ARMOR

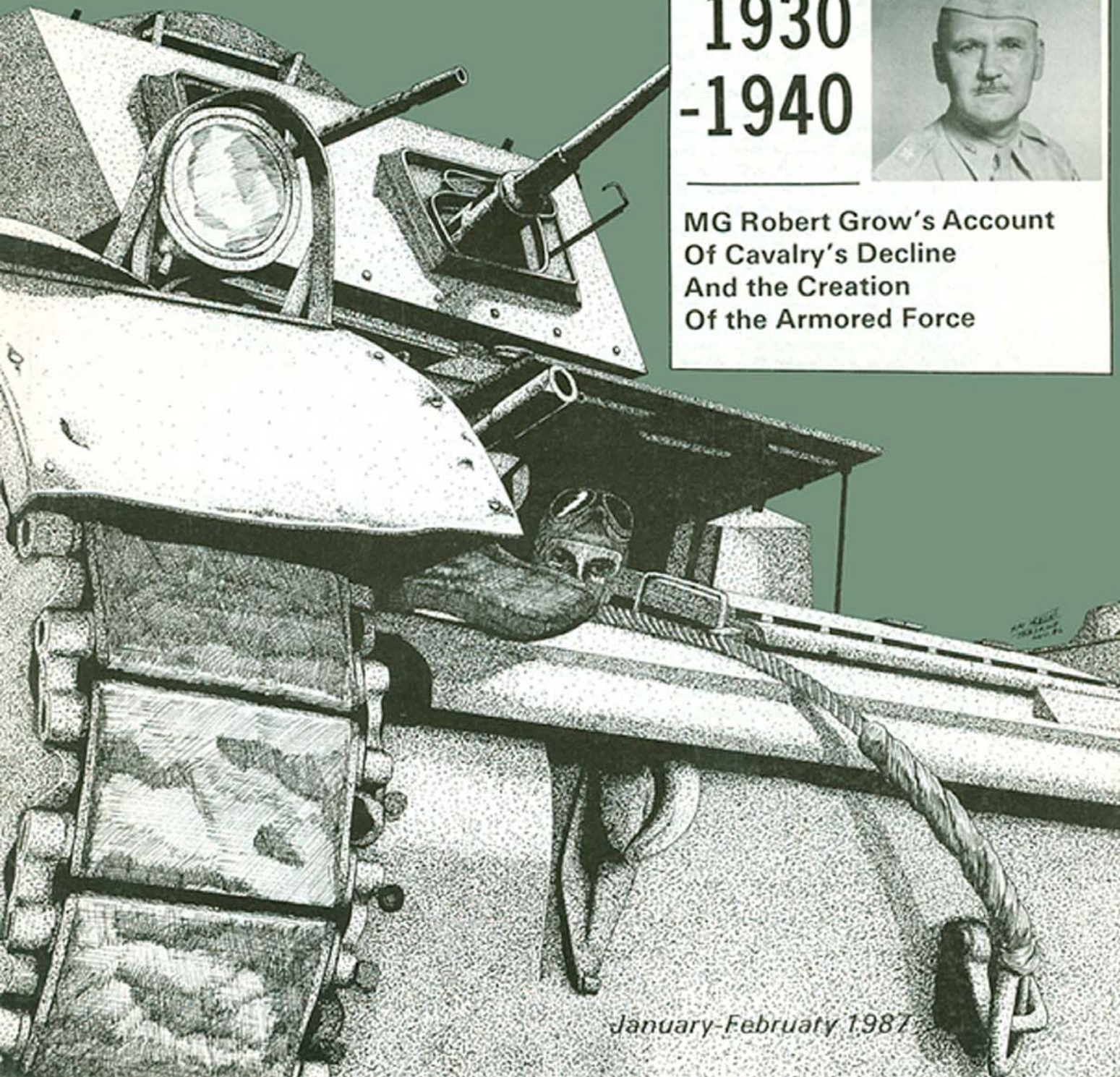
The Magazine of Mobile Warfare

Beginning of 4-Part Book-Length Series

The Ten Lean Years

1930 -1940

MG Robert Grow's Account
Of Cavalry's Decline
And the Creation
Of the Armored Force



January-February 1987

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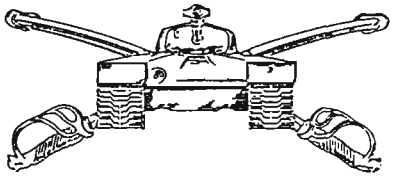

In contrast with what you may have heard or read, *ARMOR* will continue publication. Our journal is the oldest continuously published branch journal in the United States Army, and thanks to the efforts of the TRADOC Commander, the Armor Center Commander, the President of the Armor Association, the Deputy Chief of Staff for Doctrine at TRADOC, and his staff, this magazine will continue providing a forum for the discussion of mobile warfare and our doctrine. So rest assured that you subscribers will continue to receive each issue of *ARMOR*.

