calls
HHC	0815-0830	Formation
HHC (-)	0830-1530	Mission support (Note 1)
¼-ton Club	0830-0900	Weigh-in
Driver HQ 33	0830-1530	Vehicle painting (Note 5)
Driver HQ 16	0830-1530	Semiannual service (Note 2)
19E	0830-1530	Tank Table I, II, III, IV (Note 4)
Tuesday		
HHC	0630-0815	Standard calls
HHC	0815-0830	Formation
HHC (-)	0830-1530	Mission support (Note 1)
Driver HQ 33	0830-1530	Vehicle painting (Note 5)
Armorer	0830-1000	Update hand receipt (Note 3)
19E	0830-1530	Tank Table I, II, III, IV (Note 4)
All other drivers	0830-1130	Generator maintenance

(Continued on page 34)

Wednesday		
HHC	0630-0815	Standard calls
NCOICs	0730-0815	Training meeting (Note 7)
HHC	0815-0830	Formation
HHC (-)	0830-1530	Mission support (Note 1)
Driver HQ 8	0830-1530	Vehicle painting (Note 5)
Driver HQ 36	0830-1530	Quarterly service (Note 2)
All other drivers	0830-1130	PMCS checks (Note 6)
All NCOs	1600-1700	NCO development
Thursday		
HHC	0630-0815	Standard calls
HHC	0815-0830	Formation
HHC (-)	0830-1530	Mission support (Note 1)
Group A	0830-0900	Command information
Group A	0900-1130	Tasks 031-503-1004/ 1006; 031-503-1015, 081-831-1009
Driver HQ 8	0830-1530	Vehicle painting (Note 5)
Driver HQ 36	0830-1530	Quarterly service (Note 2)
Friday		
HHC	0630-0730	Standard calls
HHC (-)	0730-0900	Open wall locker standby inspection (Note 8)
HHC (-)	0900-1530	Mission support (Note 1)
Group B	0900-0930	Command information
Group B	0930-1200	Tasks 031-503-1004/ 1006; 031-503-1015, 081-831-1009
Officers	1530-1700	Officer professionalism
Notes		
1. SQT tasks are listed below for each MOS		
19E		
171-127-1009	.....	Apply BOT
171-127-1010	.....	Apply subsequent fire command
171-127-1011	.....	Apply battlesight
171-127-1013	.....	Use precision gunnery
94B		
101-524-1161	.....	Prepare and bake bread
101-524-1162	.....	Prepare and cook eggs
101-524-1163	.....	Prepare and cook cereals
101-524-1164	.....	Prepare beverages
2. Driver will assist mechanics and vehicle supervisor must check twice daily.		
3. All sets, kits, and outfits will be inventoried before this time. Each hand receipt will be updated completely.		
4. All 19Es will participate in class D uniform and the tank section will report the results of its firing at the end of the day to the commander.		
5. Drivers will do the work and vehicle supervisors must spot check.		
6. DA Form 2404 will be submitted to motor sergeant after it is signed by the section NCOIC. All parts received will be applied to vehicles and the operator list in the motor pool will be updated.		
7. Job books and key leader's checklists will be checked by the commander.		
8. Section NCOs will be present.		

Additional Ideas. After having commanded two headquarters companies I have picked up some ideas, or gimmicks if you will, that have assisted me. Some of these are my own, while others are not.

- Compile a CQ/CQ runner book. It should encompass a variety of topics and multiple choice questions. Include a copy of the division NBC test, the field sanitation test, ques-

tions that promotion boards often ask, general knowledge questions, and even that latest vehicle recognition guide from ARMOR magazine. The tour of duty usually provides enough time to answer pages of questions. Check the answers the next morning and critique the individuals. Those soldiers showing a desire to excel will identify themselves. The level of job knowledge should increase across the board and you may identify the next NBC NCO or field sanitation team member in the process as well.

- Inspect one vehicle every day. Have the driver bring his hand receipt, and complete a PMCS for you. Allocate 2 hours a day for this, and the dividends will more than compensate for the time invested. Vehicle status can be verified; driver knowledge and cleanliness and accountability of tools can be checked. You will also find out which sections are supporting your programs and which are not.

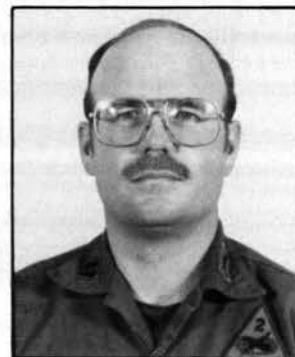
- Develop a checklist for your NCOICs to remind them of their responsibilities. It can include checking driver licenses against the DD348, updating battle rosters, checking load plans and maintenance parts racks, requesting supplies, and checking document numbers for vehicle parts "due in." This list can obviously include a variety of activities. The idea is that they must update the list by checking the items themselves. Periodically have them hand the updated list over to you at a weekly training meeting. Again, you will find out which sections are supporting you.

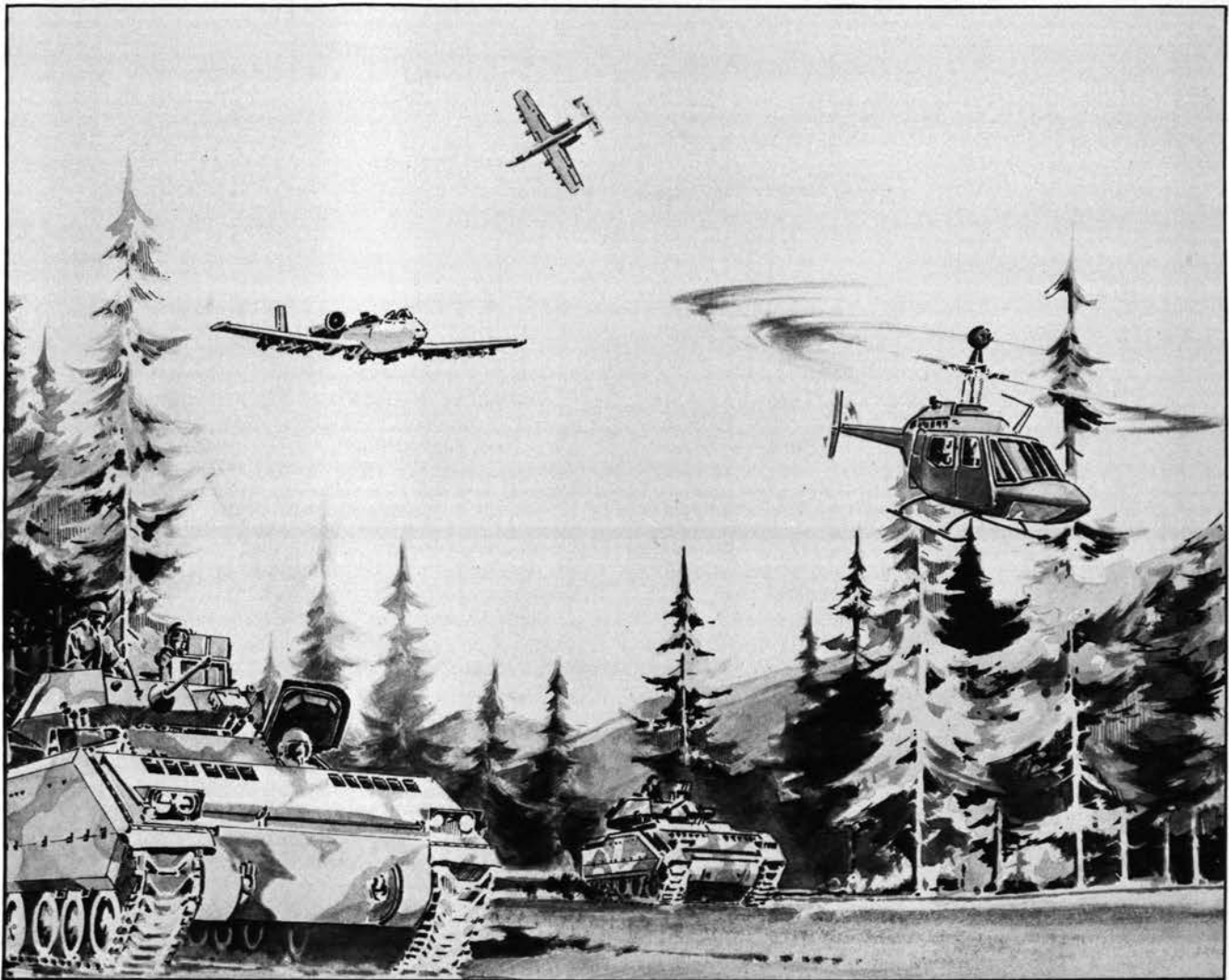
- Now that the weekly training meeting has been mentioned, it needs some explanation. The NCOICs meet weekly to resolve conflicts in the next week's activities. All job books are turned in to and are inspected by the training NCO, who quickly gets them back to the respective NCOICs. Additional guidance on next week's activities is given and you provide them feedback from last week's activities. Close the loop at this meeting.

Conclusion. An effective training program produces a well-rounded soldier—one who knows his garrison tasks and one who can fight and win. A well-organized training program makes maximum use of available resources, and if supported, is less of a strain on the staff sections. The cumulative effect of these different programs will impact significantly on your unit. You, the HHC commander, must make it work.

Writing authoritatively on a "soft topic" leaves me open for criticism and "hair-splitting." My intent is to outline a total program that has been successful on two different and separate occasions. Commanding a battalion headquarters company in CONUS and a brigade headquarters company in USAREUR have provided me an opportunity to stimulate thought not only among headquarters company commanders, but also their bosses, the staff officers, the NCOs, and perhaps all company commanders. If the article accomplishes this, then it is successful. So take your shots. Let's all learn.

CAPTAIN WILLIAM D. HEWITT graduated from Penn State University in 1976 as a Distinguished Military Graduate. He served as platoon leader, battalion XO and company commander. He is a graduate of the armor officer advanced course and currently commands B Company, 1st Battalion, 66th Armor at Fort Hood, Texas.





Airland Battle Defeat Mechanisms

by Major Michael S. Lancaster and Jon Clemens

This article continues the discussion of the armor force and the Airland Battle begun in the January-February 1982 *ARMOR*. Our purpose is to explain how Airland Battle proposes to work at the conceptual level, its defeat mechanism. As such, this article not only continues the discussion just mentioned, but serves to complement the lead article of the May, 1982 *Military Review*, "The Operational Art of the Airland Battle," by Lieutenant Colonel Steve Doerfel. In a preface to Lieutenant Colonel Doerfel's article, General Glenn K. Otis, Commanding General, TRADOC, urged a continuing professional discussion of Airland Battle. Accordingly, a bibliography of recent articles from professional journals is included. While the bibliography is not exhaustive, it constitutes a useful primer.

Lieutenant Colonel Doerfel's article suggests how Army groups and corps must employ operational art at the theater level to come to grips with the Soviet operational concept. The defeat mechanisms themselves—"operational art," if you will—must be understood at a level once removed in abstraction from specific application if their logic is to be compelling. First, though, defining "operational art" is in order. The easiest way to do this is to put the term in a context with more familiar terms—strategy and tactics.

Writing in *International Security*, winter 1980/1981 (Vol. 5, No. 3), Edward Luttwak differentiates the terms this way: In theater strategy, political goals and constraints on one hand and available resources on the other determine projected outcomes. At a much lower level, tactics deal with specific techniques. In the operational dimension, by contrast, schemes of warfare such as *blitzkrieg* or defense-in-depth evolve, or are exploited. Such schemes seek to attain the goals set by theater strategy through suitable combinations of tactics.