Mobile warfare is not a new concept; since the early Egyptians first used chariots on the battlefield, military men have been intrigued with mobility on the battlefield. However, armored — and specifically, mechanized warfare — is a relatively new concept. As I mentioned in the last issue of *ARMOR*, we begin to publish in this issue MG Bob Grow's account of the establishment of the United States Army's Armored Force. Many of you may believe that Armor just naturally grew out of Cavalry. That belief is simply not true. The experimentation, the birth, and the growth of the Armored Force was a traumatic experience for those who took part in it, and there are many lessons we can take from that story.

The men who had the vision of a combined arms, mobile force on the battlefield came from many backgrounds. They were infantrymen, cavalrymen, artillerymen, signalmen, engineers, members of ordnance, quartermasters, and dedicated civilians who saw that the time for mechanizing the United States Army had come. These men essentially placed their careers on the line for that vision. Most of the rest of the Army viewed these men as "mavericks." They had left their branches for this "new-fangled" thing called mechanization and for something that, in the belief of many professionals of the time, the Army could not afford nor would ever work on the battlefield. But this sort of criticism did not stop these visionaries.

Fighting against severely limited budgets, branch favoritism, and even personal attacks by other "professionals," these dedicated soldiers put together the foundations of a combined arms force that, in fact, has become the cornerstone for modern warfare. Their dedication and that concept met the test, both of time and of the battlefield. Their acts of selfless service deserve our study.

But there are other lessons too. One of the best things that America has been able to do over its history is demobilize. We did that with a vengeance after WW I. The Army's budget was severely limited during the period of 1920-1940. America had helped to win the "war to end all wars." There were many people who actually believed that we really didn't need an armed force. Being a soldier, a sailor, or a marine wasn't "in style," and even many professional soldiers of the Army believed that they could simply go back to the way of life before WW I: border duty in the Southwest, polo matches, formal balls and banquets, and the political intrigues of a nation finding its way into the middle of the Twentieth Century. But there were others who didn't view the world that way.

They could see that preparing for the next war, or the eventuality of one, was their duty as defenders of their great nation. Among that group of soldiers were those who came together at Camp Eustis, and later at Camp Knox, to form what we now call Armor. They invented ways to train when they had few soldiers, little money, and a paucity of support from the rest of the Army. They built a post, now known as the Armor Center, and they established a doctrine. We owe them a great debt of thanks, but we also owe them our own dedication to Armor, to combined arms, to the selfless service that is the hallmark of loyalty to our country.

— GPR

ARMOR The Magazine of Mobile Warfare

FEATURES

DEPARTMENTS

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LETTERS

An Author Responds

Dear Sir,

I am writing in response to Mr. Burniece's letter that appeared in the July-August issue of *ARMOR*. I would like first to thank Mr. Burniece for commenting on my letter, and for pointing out what could have been a popular misunderstanding concerning my own comments. Any discussion involving the M46 130-mm gun or its 152-mm successor must include some data about indirect fire. The accuracy of indirect fire against "antitank positions" or "softer skinned antitank vehicles" would be an eagerly awaited topic of discussion at the U.S. Army Field Artillery School. There was, however, no suggestion that the Soviets have adopted a Copperhead-like artillery round. I would suggest that Mr. Burniece review the large number of ground-employed and soft-skinned vehicle-mounted antitank weapons fielded by the West, and then re-evaluate the effectiveness of indirect 130-mm and 152-mm suppressive fire on these targets.

Secondly, I would like to discuss Mr. Burniece's theory on Soviet tank main armament and Soviet armor doctrine. In his letter, he contends that the "Return to a rifled gun/howitzer," especially one as large as the 152-mm gun, would be "directly opposed to Soviet armor doctrine and development over the past 45 years." It is clear that, for one main reason, the exact opposite is true. The "retention" and modernization of the capable 152-mm gun, a move that has already been accomplished and championed by the Soviet artillery, would be very much in line with the Soviet desire to field simpler, less sophisticated vehicles. This gun could be made fully dual-capable by the development and fielding of an effective antitank round. As I suggested in the article, "T-64, IT-122, and IT-130: The Soviet Advantage," the precedent for 152-mm APFSDS-T ammunition has already been demonstrated with the MBT-70/KPZ-70 and XM803. Similar Soviet ammunition developments would have the twofold result of creating a weapon system that could pose a serious threat to Western main battle tanks, while at the same time not requiring a new gun to be fielded. Contrary to Mr. Burniece's suggestion, the "IT-152" would be less of a challenge for Soviet conscript soldiers than a tank like the T-64 or T-80. The hypothetical "IT-152" would only be as challenging to its crew as the tank hull that it is based on, and only as new as its ammunition. It would simply be a continuation in the long established line of Soviet dual-capable tank destroyers.

Finally, it appears that Mr. Burniece is more than a little off the mark with his continuing discussion of the Swedish S-Tank and the West German Kanonenjagdpanzer. When the capabilities of different cannons are discussed (Soviet 122-mm and 130-mm vs. Swedish 105-mm and West German 90-mm) the representative target must be analyzed carefully. If a general lookover is given to this target it could appear as old as the T-62. If this comparison is given the attention it obviously deserves (i.e. ITOW, TOW2, HOT2, and the 120-mm tank gun), the smaller size of the Western cannons becomes all the more apparent. The NATO armor targeted by a vehicle like the "IT-152" and the Soviet armor targeted by a vehicle like the Kanonenjagdpanzer, are separated by a fine line; a line that could grow all the finer with each new tank fielded.

JAMES M. WARFORD
CPT, Armor
FRG

Seeks Sherman Manuals

Dear Sir:

I am looking for technical manuals for any model of the M-4 tank. I have a collection of *ARMOR* from the 1960s to the present that I am willing to trade for such manuals and will pay the postage.

Additionally, should anyone desire this collection of *ARMOR*, I would be willing to send it if the purchaser will pay COD charges.

EDWARD J. HERTERICH
GYSGT, USMC Ret.
P.O. Box 714
San Marcos, CA 92069

Commanders of Three Corps

Dear Sir:

I don't know if you plan to continue the series, "Armor's Heritage." I hope you do, for time being what it is, today's serving officer doesn't know the background of the Armor Branch, nor the personalities that shaped it.

As an aside, an author has to be careful in his choice of limiting words like *never, always* or, in any case, *only,* as in —

"He (Gillem) was the *only* general officer in WW II to command three distinct corps."

I'm thinking that there were several, one to my knowledge being Lt. Gen. W. D. Crittenberger, who commanded in this order: II Armored Corps, shortly, before activating and commanding the III Armored Corps, then its redesignated XIX Corps, which he took to England for the invasion, but was ordered to join General Devers in the Mediterranean where he commanded the IV Corps in the Italian Campaign from Rome to the Alps.

W. D. CRITTENBERGER, JR.
Major General, USA, (Ret.)

(Ed. Note: *ARMOR* is continuing the HERITAGE series with the first of four parts of "The Ten Lean Years" in this issue.)

Two for the Beret

Dear Sir:

I recently read an article written by SFC Stephen D. Kennedy, USASMA, in which he addressed the issue of the black beret we tankers used to wear. Sir, I support SFC Kennedy's thought 100 percent.

I was a 1SG in H Company, 2/6 CAV when we lost the beret as part of our uniform and it really hurt the morale of my soldiers.

I've always felt that the beret was the perfect headcover for a tanker. You can climb in and out of your tank without knocking it off your head and it is easily stowed in your pocket when entering a building.

It does something to a soldier when he is permitted to wear distinctive headgear. The overall morale and esprit de corps of our armor force will be greatly improved.

MICHAEL BARKER
SGM, U.S. Army
FRG

(Ed. Note: A similar letter was also received from SFC Randall E. Murray, HHC, 1-35 Armor, APO NY 09066.)

Another 1000-Point Run

Dear Sir:

After reading your articles, I noticed that you keep track of 1000-point tank gunnery runs. I have an addition for you. On 4 August 1986 at Range 117, Grafenwohr, Germany, the crew of D-33 1st Squadron, 2d Armored Cavalry Regiment, scored a perfect 1000 points, on Tank Table VIII. They were evaluated by TCETT. The crew was composed of: SSG David P. Hughes, tank commander; SGT Ivan T. Honeycutt, gunner; PFC Ronald D. Allen, loader; and PFC Bryan S. Hansen, driver.

This platoon did exceptionally well, but two other crews scored 990 points. The platoon average was 904, with 4 Distinguished and 1 Qualified. A super job!

I look forward to sending you an additional 1000-point crew in March 1987.

G. KENT TROY
CPT, Armor
FRG

Tank Format Debate

Dear Sir:

I am pleased to see that people outside the Army are concerned about soldiers and their equipment, as evidenced in the

May-June article *The Heavily-Armored Gun-Armed Main Battle Tank Is Not Optimized for Mechanized Warfare* by Mr. Craig Koerner and Mr. Michael O'Connor. The article is well written and well researched, but it only scores a near miss. The authors raise very salient points, and some of their ideas are highly valid.

For instance: any combat or NTC-seasoned tanker will agree that survivability depends on stealth and mobility. As long as a tank can protect its crew from small-bore cannon fire and area engagement artillery rounds, its armor is thick enough. Survivability beyond that must be borne of speed, low silhouette, stealth and firepower. The authors are quite correct in implying that it is futile for us to develop armor that will defeat a long rod penetrator or HEAT round capable of penetrating 650 mm of rolled homogeneous steel. Our opponents will respond by simply making bigger bullets. We should opt for less weight and greater mobility.

The authors are also near the mark by implying that the time is ripe for a light weight, highly mobile, missile carrier to be introduced to our ground arsenal for the purpose of shoot and scoot missions or, as the authors put it, stalking and ambush. But the vehicle they propose, a three-man crewed, tracked missile carrier with overhead launcher, is still too large and cumbersome for that mission. At the risk of sounding too simplistic, what is needed is essentially an AH-64 with tracks instead of rotors. Several vehicles which meet this criterion are currently being tested. They are small, lightly armored, low silhouette vehicles, crewed by a "pilot" and a gunner, and are optimally suited for stalking and ambush and other cavalry missions. But these vehicles are not tanks. And stalking and ambush will not win wars.