Battalions do not collide by chance; rather, tactics and their application at the maneuver unit level against an opponent parallel a more abstract effort wherein the operational art, or concept, and the plan of one commander are pitted against those of the opposing commander. In the case of our most obvious threat, it is Airland Battle against Soviet echelonment.

Theater strategy aside, if we place two armies opposite each other and the ultimate objective of each is to defeat the other, there are really two ways to do this. The first way is to destroy the opposing force's combat power. A force accomplishes this, whether on the offense or defense, by attacking enemy combat units and destroying armored fighting

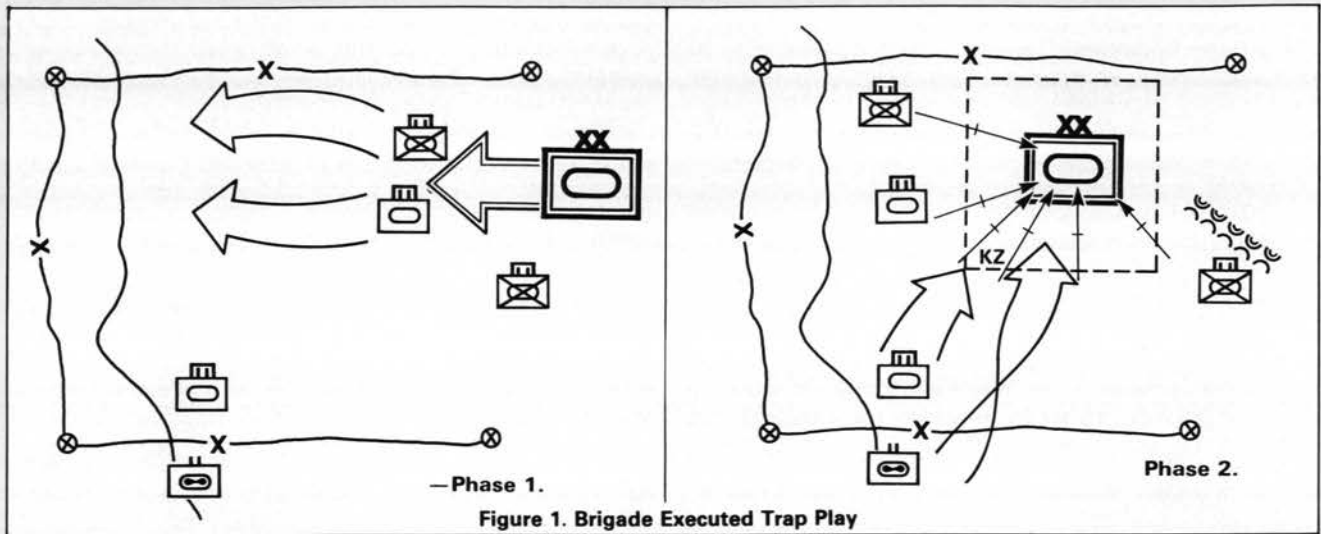


Figure 1. Brigade Executed Trap Play

vehicles and killing soldiers. The second way is to disrupt the enemy's ability to fight as he wishes to fight, by attacking command and control, lines of communication, logistics, and other necessary support. Destruction and disruption may work singly or, most often, together at the operational level to overthrow the enemy plan. Operational defeat mechanisms, then, insofar as the operational orientation is on the enemy force rather than some other strategic objective, will work to employ one or both techniques.

The clearest way to see the difference between destruction and disruption is to see the *difference in objectives* of two operations similar in design, albeit probably carried out by different tactical echelons. Both involve flanking movements carried out as part of a defense. The first example typifies destruction of enemy combat power.

Called a "trap play," or mechanized ambush, the operation entails a "preplanned retreat" on a route favorable to an enemy force to draw the enemy into a kill zone, wherein fires of ground and air maneuver units and supporting artillery rapidly destroy the enemy force. The trap play (figure 1) thwarts the enemy plan by destroying enough of the attacking regiment's systems so that it can no longer attack. Because of its scope, a disruption operation (figure 2) will be undertaken at a higher echelon.

Here, the defending corps disrupts the coherence of the main attack by maneuvering air and ground combat units against the sustainment capacity and command and control of the attacking forces. In fact, the enemy force is trying to

rupture the forward defense to get at the defender's supporting structure, collapsing the defense along the entire corps front—roughly the same tactical objective of the defender's flanking counterthrust.

It is worth noting that while we think of the Soviet concept in terms of echelonnement, most modern armies attack and defend in depth, even if their deployment is not so stylized. The discussion here will consider the Soviet operational concept of echelonnement.

We talk so often of echelonnement, thinking of it in terms of wave upon wave of massed combat systems, that we sometimes overlook the operational function of echelonnement. Tactical flexibility at all levels of command is the point. The Soviet commander is able to hold and employ considerable combat power to reinforce success *after* the battle is joined. This can happen in two ways:

First, succeeding echelons bypass units held in contact. If the Soviets cannot attack everywhere, we surely cannot defend everywhere. In fact, we allow that we must take risks in certain areas to defend others against main thrusts. With our tired and weakened battalions held in place by first echelons, second echelons attack where we are not.

Second, should leading echelons succeed in forcing a penetration of the forward defense, following echelons

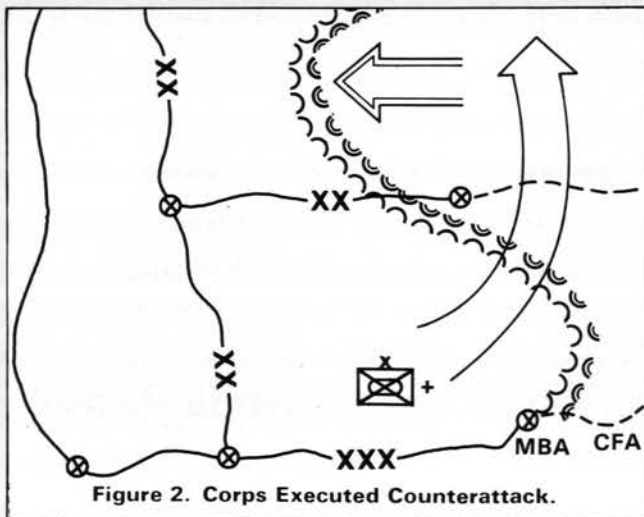


Figure 2. Corps Executed Counterattack.

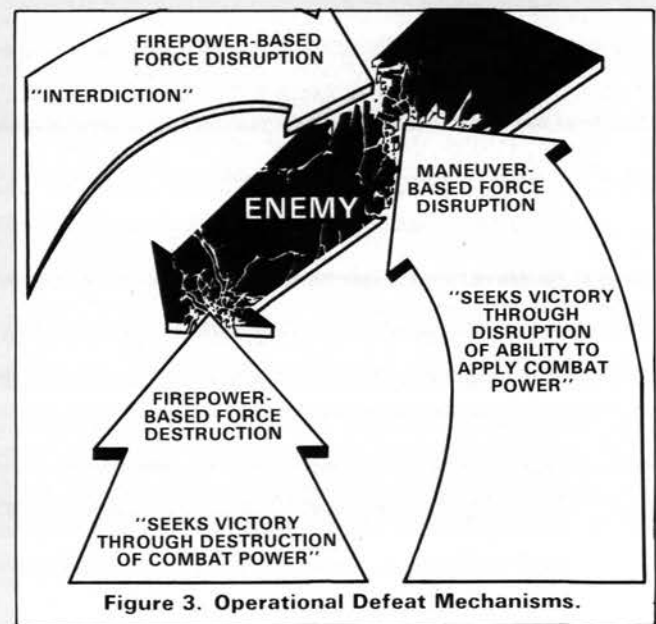


Figure 3. Operational Defeat Mechanisms.

quickly seek to exploit the penetration.

One thing is certain. The echelonment concept with its following forces does not seek success by wearing down opponents with the dead bodies of its comrades in leading echelons. It is tactical flexibility that Airland Battle must deal with at the operational level if we would first subvert the Soviet plan and then destroy the Soviet attack.

Airland Battle employs both disruption and destruction mechanisms to overthrow an echeloned attack. Figure 3 shows the defeat mechanisms of Airland Battle. The firepower-based force disruption mechanism aims at systematic disruption of following echelons when they are still some distance from the forward lines of troops (FLOT). Using precision target acquisition and weapons capable of attacking these deep targets, this mechanism seeks to slow the arrival of following forces by attacking the elements that enable Soviet commanders to marshal large mechanized forces and deploy them forward in a timely fashion. Targets include command and control, maintenance, logistics systems, and the lines of communication that support them. The goal here is twofold: first, to prevent following forces from overloading the units defending the FLOT; second, to open a time and space window between echelons to allow defending forces to counter and destroy the first echelon attack.

The maneuver-based force disruption takes advantage of the window to strike behind attacking forces, disrupting their ability to continue the attack. This mechanism is a disruption mechanism in that it, too, interrupts the coherence of the enemy commander's plan because it takes away the "lifblood" of the attacking force—its fuel, ammunition, communication, and maintenance and replacement capabilities. Both disruption mechanisms use firepower to

destroy enemy systems. The objective is to disrupt the coherence of the enemy plan. But unless one has a significant parcel of space to trade, disruption alone will not complete the destruction of the enemy attack.

Firepower-based force destruction is the means whereby the original attack is contained and following forces destroyed. Here, firepower is orchestrated to maximum effect, killing as many enemy systems and soldiers as possible. Tactics are best used to gain these effects: initially, one must maneuver combat power to counter initial enemy thrusts, preventing them from breaking through. Eventually, forces will be committed to destroying units cut off by maneuver disruption or counteroffensives. Again, the objective is to kill the constituents of the enemy's combat power rather than attempting to disrupt the enemy commander's application of his combat power.

The corps commander employs his maneuver and combat support assets, both out of the corps base and with the mission he gives his division commanders, to use both destruction and disruptive mechanisms. The armor force at the maneuver battalion and brigade level, when appropriately task-organized with fighting elements that make up the combined arms team, is the executor of two of the defeat mechanisms of Airland Battle. Armor, as a "state of mind"—high speed, maneuvering firepower—is adept at the cut-and-thrust of firepower-based force destruction as well as parry and counterthrust of maneuver-based force disruption. Airland Battle is an operational concept that can defeat the echeloned scheme of Soviet doctrine, but it must be seen as aimed at the enemy commander's plan and not just at his army.

Armor will play a key role in overthrowing both.

Bibliography

- Clarke, Bruce D. GEN, USA (Ret). "The Battle of St Vith Established a Concept in Defensive Tactics of Armor." Clarke. "The Principles of the Employment of Armor." Lecture, Naval War College, academic year 1948-1949. (Note both of GEN Clarke's articles are Armor School handouts.)
- Deal, C. Lanier, Jr., MAJ, USA. "The Key to the Deep Battle." *Military Review*, March 1982, pp. 51-54.
- Doerfel, John S., LTC, USA. "The Operational Art of the Airland Battle." *Military Review*, May 1982, pp. 3-10.
- Field Artillery School. "Implementing the Airland Battle." *Field Artillery Journal*, September-October 1981, pp. 20-27.
- Franz, Wallace P., COL, USAR. "Grand Tactics." *Military Review*, December 1981, pp. 32-39.
- Grange, David E. Jr. LTC, USA. "Infantry and Air Defense in the Airland Battle." *Air Defense*, October-December 1981, pp. 24-25.
- Griffis, Jimmy, LTC, USA et. al. "The Mechanized Infantry Battalion Task Force in the Airland Battle." *Infantry*, July-August 1982, pp. 20-24.
- Holder, L. D., LTC, USA. "Maneuver in the Deep Battle." *Military Review*, May 1982, pp. 54-61.
- Lancaster, M. S., MAJ, USA. "The Armor Force in the Airland Battle." *ARMOR*, January-February 1982, pp. 26-32.
- Luttwak, Edward N. "The Operational Level of War." *International Security*, Winter 1980-1981 (Vol. 5, No. 3), pp. 61-79.
- McCaffrey, Barry R. LTC, USA. "The Battle on the German Frontier." *Military Review*, March 1982, pp. 62-70.