While it is true that guided missiles are inherently more accurate than gun rounds, missiles have problems that do not bother gun rounds. For instance, the authors propose that we replace main gun rounds with laser-designated guided missiles. Laser designators are fine additions for a weapon system, but any tank commander can graphically describe the effects of snow, rain, fog, dust, or tree limbs on a laser rangefinder. Laser beams, be they generated by a rangefinder or designator, are not selective about the surfaces they reflect from. They are also adversely affected by a phenomenon known as scintillation, which requires nothing more than a warm sunny day to have deleterious effects. Opting for wire-guided missiles solves these issues, but introduces a whole new spectrum of widely-known problems.

Additionally, given the size of currently available long-range ATGMs, missile carriers are limited in the amount of ammunition they can carry. This limits them to short-lived battles prior to rearming. That, in turn, forces them into shoot and scoot roles. While this is a necessary function, designed to attrite, disrupt, and demoralize an enemy force, it is not likely to defeat the enemy by itself. That tactic alone will not win wars.

I am not advocating that we abandon missiles or missile carriers. They are necessary, and I am heartily in favor of their development and use. The point is that we need both missiles and main guns, missile carriers and tanks, in order to win a future war.

To win any conflict, we must seize the initiative, attack, and keep on attacking, which brings us to a philosophical, rather than technical, definition of a tank. A tank is first and foremost an offensive weapon system. It should also be able to be used defensively, but its primary mission is to close with and roll over the enemy. It must embody enough firepower, mobility, and shock effect to not only kill those at which its weapons are pointed, but send the rest of the enemy's soldiers fleeing for cover, and hound them until they give up. To do this (1) it must be large enough to generate shock effect, (2) it must be capable of continuous operations, (3) it must be fast and agile, (4) it must be impervious to small arms fire and common artillery, and (5) it must be capable of delivering large volumes of highly accurate, completely lethal fires while on the move.

ATGMs and missile carriers just do not have all of these capabilities given current or near-future technology. Until the research and development people can produce a good fire-and-forget missile which is small enough to carry in large numbers, yet is effective against heavy armor, and is capable of being fired in large, rapid volumes from a moving platform, the gun-armed tank will remain an essential component of armored warfare.

MIKE DEATON
CPT, Armor
San Francisco, CA

Tank Format Debate Goes On

Dear Sir:

The article in the May-June issue of *ARMOR* by Messrs. Koerner and O'Connor recommended a totally new tank design based on a light, lightly armored, highly mobile vehicle armed with an ATGM. One certainly must admire these two armor enthusiasts in presenting their ideas before a professional audience. And I say this without irony; we can always use novel ideas, whatever their source. While these ideas may be a radical departure from traditional notions of the main battle tank, they are not necessarily new. Similar recommendations have been put forward and debated in the past and have, in some cases, been tried in experimental and production hardware.

The continental European tanks of the 60s, for instance, such as the West German Leopard 1 and the French AMX-30, were tanks that ceded the conflict between armor and ammunition to the latter. Their low ballistic protection was supposedly compensated for by speed and agility. It wasn't. The double whammy of hypervelocity ammo and high performance fire control systems demonstrated a battlefield verity: tanks can't outrun bullets.

Since then, there has been a worldwide design trend towards greater *built-in* survivability, as evidenced by the new armors (e.g. Chobham and special armors), automatic fire suppression systems, compartmentation of ammo, and removal of fuel from the interior of the vehicle, to mention some of the more prominent measures. These features have appeared on one or more current Western world-class tanks, such as the M1, M1A1, Leopard 2 and Challenger. Their introduction has indeed had an effect on the tactical balance mentioned by Messrs. Koerner and O'Connor.

Similarly, the employment of an ATGM on a MBT has been tried and found wanting. The Shillelagh hybrid conventional gun/ammo and ATGM system, first mounted on the M551 Sheridan, armed the M60A2 and was the weapon of choice for the MBT 70. The fate of these systems is largely attributable to the technical problems and the combat inadequacy of that hybrid armament. One of th major problems which finally killed the Shillelagh was the engineering nightmare (impossibility?) of developing an APDS round for a system whose design was compromised by its incompatible gun-launcher requirements. The need for that round was the result of the user's eventual recognition that shaped-charge warheads alone wouldn't cut it on the battlefield.

But my chief difficulty with the authors' thesis is that the central idea of the main battle tank as we — whether as users, developers, or system analysts — have come to understand it over the years is somehow lost in the dense jargon of their arguments. The main battle tank, as I understand it — and I believe that most armor professionals would agree — is the robust centerpiece of the combined arms team, providing the mobile firepower essential for both the offense and the defense. In this key role, it must take under fire a variety of targets, from heavily fortified positions and armored vehicles to enemy troops in the open. It must, at times, advance into the very teeth of the enemy's defenses in order to penetrate, pursue, and exploit. At other times, it must stand firm against massive armored onslaughts to prevent an enemy breakthrough. To perform these demanding tasks, the MBT must survive, especially against those antitank weapons it encounters to its front. The authors, on the other hand, seem to have a very different idea of the role of the tank, for they have put forward a concept of not an MBT, but instead a type of tank destroyer such as the British Striker (Swingfire ATGM on the Scorpion chassis). This concept would appear to ignore the very essence of the MBT as it has evolved in the recent past into an almost world-wide consensus.

This concept is the apparent result of he authors' premises, some of which are misperceptions and others which are just wrong. For example:

"Ambush" tactics are not feasible as the predominate modus operandi of MBT in a major clash of mechanized forces on the European battlefield. While we build our tanks to fight and win in a wide variety of terrains, climates, and threat environments, they are designed primarily with the European plains in mind, because the major threat is there. The authors have imagined a war comprising a series of meeting engagements of armored columns, one of which maneuvers to ambush the others. Is this in Europe? Not in any of the scenarios I have seen, where the reality is more like massive armored formations echeloned in depth. This is not to minimize the importance of maneuver and surprise; there certainly would be penetrations, envelopments, and counterattacks on enemy flanks. But this second version does recognize an enemy more operationally sophisticated and more substantially armed than the Syrians operating in Golan.

Up-armoring vehicles may not be inherently more costly than countering with munitions. The authors appear to be unfamiliar with the state-of-the-art in armor design. The technology of armor systems has advanced in recent years, with the introduction of new materials and novel arrays of these materials combined with the more traditional steels and aluminums. These new armors can be widely and rapidly fielded by an applique and/or modern design approach. (While most readers are assumed to be familiar with applique armors, the term "modular" may be new to some. Essentially, modular armor implies an armor package attached in modules to the vehicle frame. It differs from an applique in that it is the inherent armor of the vehicle, rather than an "add-on" armor. Its modular features permit it to be replaced with an upgraded package as the threat changes with time or place.) Conversely, ammunition and armament upgrades can be very expensive, as, for example, when a new tank with vastly improved armor is introduced. Then, not only the development and fielding of a new round, but also the obsolescence of a large inventory of older antiarmor rounds, could be very costly. When the new armor cannot be defeated by merely improving components of the existing armament systems, but requires a totally new system, the cost of the response is compounded.

Improved ballistic protection will not necessarily require proportionately heavier tanks. The authors have made the common mistake of linear extrapolation on the basis of traditional armor materials and vehicle designs. When the newer armor arrays mentioned in the previous paragraph are applied in novel vehicle designs, the weight savings are dramatic. The features of design concepts for future tanks center around reduction of the armored volume and include overhead main armament with autoloading, compact (3-man?) crew compartment, and a smaller, lighter propulsion system. These ideas already exist in experimental hardware.

The authors advance other dubious propositions. The logistic support does not increase, as they surmise, in proportion to the cube of tank weight. The fuel requirement varies directly with the weight, but the overall support today is much more a function of the technological complexity of a system than of its weight. The modern tank's sophisticated surveillance and fire control system, including the thermal imager, is very demanding, but who would deny the benefits it confers on its users? The author's argument against armoring the tank for the more numerous frontal threats, because we cannot armor them all-around for aerial threats, reminds me of the automakers' argument against airbags — they protect passengers only from head-on collisions (the major cause of accidental death on the highways).

The MBT has evolved to its present form because it works. It works because it delivers its decisive firepower when and where it is needed. It carries the battle forward as the nucleus of the combined arms team. It is the penultimate defensive weapon against attacking tanks, the last before the infantry engages them from their foxholes. And, because the main battle tank alone has the size and mass to mount a gun with high recoil impulse, it is the only mobile weapon system on the battlefield (with the neglible exception of a few gun-armed tank destroyers) that can fire a lethal kinetic energy projectile, the awesome APFSDS. If, by arming the tank with a HEAT-tipped ATGM, we eliminate this singular capability, we hand our opponents an overwhelming advantage: they can now optimize their armor designs against a single type of antiarmor threat, and that one the more easily countered.

I will concede Messrs. Koerner and O'Connor at least one point: there is a need for a dedicated under-armor ATGM system in the field today. The BFV, an excellent fighting vehicle, should be freed of the burdensome antitank role, so that it can better perform its primary functions of troop carrying and fire support.

The challenge posed to armor designers and planners today is not, as the authors have suggested, to reinvent the tank but, rather, to hasten its rational evolution into an even more formidable weapon — more survivable, more lethal, and more mobile — that can control, on its own terms, the battlefield of tomorrow.

JOHN R. AKER
LTC (Ret.), USA
Charlottesville, VA

The Authors Reply

Dear Sir:

We are grateful for the thoughtful criticisms of LTC Aker and CPT Deaton. Unfortunately, we cannot respond to all of their detailed objections in a short letter. Instead, we will confine our discussion to 1) whether our proposal has been tried and shown to be deficient, 2) our choice of light, fragment-proof all around protection, instead of heavy frontal arc armoring, 3) our choice of missile instead of gun armament, and 4) whether we have designed a tank as opposed to a tank destroyer.

Both missile armed and lightly armored vehicles have been built in the past. Current missile armed vehicles have no close combat capability, very large firing silhouettes, and low velocity missiles. Our proposal differs from these in combining light armored and ATGM armament with close-in combat capability, high mobility, and a low silhouette weapon with hypervelocity ATGMs. While the lightly armored and highly mobile Leopard 1 was considered by many to be an experiment that failed, there is no combat experience supporting this conclusion.