- McNair, Carl H. Jr., MG, USA and Josef Reinsprecht, CPT, USA. "Army Aviation Forces in the Airland Battle." *U.S. Army Aviation Digest*, July 1981, pp. 6-13.
- Noah, Max W. MG, USA. "Combat Engineering in the Airland Battle." *The Military Engineer*, November-December 1981, pp. 378-382.
- Oblinger, John B. Jr. MG, USA. "Air Defense in the Airland Battle, Part I." *Air Defense*, July-September 1981, pp. 36-40.
- Oblinger. "Air Defense in the Airland Battle, Part Two: Contingency Areas." *Air Defense*, January-March 1982, pp. 35-38.
- O'Meara, Andrew P., Jr., COL, USA. "Dimensions of Mobility." *ARMOR*, January-February 1982, pp. 22-25.
- Richardson, William R. LTG, USA. "Winning on the Extended Battlefield." *Army*, June 1981, pp. 35-42.
- Sinnreich, Richard Hart, LTC, USA. "Tactical Doctrine or Dogma." *Army*, September 1979, pp. 16-19.
- Starry, Donn A. GEN, USA. "Extending the Battlefield." *Military Review*, March 1981, pp. 31-50.
- Starry. "The Principles of War." *Military Review*, September 1981, pp. 2-12.
- Tate, Clyde J. COL, USA and LTC L. D. Holder. "New Doctrine for the Defense." *Military Review*, March 1982, pp. 2-9.
- TRADOC Pamphlet 625-5, "The Airland Battle and Corps 86." 25 March 1981.
- Wass de Czege, Huba LTC (P) USA and LTC L. D. Holder. "The New FM 100-5." *Military Review*, July 1982, pp. 53-70.

MAJOR MICHAEL S. LANCASTER is a USMA graduate and is presently chief, Scenario-Oriented Recurring Evaluation System at Fort Knox, KY. He is a graduate of the Naval Command and Staff College and holds an MA degree in literature and language from the University of Kentucky. He has served in Germany and Southeast Asia and on the staff and faculty of USMA.



MR. JON CLEMENS is a writer-editor at the USAARMS Training Literature Division. Prior to joining the civil service, he was a reporter for a New Jersey daily newspaper and later for the Louisville Times. He is a graduate of Union College, Schenectady, NY.





Soviet Tank Gunnery Training

by Captain Matthew S. Williams

The Soviet soldier learns nothing about gunnery during his pre-military instruction nor during his basic training.

At the completion of his 4-week basic training, the soon-to-be tank gunner takes his formal oath of enlistment, and is sent to the gunnery specialist school. Depending on the school, and the soldier's natural aptitude, he will take about 4 weeks to complete the course.

When the soldier reaches his unit, his training program is outlined by the Ministry of Defense, refined and elaborated upon by the Military District, the Groups of Forces, and the division commanders. The regimental commander and his staff break down the number of hours for each broad subject (political training, tactical training, etc.) to be taught by the battalions. Before informing the battalions, the regimental commander checks with the division commander for approval.¹ Training of the gunner is, in effect, controlled by the division commander. Supposedly, the gunner spends 60 to 65 percent of his time in the field. And as much as 40 percent of his time is intended as night training. This will vary according to the availability of training resources and the dedication and ingenuity of his leadership.

The Soviet gunners' training is designed to produce a conditioned, rote response. To accomplish this, the gunner is primarily taught how to fire two types of engagements; one uses the stadia line rangefinder (precision gunnery), the other uses a principle called "grazing shot" (battlesight gunnery). To conserve ammunition, the Soviet gunner makes considerable use of subcaliber devices and simulators as does his American counterpart. Unlike his American counterpart, how-

ever, there is no equivalent to FM 17-12, *Tank Gunnery*, available to the Soviet gunner. His manuals are the work-notes he has made during the course of his training.

Precision gunnery, as learned and used by the Soviet tank gunner is somewhat less than that practiced by the American tank gunner. The Soviet gunner must first determine the tank-to-target range by using the stadia rangefinder, an integral part of his gunsight. This horizontal reticle measures the distance by determining target height, rather than target width. The gunner's telescope is located to the left side of the main gun. The front part is attached to the gun cradle and moves with the gun. The eyepiece section remains fixed. The front section contains two etched glass plates. One displays the ballistic reticle for various types of ammunition, the stadia rangefinding scale, the aiming point, and the deflection scale. The other plate displays a crosswire and is fixed in position (figure 1).² To set the proper superelevation for a given round, the gunner places the crosswire on the desired ranging line of the appropriate ballistic reticle. After the range has been determined, the gunner moves his crosswire to the proper range mark on the ballistic reticle that corresponds to the ammunition used. He then lays the aiming point on the target and fires.

The other firing method is the grazing shot. Soviet manuals define this as: "A shot fired in such a way that the projectile does not rise above the height of the target during the entire range of its trajectory, and the aiming point is the base of the target. The range of the grazing

shot is the greatest range of the flight of a projectile during which the projectile never rises above the target height. Therefore, the range of the grazing shot depends on the height of the target and flatness of the trajectory.¹³ This is battlesight gunnery as we know it. The extremely high velocity of the Soviet armor defeating round provides the flat trajectory that is essential if the grazing shot is to be effective.

Soviet armor doctrine is based on the attack. Therefore, tank gunnery training is geared to firing either at a halt, at a short halt, from a stationary position, or on the move as they advance.

Firing at a short halt is used only when a target is dangerous; i.e., an enemy tank emplacement, a difficult to reach position, or one so small that firing on the move would be ineffective. The *halt* and *short halt* are differentiated by the amount of time the tank is stopped during the engagement. The *halt* can run from 30 to 50 seconds and the *short halt* is considerably shorter.

When firing from the halt, the tank is usually limited to two shots and no more than four. The tank remains in the halt position until the target is suppressed, destroyed, or otherwise neutralized. The preparation for firing—target detection, ranging, direction and speed of movement of the firing tank (as well as the target), selection of ammunition, and the determination of initial sight picture—are all done on the move.⁴ As soon as the tank comes to a halt, the gunner must fire. The decision to move again is left up to the driver, and without close coordination, the tank might well halt and move out again before a shot is fired. Observation of the shot is also done on the move from one short halt to the next. Movement is made at maximum possible speed, with the distance between halts depending on the preparation of the main gun for the next shot, terrain, intensity of incoming fires, and conditions for observation. Usually, the distance between short halts is 50 to 150 meters.⁵

The Soviet gunner uses a variety of turret trainers and subcaliber devices in training for these situations. These tools are available at his home station and are used to reduce the number of main gun service rounds fired. The sheer size of the Soviet tank fleet makes extensive main gun firing economically impractical, and service ammunition is very limited.

One such subcaliber device is similar to the U.S. *Stout* board. A panel is placed in front of the gun muzzle, and the device is attached to the main gun tube. This solenoid pantograph drives a pin into the board whenever the triggers are pulled. The device is not particularly suited for training gunners to engage moving targets, and does not provide the loader with very realistic instruction. The pin pricks on the board do, however, give an accurate and permanent record of the gunner's performance against stationary targets.

Another device uses a focused beam of light and an aiming board. Images are flashed on the board by a movie projector, and the focused beam strikes the board when the gunner's firing circuit is completed. Unlike our *Stout* board, the board does not block out some areas that might otherwise be used for target arrays. This device is usually incorporated onto a rocking sled arrangement that simulates tank movement, and the gunner can be trained to shoot on-the-move. An important drawback is that the training supervisor has no permanent record of the gunner's performance. Also, since the rocking motion is mechanically induced, the gunner can learn the rhythm and anticipate the machine's next move. Additionally, the focused beam of light eliminates all superelevation between the sights and gun, thus eliminating ranging practice.

Another device uses a motion picture camera that is strapped to the main-gun tube and is activated when the firing circuit is completed. Used in the same manner as the focused light device, it has essentially the same drawbacks. A permanent record of the firing is made, but unlike the pantograph device, the trainer and the trainee must wait for the film to be developed. As with the pantograph and the focused light device, the motion picture camera does not provide very realistic training for the loader.

One optical monitoring device that reduces the problem of relating the sight and gun tube superelevation is a burst-on-target (BOT) type trainer called the KOP-R optical mirror. This device fits over the optics of the gunner's sight and is mechanically linked to the gun tube.

It allows the instructor to see exactly what the gunner is doing with his sight picture—how he is ranging—how he indexes the superelevation, and exactly where he places the aiming point. Using this tool, the instructor can shine a light back through the sight and induce error into the sight picture. Using the light as a tracer, the gunner adjusts his sights using the BOT technique. The two major advantages of this system are the flexibility (it can be used against a widely-varied target array) and the fact that it provides feedback to the instructor (when the gunner makes a mistake, he can quickly be told what he did wrong). This device can also be used with the rocking sled frame if the instructor is willing to perch himself atop a careening turret mockup and look through the KOP-R.

Perhaps the most realistic device is the TOPT. This is a recoil and ejection mockup that can be mounted on the rocking sled. When the gunner fires, the main gun recoils, returns to battery, and runs through the ejection and reloading sequence. The device can be used to train the tank commander, the gunner, and on older model tanks, the loader.

To gain further understanding of Soviet gunnery practices, a more detailed examination of the individual skills that become battle drill is warranted. Responses to a changing tactical situation are intensely dogmatic at platoon, company, and battalion level. Soviet gunnery combat drill supports this. As is characteristic of Soviet operations planning, every possible contingency is allowed for. The detail with which Soviet company and platoon commanders plan sectors of fire, reference points, and engagement areas is an example. The basics of Soviet fire distribution are simple. The commander uses one of two methods to break down the sectors of fire—either terrain points or reference-and-angle.

When using the terrain point method, the commander announces the borders of the sectors of fire as they relate to recognizable objects on the ground. An example would be, THIS IS KLEN TWO ZERO (The company commander's call sign)—ZONE OF FIRE FOR TWO FOUR (the second platoon)—ON THE RIGHT—CORNER OF GROVE—ONE SIX HUNDRED METERS—ON THE LEFT—CLUMP OF TREES—ONE FOUR HUNDRED METERS. ZONE OF FIRE FOR TWO ONE (the first platoon)—ON THE RIGHT—SINGLE HOUSE—ONE EIGHT HUNDRED METERS—ON THE LEFT—CROSSROADS—ONE EIGHT HUNDRED METERS—ZONE OF FIRE FOR TWO THREE (third platoon)—ON THE RIGHT—CLUMP OF BUSHES—SIX HUNDRED METERS—ON

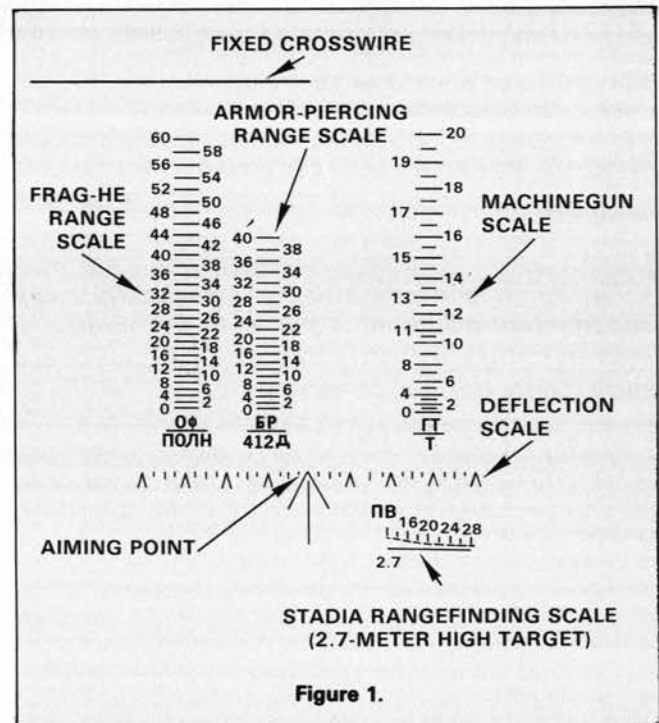


Figure 1.

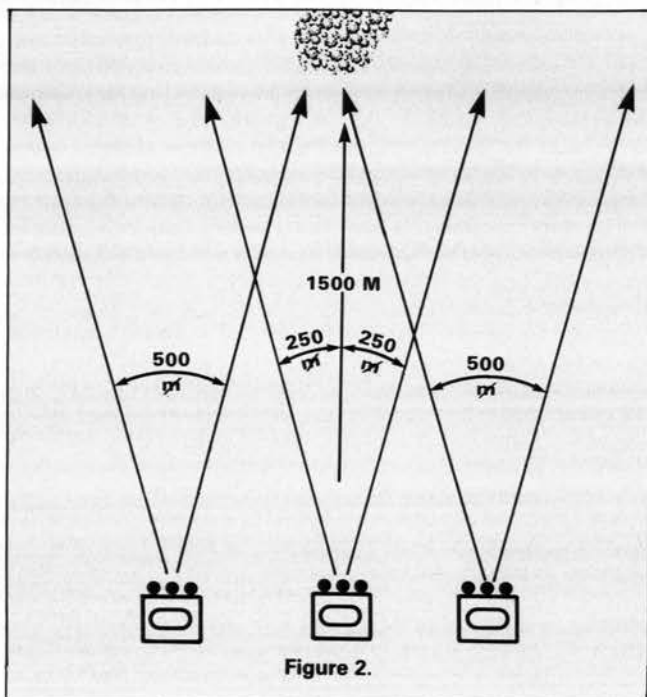


Figure 2.

THE LEFT—KRUGLAYA HILL—ONE FOUR HUNDRED METERS—THIS IS KLEN TWO ZERO.⁶ This method is least preferred since it is wordy and apt to be misunderstood if transmitted over the radio. It does, however, have the advantage of precision and clarity when presented face-to-face.

The reference-and-angle method identifies an easily recognizable feature and sets the width of the sectors. For example, THIS IS KLEN TWO ZERO—DIRECTION OF FIRE—CLUMP OF TREES STRAIGHT AHEAD—ONE FIVE HUNDRED METERS—DIVIDE ZONE OF FIRE BY FIVE ZERO—THIS IS KLEN TWO ZERO. In this brief statement, the commander has indicated that the left hand platoon takes the clump of trees, measures to a point 500 mils to the left of it, and takes that area as their sector of fire. The right platoon starts with the trees on the left, measures 500 mils to the right and uses that as their sector of fire. The center platoon simply measures 250 mils to either side of the trees (figure 2). In the event that there is no prominent feature in the exact direction of attack, the center point can also be shifted to the left or right.

Volley fire is considered a viable and effective method of neutralizing enemy targets. At 2,500 meters, you stand a 25 percent probability of hit (P_h) if one tank shoots, but if the two tanks in the platoon fire, the P_h is 58 percent, and if the whole company shoots, the P_h jumps to 94 percent!⁷

The Soviet gunner's training is physically tough and like training for all Soviet soldiers regardless of their specialty is repetitive. It excludes initiative and encourages learning by rote.

Since the flat trajectory of the Soviet hypervelocity sabot round lends itself to the grazing shot, or battlesight, method of engagement, and since the stadia-type rangefinders become progressively more inaccurate at extended ranges, the destruction of targets at maximum range presents a great challenge to the Soviet gunner. Firing at ranges in excess of 2,500 meters requires precise target designation, skillful organization of fire, and correct adjustment. Fire for effect, therefore, is usually preceded by registration. The company conducts a direct, long-range fire mission in three phases: prepare to fire, registration, and fire for effect.⁸

Prepare to fire can be as simple as positioning the tanks within

reasonable proximity to each other and acquiring the target. In addition, the commander must give the instructions for the first shots on target. These shots serve as the registration for the rest of the company. When the registration is complete, the "ladder" technique is employed. On command, one crew sets its sights slightly below, one crew sets right on, and one crew sets slightly above the announced settings. Crews of other platoons observe the strike of the rounds.⁹ When the correction is determined, the firing platoon reloads and the entire company fires in volleys until the target is destroyed. If speed is not a consideration, bracketing fire can be used to conduct the registration followed, as with ladder fire, by company volley fire.

The Soviet gunner's training is physically tough and, like training for all Soviet soldiers regardless of their specialty, is repetitive. It excludes initiative and encourages learning by rote.

The Soviet gunner learns precision gunnery using the stadia rangefinder. He also learns the grazing shot technique, night fighting, and fires on a variety of gunnery simulators. He spends many hours at the pantograph, and using focused light beams, movie cameras, and TOPT trainers to analyze his performance. BOT trainers, recoil simulators, and in-bore subcaliber devices also are used, but in comparison to his American counterpart, the unique feeling of putting steel on target remains a thing of lectures rather than direct experience for the Soviet gunner.

The Soviet tank gunner may not have the natural mechanical aptitude of his American counterpart, but his equipment is designed to compensate for this. He may or may not be highly motivated with feelings of socialist fervor, but he is very closely supervised by his officers, and his political indoctrination is thorough.

As part of a platoon, and as part of a company, the Soviet gunner learns by rote the techniques of long-range gunnery, ladder, and bracketing fire in platoon and company volleys. Repetition is the essence of his training. In the absence of further orders, the Soviet gunner will continue to follow instructions even though they have become obviously inappropriate.

The average Soviet gunner is 5 feet 4 inches tall, competent, well-conditioned physically, and will do what he is told. In combat, he will do everything in his power to make his enemy's life a good deal shorter (or, at the very least, most unpleasant) than it would be otherwise.

He is tough—but he is beatable.

Footnotes

¹DOD Bulletin 1100-1-7-78: Defense Intelligence Report: *The Soviet Motorized Rifle Battalion*, September 1978, p 57.

²*Soviet Tank Crew Training*, volume 2, annex C, appendix 15, p C-1.

³Ibid.

⁴Ibid.

⁵Ibid.

⁶"Fire Distribution in Battle," by Lieutenant Colonel F. Rodinov, *Voenny Vestnik* in Russian, Number 1, 1976, p 92 and 93.

⁷*Soviet Tank Crew Training*, volume 2, annex C, appendix 15, p C-11.

⁸"Fire to Maximum Range," by Captain N. Korschunov, *Voenny Vestnik* in Russian, Number 2, 1980, p 70-72.

⁹Ibid.

CAPTAIN MATTHEW WILLIAMS was commissioned in 1977 as a distinguished military graduate from the University of Pennsylvania. He has served as platoon leader in his initial assignments and later as S1 at battalion and brigade levels in Germany. He is presently serving with the XVIII Airborne Corps G3 Air.





Replacing Britain's APCs

by Mark L. Urban

The programmed replacement of Britain's armored personnel carrier (APC) force over the next decade poses a number of problems, not the least of which is cost. Some 2,300 vehicles of the FV432 (figure 1) family are due for replacement and, like the U.S. M113, are outdated. A requirement was recently laid down for 1,900 MCV80s (figure 2) to be produced by GKN-Sankey, at a reported cost of £1,000 million (approximately \$1.75 billion). Reliable sources indicate, however, that this requirement has been revised downward due to fiscal constraints. The discussion is now one of acquiring perhaps half the original number of MCV80s and other, less expensive, vehicles. It should be noted, however, that even the original requirement for 1,900 vehicles might be inadequate.

Since the FV432 came into service in 1963, less than one third of Britain's infantry battalions have been mechanized. The remainder are described as "airmobile" and would probably be transported to the battlefield in trucks to fight on foot. While the quality and flexibility of Britain's airmobile infantry battalions cannot be doubted, it would be preferable to equip those

earmarked to reinforce the 1st British Corps in Germany with some form of armored protection.

British concepts of the use of infantry carriers on the battlefield differ from those of many NATO countries in that most commanders see the FV432 as no more than a "battlefield taxi," (an APC in its truest sense) designed to deliver the fighting men to the battlefield. However, even with the recent addition of a 7.62-mm machinegun turret, the FV432 is not equipped to be aggressive on the battlefield. Perhaps because of the high fighting qualities of the British infantry, commanders have seen little need for a mechanized infantry combat vehicle (MICV). The proposed MCV80 does represent a halfway house, with its respectable main armament, but without the capability for infantry to fire from within.

The MCV80, as recently displayed at the British Army Equipment Exhibition, is armed with a 30-mm Rarden gun and a 7.62-mm coaxial machinegun in a conventional turret. Its firepower will be significantly enhanced when the 30-mm Rarden armor-piercing, discarding-sabot (APDS) round is made available. The

Rarden can be fired in single shots or bursts and is effective against the full range of Threat armored vehicles except main battle tanks.

The MCV80 has aluminum armor on all sides and the floor. In its platoon mode, the vehicle carries ten men: driver, commander, gunner and seven infantrymen. While no provisions have been made for firing through gunports from inside the vehicle, there are two large roof hatches which may be used for this purpose.

Considerable emphasis has been placed on mobility. The Rolls-Royce OV 8 CA V-8 550-hp engine gives a power-to-weight ratio of 23.5 bhp/ton. The power pack is linked to an Allison X series (UK-built) transmission with four forward and two reverse gears. The differential steering system is based on a variable hydrostatic drive. Ground clearance is 490-mm (approx. 19 inches). GKN-Sankey has made use of new technology "squeeze-form" aluminum in the running gear to increase strength and reduce wear. Tracks are rubber-padded, and rubber-bushed track pins lower noise and friction. Torsion bars provide the suspension. The vehicle does not seem



Figure 1. FV432

to have armor skirting over the tracks.

The new engine and its power train, steering, and trackage give improved mobility to the 24-ton vehicle, but its increased weight, due to the improved armor, has reduced its mobility in the strategic sense because of its 9-ton weight increase over the *FV432*. It also lost the water crossing capability of the *FV432*.

A number of variants to the *MCV80* are being studied by the manufacturers. The APC version would offer a 7.62-mm machinegun turret and the ability to carry 10 infantrymen. The "APC 90" version would have no Rarden turret and would be shorter with five, rather than six, road wheels. There are also recovery, mortar, and command vehicle variants under study. The automotive system is designed to operate with loads up to 30

tons and the addition, for example, of a 35-mm DCA anti-aircraft turret would present no problems (Figure 2).

The *MCV80* is nearing the end of its main development phase and if all goes well, should be in service by the late 1980s. The biggest question now hanging over this vehicle is that of cost. Unofficial sources indicate that in-service costs of £750,000 (approx. \$1,312,500), per platoon vehicle may be reached. Discussions now revolve around the question of purchasing fewer of these tracked vehicles and purchasing greater quantities of wheeled APCs.

In this latter category, the front runner may well be the *AT105 Saxon*, (figure 3) also manufactured by GKN-Sankey. The *Saxon* was designed primarily for the internal security role and has been sold to a number of developing countries. Its simple construc-

tion and conventional automotive components make it easy to maintain, give it reliability and, most important, it is inexpensive.