The way to think about choosing the optimal armor level is to compare your cost of adding armor to your enemy's cost of increasing weapon performance to penetrate it. Obviously, increasing your armor thickness without increasing cost must increase weight and reduce mobility. Therefore, the straightforward way to determine the cost of uparmoring is to hold other aspects of design, such as mobility and armor type, constant. Given your choice of armor type, configuraiton, etc., increasing protection further must come from increasing armor thickness. To uparmor in this way without losing mobility is very expensive, as Richard Simpkin makes clear.

Thickening tank armor beyond the "frag-proof" M-2 level is an excellent example of such a costly, yet cheaply countered, design feature. The ease with which new AT weapons, such as APILAS ("Slingshot"), TOW2, and others were deployed in response to the invention of Chobham armor shows how readily uparmoring is defeated. Improvements in protection which add little to life-cycle costs, such as fire suppression systems, external fuel tanks, internal compartmentalization, Chobham armor (a one-time expense over the life of the vehicle), and even modular armor are worthwhile. We favor all of these measures. However, while modular armor allows relatively rapid and cheap deployment of new armor types, it does not eliminate the weight and cost penalties of thickening tank armor. Furthermore, there is no reason to believe the technology of armor will outpace technological improvement in AT weaponry. Increasing armor thickness will continue to be futile.

Many readers have objected to our choice of an ATGM, instead of a gun, for the main armament of our vehicle. They contend that missile systems, for reasons of their ammunition size and HEAT warheads, are incapable of delivering the quantity and types of fire that guns provide. First, the problem of ammunition applies to only AT rounds (ADATS is over twice the size of gun rounds). Our HE and smoke rockets are comparable in effect to gun rounds, and smaller in cylindrical volume. Thus, our design, which is larger than TOW-armed M113 variants and has no internal infantry like the M-2 BFV,

would have an ammunition supply comparable to that of current MBTs. Second, the disadvantage of allowing the enemy to optimize against HEAT rounds is overwhelmed by the twin advantages of the small silhouette of a weapon on a telescoping arm mount (TAM), and the missile's greater accuracy. TAMs have the ability to use horizontal cover too high for turreted or overhead mounted guns (OHMG), and vertical obstacles such as buildings, for defilade. Another decisive advantage of ATGMs is their high hit probabilities against small targets (such as OHMGs) at all ranges. Guns have low hit probabilities against such targets, even at short ranges.

Is a lightly-armored, missile-armed vehicle a tank? In the defensive role, it is more effective than any MBT yet fielded. On the offensive, it possesses greater firepower and mobility than current MBTs, and is just as survivable. Tanks succeed in the attack by using fire and maneuver to suppress enemy fire, close range, and destroy the enemy. Historically, few tanks have succeeded by relying on heavy armor and advancing into enemy fire. From WWI to the present, attacking tanks succeeded by using combined arms and suppressive fires to neutralize AT weapons, relying on their armor to protect them from the ubiquitous small arms fire and high explosives, NOT by failed attempts to absorb AT fire. Thus, the heavy armor on current MBTs is of NO use in the assault role, and a lightly-armored vehicle is no more a tank destroyer than are the M-1 Abrams and the Leopard II. Tanks on the assault benefit from superior mobility to minimize exposure times, accurate and lethal covering fire, and integral smoke-laying capability to deny the enemy effective fire as the attacker closes range. Our proposed tank, with its ultrahigh acceleration, accurate ATGMs, and smoke rockets, is superior to conventional tanks in all of these functions. The emphasis on "ambush tactics" in the design does not compromise the tank's attacking power, nor does it imply any belief in a "war of meeting engagements." (In hindsight, "ambush tactics" was an unfortunate phrase.) Rather, this tank was designed to excel at the "microtactics of defense," which are useful both in tactical defense and in an attacker's overwatch force. Therefore, our tank design is superior to current MBTs in both attack and defense.

CRAIG KOERNER
MICHAEL F. O'CONNOR
Chicago, IL

Direct Link for NBC Alarm

Dear Sir:

When you put out your defensive position's listening or observation posts, after having been given an NBC threat assessment, did you ever wonder if there were a quicker, more effective way to alert your position to an NBC attack?

When the M-43 detector unit is placed forward of the LP/OPs and the M-42 alarm unit is stationed at an LP/OP, even the most competent soldiers cannot pass on an alert until they have gone through their protective mask-donning routine. The time required to accomplish this is small, but the alert must be passed as quickly as possible to prevent casualties. This holds true particularly for soldiers inside tracked vehicles, especially tank crews. How can we alert them more quickly. One way — using an M-60 tank unit/platoon for example — is to wire the M-42 alarm unit into the unit/platoon hot loop wire system. How do you make the connections?

Using the M-8 automatic chemical agent alarm system, take WD-1/TT field wire and hook into the binding post on the M-42 alarm unit and run the other ends of the WD-1/TT to the AN/VIC-1 intercommunications set. Then run your hot loop from tank to tank and put the AN/VIC-1 into operation. When the M-43 detector unit is set off, the alarm signal can be heard over the entire hot loop, alerting everyone wearing their CVC. For mobile operation, you could also run the WD-1/TT from your M-43 to the intercommunication set and when you come upon a contaminated area, you would get the alarm over the intercommunications set.

Using this technique will greatly enhance the reaction time under an NBC threat, and also improve the purpose of the M-8 automatic chemical agent alarm system.