The *AT105 Saxon* is equipped with light armament. In its APC version it can be unarmed, or armed with a single 7.62-mm machinegun, or twin guns. Such armament must be considered somewhat inadequate in the context of a high-intensity European battlefield. The *Saxon* is, however, equipped with firing ports for small arms. Its conventional armor can defeat 7.62-mm and 5.56-mm and Garand armor-piercing rounds at point blank range. It can also defeat petrol bombs and other incendiary devices. The crew consists of commander and driver and it can carry eight infantrymen. It has an angled belly to resist mines and its GM Bedford 500, 6-cylinder diesel powers the 10-ton vehicle at road speeds of up to 96 km/hr. According to *Saxon* drivers who have spoken to the author, the *Saxon* does not have a significant cross-country capability because of its design features and the fact that it was primarily meant for road travel.

The Director of Army Training has apparently developed a concept of a mixed APC force in which tasks of close support for armor, transport to the battlefield, and rear security are differentiated. The wheeled APC is seen as filling the third requirement. Other wheeled APCs currently available include a four-wheeled, two-axled Vickers *Valkyr* (figure 4) armed with turret-mounted, twin 7.62-mm ma-



Figure 2. GKN-Sankey *MCV80* with two-man turret mounting a 30-mm Rarden gun.



Figure 3. AT105 Saxon



Figure 4. Valkyr

chineguns and equipped with firing ports and vision blocks for the troops inside. Its conventional armor can defeat 7.62-mm armor piercing rounds at point blank ranges and 105-mm splinters within 10 meters. In addition to the driver and commander, it can carry 10 troops. The *Valkyr's* GM 453T, 180-hp diesel engine allows road speeds up to 100 km/hr and the vehicle can climb 60 percent gradients. It has a 500-km cruising range, and is amphibious. Command and ambulance variant modes have been developed and it has also been fitted with a turret-mounted HOT antitank missile system.

Another armored wheel vehicle is GKN-Sankey's *FS100 Simba*, (figure 5) variants of which include vehicles armed with the 90-mm Cockerill gun and a TOW/ITV turret.

Another British-made armor vehicle on hand is the Alvis *Stormer*. The *Stormer's* hull is an elongated *Spartan* hull with an extra road wheel. A turret-mounted 25-mm Bushmaster gun is fitted, and the vehicle has impressive mobility.

A decision factor now under consideration in Britain is the possibility of adopting the U.S. *M2* infantry fighting vehicle. The reasoning behind this possibility lies in the probable extremely high unit cost for *MCV80s* if the original requirement for 1,900 is reduced by half. Furthermore, there already exists cooperation between Britain and the U.S. in the proposed setting up of two government-contractor (Go-Co) bases in Britain to service and modify USAREUR vehicles, including the *M2*. The *M2* would, no doubt, provide a more sophisticated and effective alternative than any of the vehicles mentioned above, except perhaps the *MCV80*. However, political considera-



Figure 5. FS100 Simba

tions involved in such a step would be difficult to resolve. A deterrent could be the argument that the *M2* is overly sophisticated for British needs, driving up total cost.

Meanwhile, command variants of the *FV432* have already been replaced in many British Army on the Rhine (BAOR) units by *Sultan* command vehicles of the *Scorpion* family. Similarly, *Striker* antitank vehicles may further replace the *Swingfire* *FV436* variant of the *FV432*. The British Army may, therefore, find itself with a curious mixture of *MCV80s*, *Scorpion* family vehicles, *FV432s*, and wheeled, armor vehicles. Obviously this is a somewhat unsatisfactory solution, at least from the point of standardization.

(The opinions expressed herein are those of the author and do not represent those of any agency or part of the Ministry of Defense.)



MARK L. URBAN served as an officer in the 4th Royal Tank Regiment and currently is an officer in the (British) Territorial Army. He is a student of International Relations at the London School of Economics, England.

RECOGNITION QUIZ

This Recognition Quiz is designed to enable the reader to test his ability to identify armored vehicles, aircraft, and other equipment of armed forces throughout the world. *ARMOR* will only be able to sustain this feature through the help of our readers who can provide us with good photographs

of vehicles and aircraft. Pictures furnished by our readers will be returned and appropriate credit lines will be used to identify the source of pictures used. Descriptive data concerning the vehicle or aircraft appearing in a picture should also be provided.

(Answers on page 48)



PROFESSIONAL THOUGHTS

We Still Need an Armored Force Badge

With reference to CSM Gillis' Driver's Seat, "Thoughts on the Need for an Armor Force Badge," (September-October 1981), I have the following comments to share with the armor community.

In his article, CSM Gillis states that "junior officers would receive the badge upon completion of the Armor Basic Course and enlisted men in Skill Level 2 through 5 (E4 through E7) upon obtaining a score of 80 or better on this skill qualification test (SQT). A sentence later he says: "It (the AFB) would be equal in precedence to the Expert Infantry Badge." This brings out two very important points.

First, the Expert Infantry Badge (EIB) test standards are set at 100 percent, so the AFB (with an 80+ score) could not be equal in precedence to the EIB and, secondly, as a junior officer coming out of the basic course, I should at least be made to earn the badge through a test so that I can wear it with the same pride as that of my soldiers who have earned it. Let's face it; the Infantry doesn't give the EIB away, it is earned with a 100 percent test score, and only the most competent wear it.

The two problems I spoke of above are probably easy to solve. First, make the test standards high—a 100 percent score or nothing. Secondly, offer an AFB test at the Basic Officer Courses, the NCO Courses and, perhaps, the Officers' Advanced Course, as well.

The Armor Force wants and needs a badge of prestige; one that we can wear with pride, knowing full well that we all achieved the same high standards to wear it, whether we be captains or privates. The AFB test should be demanding and challenging, and 100 percent is not too much to ask of ourselves. It is the "max"—the only goal for the Armor Force!

Through discussions between the officers and NCOs of Company F, 40th Armor, during professional development periods, we outlined the following criteria of what we thought would be a true test of the expert professional tanker and cavalryman.

Prerequisite

- Be a volunteer.
- Achieve expert qualification with the .45 caliber pistol.
- Score 270 or more points on the Army Physical Fitness Test (APFT) with a minimum of 80 percent in any single event.
- Score 90 percent on a day/night land navigation exercise.
- Have a first time GO for all test stations involving common tasks for armor crewmen and cavalrymen. These stations would include:
 - 18 hands-on-component SQT stations for skill level 1 and 2 with some stations having more than 1 task.
 - Crossover tasks.
 - 6 round-out tasks selected by the unit commander to further challenge the soldier; they may be selected from skill level 1-3.

A breakdown of the common tasks follows:

Hands-on-Component

Tasks	Soldiers Manual
• Maintain a .45 caliber pistol.	171-376-1001
• Maintain an M3A1 submachinegun.	171-140-1104
• Give first aid to prevent shock.	081-831-1005
• Put on and wear an M25A1 protective mask.	031-503-5012
• Operate an AN/GRA-39 radio control group.	113-622-2002
• Emplace and recover an electrically-armed Claymore mine.	051-192-1510

- Remove, disassemble, assemble, and install the breechblock of a 105-mm main gun (or equivalent tank main gun).171-139-1007
- Maintain an M85 .50 caliber machinegun.171-139-1041
- Orient a map using a compass.071-379-1011
- Determine grid coordinates of a point on a military map using the military grid system.071-329-1002
- Apply gunner and loader misfire procedures.171-139-1023
171-139-1018
- Place a tank external phone into operation.113-600-2006
- Install and operate an AN/VRC-46 or AN/VRC-12 radio set with intercom system.113-587-1042
113-587-1043
113-587-2034
- Use automated Communication and Electronics Operating Instructions.131-573-8001
- Install and operate hot loop wire communication. 113-588-1064
- Decontaminate self and equipment using appropriate decontamination apparatus.031-503-2002
- Prepare a range card for a tank.171-127-1015
- Give first aid to a nerve, blood, and blister agent casualty.081-831-1011
081-831-1012
081-831-1013

Crossover Tasks

- Perform operator's maintenance on M16A1 rifle, magazine, ammo; load, reduce stoppage and clear M16A1.
- Prepare an M72A2 LAW for firing, restore to carrying configuration.

AFB Roundout Tasks

- Call for and adjust indirect fire.
- Emplace and recover an M21 mine.
- Identify friendly and Threat vehicles and aircraft.
- Install and operate a TA-1 telephone.
- Enter and leave a radio net.
- Collect and report information using the SALUTE spot report format.

These outlined criteria are not designed as a concrete guide, but rather a road map for planning and adjusting. The 18 stations of the hands-on-component tasks are taken directly from SQT manuals and soldier's manuals.

The two crossover tasks are designed to keep the soldier familiar with equipment he may have to use on the battlefield should he lose his tank, i.e. an M16A1 and the M72A2 LAW.

The roundout tasks are designed to offer an extra challenge to the AFB candidate; these areas are slightly more complex than the others. All stations would be practiced and rehearsed similar to the way we prepare for a normal hands-on-component SQT.

A suggested schedule for the tests follows:

- Monday—Weapons qualification and APFT.
- Tuesday—Land navigation exercise ending with an overnight bivouac.
- Wednesday—Round robin of test stations for common tasks.
- Thursday and Friday—Written examination for SQT tasks.

The test criteria would be published in a format similar to that of manuals used for SQT testing at battalion and squadron level. The test could be taken only once every year. Test sites could be set up at Fort Knox for armor officers and NCO's attending the various armor courses.

CSM Gillis said "The time is right, it's time we succeed." And succeed we must with not only a symbol of our professionalism, but also a high standard that makes success all the sweeter. The AFB would give our armor soldiers a higher level of competency for which

to strive. The officers must prove their skill and knowledge by taking the same test that the newest E2 will take. If the AFB is to be of the same level of precedence with the EIB then let's make it just that. High goals result in high performance; 100 percent, the "max," because we are that good!

MICHAEL PREVOU
First Lieutenant, Armor
Berlin, Brigade



We Need Real Combined Arms Training

Preparing to fight tomorrow's battles is the prime mission of trainers in the combat arms. Commanders and leaders at all levels in the Infantry, Armor, Field Artillery and Engineer branches are told, taught, and exhorted to think and train using the combined arms concept. Dedicated batteries, attachment of engineer assets, up-front air defense weapons systems etc. etc., all are designed to enable the maneuver element commander to use his tank/infantry teams to maximum advantage. The fire support team (FIST) adds to the commander's ability to control all types of indirect fires. Everything possible seems to be in the works to make the maneuver elements more mobile, responsive, and secure . . . with one exception. The tank/infantry team exists 90 percent of the time on paper, in FM 71-1 *The Tank and Mechanized Infantry Company Team*, and FM 71-2 *The Tank and Mechanized Infantry Battalion Task Force*, but only about 10 percent in reality during training.

Tankers wallow in tank gunnery, as well they should. Infantrymen immerse themselves in patrols, in digging better and better fighting positions, and teaching every Tom, Dick and Jose to be a *Dragon* expert. After both the tankers and the infantrymen have spent most of their time on the above they may, if they're lucky, if the fuel's available, and if they have a senior commander who makes it happen, spend a day or three trying to work together. The result is, inevitably, chaos! The infantrymen don't know how to employ their antiarmor weapons with friendly armor. The tankers don't appreciate the differences in crosscountry mobility between *M60A1s*, *M48A5s* and *M113s*. The infantry platoon leaders and company commanders are not familiar with what tank weapons can do. The tank platoon leaders and company commanders don't appreciate the use of 81-mm mortars . . . and so on and so on!

Combined arms training, if it is to be at all effective, must start with briefings and classes to make each group aware of what the other has got, and what can be done with it. This must be taught at the fighting levels. The fact that the S3s and commanders are graduates of the Command and General Staff College and know how to use combined arms teams doesn't mean a thing to the trigger-pullers because these senior officers won't be fighting the battle. The captains, lieutenants, and noncommissioned officers will . . . and they don't know how! They don't know how because they haven't been trained!

The objective of combined arms training ought to be the ability of tank and mechanized infantry platoons and companies to work with each other as a matter of course. The tank platoon should be as familiar to the mechanized infantry company commander as one of his own mechanized platoons. Likewise, the mechanized platoon to

the tank company commander. Platoon leaders, platoon sergeants, squad leaders and tank commanders should be thoroughly familiar with what the tank and mechanized squads can and cannot do. How do we accomplish all this?

We accomplish it by making four changes to current organization and training!

- Training courses at all levels—officer, noncommissioned officer, and individual—for tank and infantry personnel must include at least 1 full week of practical, hands-on training with the equipment of the *other* arm. This must include a heavy dose of tactical employment.

- Tank and mechanized infantry battalions must be assigned "sister" battalions, these being battalions closest in proximity (more of a problem with reserve components, of course). In other words, the 1st Battalion, 110th Armor and the 2d Battalion 181st Infantry, both in the 26th "Yankee" Infantry Division, Massachusetts National Guard, would be "related." Currently, they are not even in the same *brigade*, even though they overlap each others' geographic territory. These sister battalions would train together, travel together, and as much as possible, live side by side. The only exceptions would be that the tankers would do their gunnery training apart, as would the infantry's TOW gunners, but only up to a point. Table VII, for example, could and should be conducted with a tank backed up by an *M113* and its squad. At battalion level, the S4s of both tank and infantry headquarters would have the opportunity *and the requirement* to become experts in handling the logistical problems of each other so that attachments wouldn't generate supply disasters. After all, how many infantry S4s know the ammunition requirements of an *M60A1* or what widget makes an armored vehicle launched bridge (AVLB) go? How many armor S4s speak fluent *Dragonese*? There are also the administrative differences i.e., critical MOSs and so on. If a tank or mechanized battalion is going to be able to successfully employ an attached mechanized or tank company, the staffs must be experts in handling the problems inherent to each type of unit. For instance, when a tank company is attached to a mechanized infantry battalion, should a slice of the tank battalion's maintenance section go with it? The time to decide is not after the attachment and three turrets have gone on the blink. Requiring that a tank and infantry battalion constantly work together also benefits the higher headquarters staff. There are going to be misunderstandings, problems the commanders cannot work out on the spot, and unforeseen hassles. This is what brigade staffs are for!

- Each tank company, and each mechanized company would

spend at least 1 month a year attached to the opposite battalion, during which time all administrative and supply functions, as well as training management, would be done by the gaining headquarters. This comes under the general heading of "training the way we'll fight!" After all, administrative and supply problems do not go away during combat. Quite the contrary; they become worse! So, it logically follows that the time to get everyone used to working with the "other guy" is during training, when the foul-ups won't cost lives and lose battles! Furthermore, in combat, these sister battalions would in fact be cross-attached, the respective battalion commanders would reap the benefits of knowing the company commanders and companies they would receive upon the formation of battalion task forces *before* the fact. The benefits of a gaining commander and his staff knowing from experience the strong and weak points of the attached unit are too obvious to belabor. The benefits of the attached commander understanding what the battalion commander means and wants, as well as how the staff functions, are likewise obvious. Carrying this to the logical end, it is fair to say that the battalion commanders of both sister battalions should be able to write an OER on the tank and mechanized company commanders of each others' battalion.

- Tank and mechanized platoons must be required to conduct platoon training together. Both live- and blank-fire training must be run together with independent training a rare exception. Advanced gunnery training and platoon-level, live-fire exercises, such as the mechanized infantry platoon attack course, must be done with the "other guy" involved. Soldiers must get used to having tanks and mechanized infantry along, shooting, maneuvering, supporting, and doing all the multifarious things that they are expected to do on the battlefield. This is where that squad leader and tank commander get to know each other, make their mistakes, find out that a tank goes through areas where an *M113* bogs down and so on. This is where the soldier with the *M203* gets used to the sound of the tank's 105-mm main gun, and the *Dragon* gunner learns that when there's an *M60A1* 30 yards away, he's better used as a rifleman looking for trench

denizens with *RPG-7*s, or other *ATGM*s who have evil designs on the tank. The basic combined arms building block is the company team, be it balanced, tank-heavy or mechanized-heavy.

Teams of any sort, athletic, business, or military, perform only as well as they have practiced together. Given the enormity of the stakes for military teams, practicing and training together, as often as possible, and as realistically as possible, must be *derigeur*.

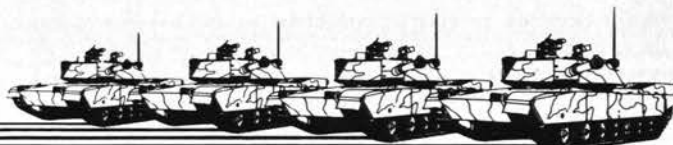
Great emphasis has been placed on the "go with what we've got" and "we'll fight the way we train" concepts. Most, if not all of us, believe both statements; therefore, the time is long overdue to start training for the way we plan to fight. The four points listed above are one way to accomplish the objective of readiness.

Captain John R. Drebus, in a letter printed in the September-October 1980 issue of "ARMOR" says,

"Everybody talks combined arms" I agree! Captain Drebus further says, ". . . everybody trains combined arms. . . ." I do not agree, though I wish I could! He continues, ". . . everybody knows that we must fight combined arms. Why, then, do we not structure combined arms?" Why not, indeed? Why does it seem that the infantry and armor branches are talking one way but operating another? Who's turf is being threatened?

Perhaps I'm being unfair; but then I'm a mechanized infantry company commander, and being proficient in combined arms operations is rather more important than literary fairness. We, in the reserve components, look to the active Army for new concepts, ideas, and above all, operational and training concepts based upon experience in achieving objectives. The new manuals and doctrines are exciting, make sense, and seem well-tailored to the use of initiative by non-commissioned officers and lieutenants. All we need now is some guidance and direction on how to put this doctrine into practice.

KENNETH A. SIEGEL
Captain, Infantry
MAARNG



The Deliberate Attack—an Overlooked Option

It is easy to envision continuous, fluid, offensive combat as a dynamic transition from the movement to contact, to the hasty attack, to the exploitation, and on to the pursuit. Not quite so easy to see is the application of continuous combat to the deliberate attack. There is a tendency to think of the deliberate attack as consciously slowing or even stopping the action. This loss of momentum violates the concepts of continuous combat and is usually the result of insufficient resources or inadequate contingency planning. Commanders never have enough resources, and inadequate planning is not always a command failure since commanders cannot always see the battlefield well enough to accomplish adequate planning. Nonetheless, these factors can allow or stop the action until sufficient combat power can be restored. In fact, the commander may not always have the resources to continue a specific thrust and may have to revert to a deliberate attack.

The Soviets consider the defense to be temporary. When forced to defend, they immediately deploy forces in-depth. As part of the regi-

mental defense, their battalions defend with two mutually supporting company-size strongpoints reinforced with tanks. They position the third company rearward to provide depth. Gaps which cannot be covered by direct fire are mined or blocked with other engineer obstacles and covered by indirect fire.

The Soviet soldier begins fortifying his position as soon as he halts. The degree of his fortification is dependent upon the time he has to prepare. The Soviets provide mine layers and mechanical ditching equipment to each divisional and regimental engineer company and make this equipment readily available to frontline battalions. Additionally, all combat troops are trained to handle and lay mines. With this emphasis on fortification, little time is required to prepare a position. Within 8 hours of occupying a position, a regiment can establish a series of mutually supporting, fortified positions with overhead cover, wire obstacles, minefields, and a tank ditch. These defenses are even stronger when villages, towns, or cities sitting astride mobility corridors are used as anchor sites.

Although Soviet doctrine seems to stress frontline units remaining in place even when penetrated, it does not preclude units, even flank units, from maneuvering to block or counterattack. Historically, Soviet commanders have moved and maneuvered during the defense, and the Soviets believe that they taught the concept of the "collapsible defense" to the German Army.

In a continuous combat scenario, I see three basic options: to go immediately from the defense to the offense (as in the counterattack); to degrade the ability of enemy frontline units to fortify positions while we prepare to attack; or to conduct a deliberate attack against fortified positions.

Any time we give a Soviet unit 8 hours unhindered, or more than 8 hours hindered preparation time, we will be forced to attack against fortified and reinforced positions even when occupied by units at less than full strength.

It is inconceivable that the Soviets would allow us to find a gap or assailable flank unless it leads to a fire trap. Anyone who believes that a deliberate attack will progress rapidly is not being realistic. There are numerous examples of deliberate attacks against strong defenses: Bradley's breakout at Normandy; the break into the Liri Valley at San Pietro; and Alexander's attack at El Alamein; where in all instances, it took days and even weeks to make a penetration.

I have slowly but surely become convinced that a deliberate attack must be conducted at numerous points across a wide front using all suitable avenues of approach. In such operations, no main or supporting attacks will be designated, and commanders will need to retain sizeable reserves to exploit any penetration. The penetration(s) will be exploited regardless of their location, direction of movement, or avenue of approach. Airmobile forces can be used as an anvil or to assist in sealing off the area of the penetration from enemy support or reinforcement.

Pressure must be maintained across the entire front in order to fix local reserves and ensure against lateral movement of enemy forces. Unsuccessful attacks will not be continued except to the extent of fixing enemy forces in place. Uncommitted divisional brigades or battalions of another division whose attack has failed will be drawn off to exploit success in other areas of the corps.

A division will attack with two brigades, keeping its third brigade for rapid exploitation on either axis. In the case of a dual penetration, the reserve will exploit the most successful attack or attack over the best avenue of approach. If the attack fails or slows on both avenues,

the two attacking brigades will continue to maintain pressure while the third brigade is drawn off to support a corps success elsewhere.

Brigades must attack with a task force against an isolated platoon of a company position. Preferably, the brigade would have to attack only one company, but at worse, would attack the flank companies of adjacent battalions or regiments.

Penetrating brigades will be task organized light only for the penetration, or heavy for penetration and movement against deeper objectives. Corps and division must provide the brigades the ability to suppress enemy defenses for a prolonged period while maintaining the flexibility for rapidly shifting resources to follow up successes elsewhere. The division and brigade must then be prepared to lose a substantial amount of its support, some of its maneuver battalions, or even be required to support other attacks.

This concept is not an attrition offense nor does it violate the fundamentals of the offense. Overwhelming combat power is concentrated at the points of intended penetration. The initial attacks are conducted with increasingly larger amounts of combat power until the position(s) fall. Since enemy strength will be relatively equal across the entire front, the attack across a broad front will make him dissipate his reserve against multiple threats. He will be required to make redeployment decisions earlier than he might if he were attacked at fewer points. The earlier requirement for a decision increases his probability of error and may keep him from meeting his own counterattack criteria.

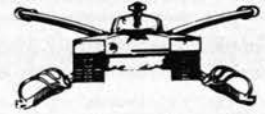
The deliberate attack concept will enable the commander to remain flexible and retain the initiative throughout the entire battle and afford himself the opportunity to make the transition into exploitation and pursuit at the earliest time.

The principles of the deliberate attack will not change in a nuclear-capable or nuclear-active environment because the Soviet defense is designed for both nuclear and conventional warfare and will remain essentially the same. Therefore, the deliberate attack will provide a defense against nuclear weapons by dispersing troops over a wider area, and friendly forces will not be concentrated for one penetration within each corps area, but positioned for multiple penetration attempts.