SSG CHARLES MURPHY
TACOM Branch, Cmd & Staff Dept
USAARMS, Fort Knox, KY

In Response...

Dear Sir:

In response to the article, "Bring Back the Beret," in the July-August edition of *ARMOR Magazine,* it should be pointed out that the only branch/MOS-related award is the infantry blue cord. To some extent, the CIB and EIB are oriented towards soldiers with a PMOS within CMF 11. However, the Parachutist Badge, Air Assault Badge, and Ranger Tab are available to those soldiers who volunteer and earn them.

The maroon beret is, and always has been, the international headgear for paratroopers. All paratroopers, whether they are infantry, armor, finance, or any other branch, have one thing in common. They serve in an airborne unit and regularly jump out of airplanes. They are volunteers. They first volunteered when they joined the Army and then again to go to jump school. Ranger and Special Forces soldiers volunteered three times — once to join the Army, again to become Airborne, and then again for Ranger or Special Forces units. It seems that in trying to make a point about the armor soldiers getting a black beret and instituting an Expert Armor Badge, you've taken cheap shots at the infantry as well as some fine fighting units. The infantry soldier is and always will be the cutting edge of the battlefield; this is proven by the amount of casualties that infantry units sustain during war. Infantry soldiers deserve to wear awards such as the CIB when they survive combat, and the EIB when they meet the requirements.

Now, let's be objective about the airborne finance clerk. He or she wears no more distinctive garb on a uniform than does a tank crewman in the 82d's 3d Battalion (Airborne), 73d Armor Regiment. I fail to see your point in comparing an airborne finance clerk and a non-airborne armor platoon sergeant.

As for the statement about the black beret belonging to the Armor, it was never authorized by DA as headgear for tankers. When it was worn, it was done so under local policy for local wear only. U.S. armor personnel most likely started to wear the black beret so they would resemble their fellow NATO tankers. In fact, it was an armor officer, General Creighton Abrams, when he was the Army Chief of Staff, who outlawed the tankers' black beret.

In your historical statement about the 4th Armored Division rescuing the 101st Airborne, you didn't mention that an entire U.S. armored division had retreated from the Germans in the Ardennes Forest during the Battle of the Bulge, and the only soldiers to stay to fight were paratroopers. Of course, the troopers of the 101st Airborne will always be grateful for the breakthrough achieved by Third Army and the 4th Armored Division, but one should not forget the courageous stand of the 101st at Bastogne or the decisive intervention by XVIII Airborne Corps at the northern shoulder of the Bulge. In fact, the following statement appeared in the *Stars and Stripes* during the siege of Bastogne:

"The magnificent spirit of selfless heroism which inspired yourself and the officers and men of the garrison of Bastogne to victoriously defend Bastogne from December 19, 1944, to the arrival of the 4th Armored Division on December 26, 1944, constitutes an inspiring example of discipline, valor and endurance. You and the officers and men of your command are hereby highly commended for a superior performance."

— LT GEN GEORGE S. PATTON, JR.

Nothing was said about the paratroops who jumped into France behind enemy lines the night prior to D-Day and secured key terrain for the main invasion forces. You forgot to say anything about the Rangers who scaled the sheer cliffs at Pointe du Hoc in order to capture the coastal guns supposedly there. All of these soldiers completed their daring missions without a beret and with no armor support (except for a steel helmet and a cotton uniform). However, the point of this response is not to discuss the distinguished history of the paratroopers, for in the end it is a combination of a combined forces team which inevitably destroys the enemy.

Finally, it is not the beret that makes soldiers elite, but it is a special dedication

which inspires them, whether they wear the maroon beret of paratroopers (even finance paratroopers), the black beret of Rangers, or the green beret of Special Forces. They are all volunteers who are willing to give a little more of themselves than the average soldier.

JEFFREY D. NEWSOME
1LT, IN
82d ABN DIV

Thoughts on "Kobra," Smoke and "Dead" TC's

Dear Sir:

I have appreciated your magazine for some years and was saddened to hear that its publication will soon be ending. I know many people, including myself, who would gladly pay an extra subscription fee to keep *ARMOR* active in its present form, assuming that this arrangement would be practical.

Concerning the comments made by readers about the implausibility of the muzzle-loading characteristics of the "KOBRA" ATGM, I agree that this does sound farfetched. However, while everyone is quick to dispute the muzzle-loading feature, no one appears to doubt the dimensions of the missile. Maneuvering a 1.2 meter (That's 3 ft. 11 in.) missile into the breech within the cramped confines of the T80 turret, made more difficult by the presence of automatic loading equipment behind the breech, sounds almost as implausible as muzzle-loading.

In reference to SFC Allison's letter, he certainly presents some interesting and viable ideas. In fact, he seems to have been beaten to the point concerning his suggestions for ATGM countermeasures. A smoke greande launcher-deployed ATGM decoy system is an available option on the French AMX-40. Although I am unaware as to how the system works (i.e. what the decoys are meant to replicate), a flare attempting to mimic the tracking flare on a SACLOS-guided ATGM would seem to be the practical solution.

Concerning the overhead, under armor projector, this idea has also already been taken up, a la the 60-mm mortar on the Merkava Mk II, and the Swedish Lyran launcher. These systems have the added advantage of being able to launch conventional rounds such as illumination and smoke in addition to a possible ATGM decoy.