H. JOSEPH ROZELLE
Lieutenant Colonel, Armor
HQ, Sixth Army

Recognition Quiz Answers

- M551 Sheridan** (US). Crew: 4; combat weight: 15,830 kg; power-to-weight ratio: 18.95 hp/ton; maximum road speed: 70 km/hr; water speed: 5.8 km/hr; maximum road range: 600 km; armament: 1 × 152-mm gun/launcher, 1 × 7.62-mm coax machinegun, 1 × 12.7-mm AA machinegun.
- M1 Abrams** (US). Crew: 4; combat weight: 54,430 kg; power-to-weight ratio: 25 hp/ton; maximum road speed: 83.39 km/hr; maximum road range: 442 km; armament: 1 × 105-mm gun, 1 × 7.62-mm coax machinegun, 1 × 7.62-mm machinegun (loader), 1 × 12.7-mm AA machinegun.
- M48A5** (US). Crew: 4; combat weight: 48,987 kg; power-to-weight ratio: 15.89 hp/ton; maximum road speed: 48.2 km/hr; maximum road range: 499 km; armament: 1 × 105-mm gun, 1 × 7.62-mm coax machine gun, 1 × 7.62-mm machinegun (leader) and 1 × 12.7-mm machinegun (commander).
- M60A1** (US). Crew: 4; combat weight: 51,348 kg; power-to-weight ratio: 15.31 hp/ton; maximum road speed 48 km/hr; maximum road range: 500 km; armament: 1 × 105-mm gun, 1 × 7.62-mm coax machinegun, 1 × 12.7-mm AA machinegun.
- M60A3** (US). Crew: 4; combat weight: 51,530 kg; power-to-weight ratio: 13.1 hp/ton; maximum road speed: 48 km/hr; maximum road range: 450 km; armament: 1 × 105-mm gun, 1 × 7.62-mm coax machinegun, 1 × 12.7-mm AA machinegun.
- M9 Armored Combat Earthmover** (US). Crew: 1; empty weight: 14,515 kg; loaded weight: 24,494 kg; maximum road speed: 48 km/hr; water speed: 4.8 km/hr; maximum road range: 322 km; armament: none; armor: aluminum.



Armor Assignment Team

Infantry/Armor Branch EPMD



LTC Richard C. Pahland,
Chief, Infantry/Armor
Branch



MSG Leonard Cook,
19Z Senior Career Advisor



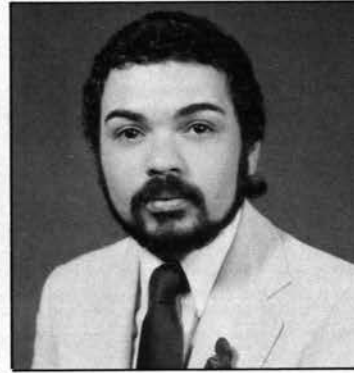
SFC Robert Way,
19E Career Advisor



SFC Philip Schaffer,
19D Career Advisor



Zilpha Pinkney,
Chief, Armor Assignment
Team



Jerry Brown,
E7/E8 Assignment Manager



Mulvina Dean,
E6 Assignment Manager
(Overseas)



Dianne Miller,
E6 Assignment Manager
(CONUS)



David Groome,
E1/E5 Assignment Manager
(Overseas)



Jean Picco,
E1/E5 Assignment Manager
(CONUS)



Velda Fisher,
NCOES Manager

Telephone numbers for Armor Branch: *Commercial:* (202) 325-8071; 8072; 9080; 8426, 9192.
Autovon: 221-8071, 8072; 9080; 9192.

COL David M. Maddox
2d Armd Cav Regt
Nurnberg

COL Frederick Franks
11th Armd Cav Regt
Fulda

COL William Burleson
1st Bde, 1st Armd Div
Illesheim

COL William Griffiths
2d Bde, 1st Armd Div
Erlangen

COL Gordon Sullivan
1st Bde, 3d Armd Div
Kirchgon

COL Jack Clark
3d Bde, 3d Armd Div
Friedberg

COL Peter McVey
1st Bde, 3d Inf Div
Schweinfurt

COL Thomas Foley
3d Bde, 3d Inf Div
Aschaffenburg

COL Calvin Waller
2d Bde, 8th Inf Div
Baumholder

COL Fred Greene
194th Armd Bde
Ft. Knox

COL Cecil Shrader
1st Bde, 1st Cav Div
Ft Hood

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2d Bde, 1st Cav Div
Ft Hood

COL Richard Edwards
2d Bde, 1st Inf Div
Ft Riley

COL Eugene Daniel
1st Bde, 24th Inf Div
Ft Stewart

COL Philip Mallory
1st Bde, 2d Armd Div
Ft Hood

COL John Kennedy
2d Bde, 2d Armd Div
Ft Hood

COL William Fitzgerald
3d Armd Cav Regt
Ft Bliss

COL Joseph Conrad
2d Bde, 4th Inf Div
Ft Carson

COL Robert Moscatelli
3d Bde, 4th Inf Div
Ft Carson

COL John Heldstab
1st Bde, 5th Mech Div
Ft Polk

COL James Hattersley
Hq Comd
Ft Ord

COL John Mayer
Hq Comd
Ft Stewart

COL Ronald Griffith
1st Bde, 2d Inf Div
Camp Casey

COL Jerome L. Haupt
Spec Trps Cmd, EUSA
Yongsan

COL Andrew O'Meara
1st Trng Bde
Ft Knox

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4th Trng Bde
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1-33d Armor
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LTC Warren P. Giddings
2-33d Armor
Kirchgoens

LTC Tommy A. Baucum
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Friedburg

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3-33d Armor
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1/2d Armd Cav Regt
Bindlach

LTC Thomas W. Stewart
2/2d Armd Cav Regt
Bamberg

LTC Thomas J. Konitzer
3/2d Armd Cav Regt
Amberg

LTC Thomas E. White
3/11th Armd Cav Regt
Fulda

LTC Bruce B. Clarke
2/11th Armd Cav Regt
Bad Kissengen

LTC Stanley F. Cherrie
3/11th Armd Cav Regt
Bad Hersfeld

LTC Dale B. McGarry
4-73d Armor
Boeblingen

LTC Oleh B. Koropey
1-72d Armor
Korea

LTC Larry J. Medley
2-72d Armor
Korea

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1-64th Armor
Kitzingen

LTC Robert W. Roper
2-64th Armor
Schweinfurt

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LTC J. B. Holeman
1-7th Armor
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1-8th Armor
Ft Hood

LTC Arnold H. Gaylor
2-5th Armor
Ft Hood

LTC Francis J. Cummings
2-8th Armor
Ft Hood

LTC L.C. Richardson
3-10th Armor
Ft Hood

LTC Darrel T. Charlton
1-9th Cavalry
Ft Hood

LTC James R. Joy
1-66th Armor
Ft Hood

LTC Juris Jaunitis
2-66th Armor
Ft Hood

LTC Joe N. Frazar
3-66th Armor
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LTC Garry P. Hixson
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LTC William G. Lutz
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Ft Hood

LTC Claude W. Abate
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3-5th Cavalry
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LTC Edwin L. Earp
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Ft Riley

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1-63d Armor
Ft Riley

LTC Alfred J. Bergeron
2-63d Armor
Ft Riley

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Ft Riley

LTC William L. Jackman
1-4th Cavalry
Ft Riley

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Ft Polk

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Ft Polk

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Ft Polk

LTC John W. Holdsworth
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Ft Stewart

LTC Daniel E. Deter
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18/4th Tng Bde
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1/1st AIT/OSUT Bde
Ft Knox

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2/1st AIT/OSUT Bde
Ft Knox

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3/1st AIT/OSUT Bde
Ft Knox

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4/1st AIT/OSUT Bde
Ft Knox

LTC Frederick A. Kyle
6th Sqdn, 1st AIT/OSUT Bde
Ft Knox

LTC George D. Featherston
6/2d BT Bde
Ft Jackson

NEWS NOTES



The FISTV as described in News Notes, November-December ARMOR.

Patton Museum Opens New Wing

A new, 10,000-square foot addition to the Patton Museum that portrays the six-year development of armor during WW II was recently opened to the public. Museum Director, John Campbell, said "Phase III will be a one-third extension of the portrayal of armor to the existing museum." Museum hours on weekdays are from 0900 to 1630 and on holidays and weekends from 1000 to 1630 hours. Admission is free.

New Transmission Contracts Awarded

General Electric Co., has been awarded a contract by the US Army Tank-Automotive Command for the concept design of a 1,000 horsepower hydromechanical steering transmission for tracked combat vehicles.

Eighteen firms, including several from Great Britain and Europe, were solicited and four responded. One of them was also awarded a contract for the concept design of a hydrokinetic transmission, which differs from a hydromechanical primarily in that it uses a torque converter.

Following the 7-month study effort, GE and the rival firm will submit quotes on the engineering development, including fabrication and hardware demonstration of their respective transmissions.

New smoke grenades Tested in France

Two weeks of trials of newly-developed smoke grenades were concluded recently in France with five NATO nations represented. They were: France, the Netherlands, Norway, the Republic of West Germany and the US. A total of nine different smoke grenades were tested at Bourges, France, and extensive winter testings are scheduled to take place in February in Norway.

Lighter, Air-Cushion Vehicles Under Test

Bell Aerospace Textron has been awarded a \$22.5 million contract from the US Army Mobility Equipment Research and Development Command (MERADCOM), Fort Belvoir, Virginia, to produce four Lighter, Air Cushion Vehicles (LACV-30).

The LAVC-30 rides on an air cushion and can traverse water,

beaches, ice, snow and marginal (swampy) ground. It can carry two 20-foot MILVAN containers with a combined weight of 30 tons as well as wheeled and tracked vehicles, engineer equipment, pallets and other cargo. The LAVC-30 will be used for logistics-over-the-shore missions, in combat service support operations, to support secondary missions in coastal, harbor, and inland waterways, and for search and rescue and medical emergency missions.

The Army is currently procuring 12 craft under a \$70 million contract with Bell Aerospace Textron. The new contract is the first part of an additional multi-year contract for 12 additional craft, the first of which is expected to be delivered to Fort Story, Virginia in February 1984. All 12 craft are expected to be completed by November 1986.

Army To Purchase New M16A2 Rifle

The Army has announced that when it purchases new rifles, it will buy the new and improved model of the M16A1 now in the field.

The new rifle will accept the NATO 5.56-mm round and will have changes to the handguards, pistol grip and butt stock, among other improvements, the Army said. The US Marine Corps is currently buying the new model. The Army said that the earliest probable date for purchasing the new rifle would be 1985.

U.S. POSTAL SERVICE STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION (Required by 39 U.S.C. 3685)			
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June 1980

(See instruction on reverse)

STRATEGIC STUDIES AND PUBLIC POLICY: THE AMERICAN EXPERIENCE, by Colin S. Gray. University Press of Kentucky, 1982.

This concise, scholarly, well-written book discusses the evolution of the field of strategic studies in relation to public policy, and examines the roles played by civilian strategists vis-a-vis public policymakers. The author believes that as an action-oriented or policy-relevant field, strategic studies should impart knowledge which "... should prove useful to a policymaker in the diagnostic and search phases of his grappling with a policy problem, and should contribute to better comprehension of the nature of that policy problem."

The author discusses three principal periods of "creative endeavor" in strategic studies: post WWII years, 1955-1965 and the 1960s to the present.

Gray contends that civilian strategists have a duty to remind their societies that the world, by and large, is not populated with liberal democracies and to provide policymakers with the intellectual tools for devising strategically rational policy.

In the final chapter, Gray discusses why strategists are "neo-realists" and suggests that civilian strategists are able to improve policy because their work rests upon advancing the "scholarly exploration of strategic behavior."

This informative book requires careful and deliberate reading and is highly recommended for the policymaker and military professional.

JAMES B. MOTLEY
Colonel, USA
The Atlantic Council of the U.S.

NIGHT WITCHES: THE UNTOLD STORY OF SOVIET WOMEN IN COMBAT, by Bruce Myles. Presidio Press, Novato, CA. 1981. 276 pages \$14.95.

This is a readable and extremely interesting treatment of a subject seldom discussed in Soviet military historiography: the use of women in combat roles in the Great Patriotic War (WWII).

Based on personal interviews of survivors and unpublished memoirs, the author has woven an uncomplicated journalist's account of the sometimes heroic exploits of these female pilots. He chose the nickname given to them by the Germans, "Night Witches". He discusses the methods of selecting, training, and assigning of these women pilots to frontline, combat units. The first all-female unit was sent to the front in May 1942. Women were assigned to fighter, bomber, and night-bomber squadrons. Only a few highly-qualified females were assigned to previously all-male fighter squadrons and

the usual problems arose: some male pilots flatly refused to fly with a woman "wingman" and there was the problem of accommodations for the women.

The use of the book for academic purposes is negated by the lack of footnotes and other reference materials. However, some relevant data is provided. Lily Litvak, the best known of the women fighter pilots, shot down 12 German planes before she was shot down. Marina Chicnova, a night-bomber pilot, flew 500 missions in wood and fabric aircraft.

It is difficult to apply the experiences of these Soviet women in combat to the possibility of using American women in similar roles. The manpower problems of the Soviets in 1942 are different from our peacetime manning problems. Also, the role of women in Soviet society is different from that of women in ours. Even so, I finished the book with a great respect for the exploits of these unsung heroines of the Soviet Union.

JAMES F. GEBHARDT
Captain, Armor

WILLIAM ORLANDO DARBY: A MILITARY BIOGRAPHY, by Michael J. King. Archon Books, 1981. Illustrated. 219 pages.

Perhaps the most respected insignia in today's Army, other than the infantry's crossed rifles, is the black and gold Ranger shoulder patch. While many of today's officers and noncommissioned officers may well be familiar with the rugged Ranger training hammered out at Fort Benning, Georgia, this volume for the first time delineates the lineage of this illustrious fighting unit and its creator, Brigadier General William O. Darby.

The Rangers were formed in Northern Ireland during WW II and patterned after the British Commando units which had already gained an enviable reputation. Throughout American military history the title of "Rangers" had been held by many fighting units that specialized in "high standards of individual courage, initiative, determination, ruggedness, fighting ability and achievement."

During WW II, Darby personally led Ranger units in combat beginning with El Guettar, North Africa. Darby's Rangers played a vital role in the Sicilian campaign and it was on that island that the Rangers gained their reputation. They relied heavily on night operations and moved in small elements. They were highly successful.

Darby was killed on 30 April 1945 and was posthumously promoted to the rank of brigadier general.

This is an excellent historical volume, worthy of the military professional and the historian's perusal.

MICHAEL E. LONG
Captain, Infantry
Fort Shafter, HI

GREAT BATTLES ON THE EASTERN FRONT, by Colonel Trevor N. Dupuy (Ret.) and Paul Martell. The Bobbs-Merrill Company, Inc., 1982. 294 pages. \$14.95.

"The Soviet-German War of 1941-1945 involved more men, more guns, and more casualties and was fought over a more extended front than any other war in history."

Eighteen major battles are thoroughly described from Operation Barbarossa, the German invasion of Russia, to the Battle of Berlin. For each battle the authors include numerical data on orders of battle, deployment of troops, density of troops, composition and strength of armies, distribution of weapons, and finally, reinforcements. Much of this data has never before been published in English and will prove invaluable to students of the Russo-German war years.

The authors conclude their work with an equally comprehensive account of the Soviet campaign in Manchuria following the German surrender. Seventeen maps illustrate the major battles described and the "stat hound" will find much to intrigue him.

With respect to the Russian contribution to the Allied victory in WW II, one can only conjecture what the fate of the invading armies in Western Europe might have been had not some three million German troops been involved in the Russian campaigns.

R.E. ROGGE
Master Sergeant (Retired), USAF
Lebanon Junction, KY

WITH THE GERMAN GUNS, by Herbert Sulzbach. Archon Books, Hamden, CT, 1981. \$19.50.

The author is perhaps the only man in the world who was commissioned by the Kaiser in WWI and by King George VI in WWII. Sulzbach served for four years with the German artillery in the first war, was commissioned in the field and won the Iron Cross twice. Because of his Jewish heritage he was forced to flee Hitler's Germany and went to England. At the outbreak of WWII he was interned. Later he enlisted in the British Army and was commissioned. During WWI he kept a four-year diary which was later published in Germany. This is *With The German Guns*.

For the combat veteran this is an astounding book. For those who have never experienced war, this is an equally astounding book. There have been a number of first-person WWI books published, but this is the first such German book we have seen. It is well worth its price. For those familiar with British accounts of the Western Front, this book gives a good insight into the German side of those horrendous blood baths when a generation of men was destroyed.

Read it. It's worth your while.

ARMOR STAFF

STEEL

ON TARGET

The more things change, the more they remain the same. Signs of modernization are appearing throughout the Armor Force. Promised new equipment is reaching the hands of troops. Abrams tanks vie with Mercedes on the autobahns of Germany. From Bradley's to battledress, the metamorphosis taking place is truly exciting.

Yet, with so much attention focused on the materiel changes taking place, some important things that remain the same may be overlooked.

The most vital constant has been the willpower of the tankers and cavalrymen who man the turrets.

The most sophisticated machines and most advanced technology are mere extensions of their will. Machines possess neither the will to win nor the refusal to lose. That determination resides in the hearts of our soldiers.

The history of Cavalry and the Armor Force is replete with examples of ordinary troopers and tankers achieving the extraordinary because they were unwilling to allow the enemy to exert his will on them. Call it grit, esprit de corps or downright stubbornness, the refusal to abdicate in the face of danger has had little to do with the equipment available or the odds faced.

In 1941, the lightly-armed, horse-mounted 26th Cavalry took on the Japanese armor, infantry, and aviation invading the Philippines. The tenacity of this

small band of horsemen inflicted heavy losses, disrupted the Japanese timetable and allowed the orderly withdrawal of friendly forces to the Bataan Peninsula. Three years later in the Ardennes, the 7th Armored Division held the town of St. Vith for six days against the relentless onslaught of more than eight German divisions and bought the time necessary to thwart the last enemy offensive of the war. In the

words of Theodore Roosevelt, "Thank God for the iron in the blood of our fathers."

Today's tankers and troopers are cut from the same cloth. Woven into that fabric is the same blend of tough-mindedness, resourcefulness, and audacity that characterized their predecessors. Wherever they're from, whatever their backgrounds, however varied their skills and talents, the soldiers who comprise the fiber of today's Armor Force share a common tradition of liberty, and express their conviction

and fierce determination as free men to remain so whatever the threat.

Armor salutes the scouts and tankers who man the tracks. You've never succumbed to the threat in the past and when the guns sound in the future, the stand you take in the face of danger will match the determination of an earlier generation, no matter the odds, no matter the equipment.

Good Shooting!





Symbolism

The buckler represents the armored protective device. The arm embowed is raised in the attitude of striking. The red tower gushing water to each side alludes to the bitter fighting at the Roer River dams, for which a Presidential Unit Citation was awarded. The spears symbolize the advance through Normandy, northern France, and Germany. The shield, bearing a part of the arms of Luxembourg, represents the award of the Luxembourg Croix de Guerre for participation in the liberation of that country.

Distinctive Insignia

The distinctive insignia is the shield of the coat of arms.

34th Armor (The Strong Arm for Victory)

Lineage and Honors

Constituted 28 August 1941 in the Regular Army as 34th Armored Regiment and assigned to 5th Armored Division. Activated 1 October 1941 at Fort Knox, Kentucky. Regiment broken up 20 September 1943 and its elements reorganized and redesignated as follows: Regimental Headquarters and Headquarters Company and 2d Battalion as 34th Tank Battalion, an element of the 5th Armored Division; 1st Battalion as 772d Tank Battalion and relieved from assignment to 5th Armored Division; 3d Battalion as 10th Tank Battalion, an element of the 5th Armored Division; Reconnaissance Company as Troop D, 85th Cavalry Reconnaissance Squadron, Mechanized, an element of the 5th Armored Division; Maintenance Company and Service Company disbanded.

34th Tank Battalion inactivated 8 October 1945 at Camp Myles Standish, Massachusetts. Redesignated 18 June 1948 as 34th Medium Tank Battalion. Activated 6 July 1948 at Camp Chaffee, Arkansas. Inactivated 1 February 1950 at Camp Chaffee, Arkansas. Activated 1 September 1950 at Camp Chaffee, Arkansas. Inactivated 16 March 1956 at Camp Chaffee, Arkansas. Relieved 27 March 1957 from assignment to 5th Armored Division.

772d Tank Battalion inactivated 14 November 1945 at Camp Shelby, Mississippi. Redesignated 16 January 1947 as 306th Tank Battalion; concurrently withdrawn from the Regular Army and allotted to the Organized Reserves. Headquarters and Headquarters Company activated 5 February 1947 at Seattle, Washington (organic companies activated 25 June 1947 at Seattle, Washington). Reorganized and redesignated 2 May 1949 as 306th Heavy Tank Battalion. Inactivated 15 September 1950 at Seattle, Washington. Disbanded 20 February 1952. Reconstituted 27 March 1957; concurrently, withdrawn from the Army Reserve (formerly Organized Reserves) and allotted to the Regular Army.

10th Tank Battalion inactivated 9 October 1945 at Camp Myles Standish, Massachusetts. Redesignated 18 June 1948 as 10th Medium Tank Battalion. Activated 6 July 1948 at Camp Chaffee, Arkansas. Inactivated 1 February 1950 at Camp Chaffee, Arkansas. Activated 1 September 1950 at Camp Chaffee, Arkansas. Inactivated 16 March 1956 at Camp Chaffee, Arkansas. Relieved 27 March 1957 from assignment to 5th Armored Division.

Troop D, 85th Cavalry Reconnaissance Squadron, Mechanized, redesignated 25 August 1945 as Troop D, 85th Mechanized Cavalry Reconnaissance Squadron. Inactivated 11 October 1945 at Camp Kilmer, New Jersey. Redesignated 18 June 1948 as Company D, 85th Reconnaissance Battalion. Activated 6 July 1948 at Camp Chaffee, Arkansas. Inactivated 1 February 1950 at Camp Chaffee, Arkansas. Activated 1 September 1950 at Camp Chaffee, Arkansas. Inactivated 16 March 1956 at Camp Chaffee, Arkansas.

Maintenance Company, 34th Armored Regiment, and Service Company, 34th Armored Regiment, reconstituted 27 March 1957.

34th and 10th Medium Tank Battalions and 306th Heavy Tank Battalion; Company D, 85th Reconnaissance Battalion; and reconstituted companies of 34th Armored Regiment consolidated and redesignated 27 March 1957 as 34th Armor, a parent regiment under the Combat Arms Regimental System (Headquarters and Headquarters and Service Company, 34th Medium Tank Battalion, redesignated as Headquarters and Headquarters Company, 34th Armor).

Campaign Participation Credit

World War II
Normandy
Northern France
Rhineland
Ardennes-Alsace
Central Europe

Vietnam
Counteroffensive, Phase II
Counteroffensive, Phase III
Tet Counteroffensive

Decorations

Presidential Unit Citation (Army), Streamer embroidered *ROER RIVER DAMS* (10th Tank Battalion cited; WD GO 31, 1947)

Luxembourg Croix de Guerre, Streamer embroidered *LUXEMBOURG* (10th and 34th Tank Battalions and 85th Cavalry Reconnaissance Squadron cited; DA GO 43, 1950 and DA GO 44, 1951)