I am in total agreement with SFC Allison concerning his statement that the 3-man engagement on TT VIII should include a "dead TC" scenario. However, I feel that the "dead loader" situation should, depending on the secnario number, also be presented as an alternative. Besides the real possibility of losing an LP/OP as a casualty, the loader will now be semi-exposed while firing the loader's machine gun.

In closing, I'd like to again express my hope that we'll still be reading *ARMOR* well into the future.

SSG JEFFERY S. SPENADER
B Co, 1/63d Armor
Ft. Riley, KS

Smokers Raise Some Clouds

Dear Sir:

We in Smoke Division at the Chemical School read with interest the article written by Captain Reardon, "Countering Soviet Smoke," in the May-June 1986 issue of *ARMOR*. We would like to offer comments on some of the technical points of the article.

In the opening scenario, we are somewhat confused as to when the friendly forces were first subjected to enemy artillery fire. In actual Soviet exercises described in *Soviet Military Herald* the smoke-HE artillery barrage is delivered on the enemy well before the Red Forces enter ATGM range (about 4,000 meters). The smoke mixture in the artillery will be a mixture of toxic agents and plasticized white phosphorus (PWP), which is WP and powdered butyl rubber. PWP is an excellent obscurant well into the far infrared range of the spectrum, depending on path-length, thermal sights would experience difficulty, if not impossibility, seeing through it.

Captain Reardon uses the term "bi-spectral" to describe thermal-obscuring smoke. "Bi-spectral" more accurately describes smoke which obscures visible and near infrared only. "Multi-spectral" would be the correct term to describe visible, near, and far infrared (thermal) obscuring smokes.

The Soviets plan to place so much thermal-obscuring smoke on future battlefields that they even forego the employment of thermal sighting systems with their ground forces, as the systems would be rendered useless in such an environment.

Captain Reardon presents some interesting countermeasures to Soviet smoke employment which we may incorporate into our lesson plans. But he does mention the use of 4.2" mortar smoke to "erase" Soviet smoke lines. We at the Smoke Division have as yet never been able to figure out how to "erase" existing smoke. Please elaborate on how this is done!

KEVIN W. KILLE
Captain, CM
Instructor

Good Story; Weak Conclusion

Dear Sir:

I have just read the article "Attacking Dismounted Infantry with Armored Cavalry," (*ARMOR*, September-October 1986) and feel compelled to offer three comments, two positive and one negative.

First, I am glad to see that at least a few of the Army's professional journals are coming to the realization that the war in Vietnam can provide superb examples of combat actions at battalion level and below. For too long, we have ignored the tactical lessons of that war simply because we did not like the political and strategic outcome.

Also on a positive note, I would like to congratulate the authors on the realistic and insightful "Lessons Learned" section. I found particularly interesting the authors' observations on the importance of training subordinate leaders to assume command. Too often in the U.S. Army we fail to let our subordinates try their hand at commanding the next higher echelon.

The article's only flaw — and it is a serious one — is in the conclusion. The statement, "...attack of dismounted infantry with armor forces is a slaughter," is a dangerous over-generalization. Although the courage of the North Vietnamese Army's soldiers is beyond dispute, the NVA was a rather unsophisticated enemy lacking, for example, modern antiarmor weaponry. Moreover, it is quite clear from the discussion that the enemy was not fighting from well-prepared, dug-in fighting positions. There are a number of historical examples which suggest that if these conditions had been present, the outcome might have been different.

My purpose in making this criticism is not to detract from the actions of any of the participants, nor is it to detract from the importance of armor on the battlefield. It is rather to suggest that authors, and even editors, have a responsibility to be careful about over-generalizations. In our business, over-generalizations can get people killed.

MICHAEL L. BROWN
MAJ, GS
Chief, G3 Tng Div
Berlin Brigade

We often have questions concerning manuscript requirements for articles submitted to *ARMOR* for publication. The requirements are quite simple.

Submit your article in typewritten, doublespaced format on white, unlined paper. Leave margins of at least one and one-half inches, and be sure to put your last name at the top of each sheet of paper.

If you include photographs with your manuscript, ensure that they are black and white prints, and indicate whether you desire that we return them to you after the article appears in the magazine. While we can work with prints of nearly any size, larger prints are easier to work with and will appear as better illustrations in the magazine. Hence, if you can submit large prints, do so. Line drawings or sketches should be in black ink on white paper.

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COMMANDER'S HATCH

MG Thomas H. Tait
Commanding General
U.S. Army Armor Center

Legacy

"...What will be your legacy after you're gone?"

A legacy is something we leave to our successors. The traditions and values of the Army and nation are legacies that were left to us by our forefathers. We all leave something behind when we depart.

Armor/Cavalry leader, what will be your legacy after you've gone? Will the imprint you leave on your crew, platoon, company, battalion be positive or negative?

Unfortunately, some of the best lessons learned can come from a totally negative experience. As a young officer, I served in a battalion where the negatives were accentuated and the positives were almost nonexistent. There were many poor leadership examples in that particular battalion, and much was learned from the examples set by those leaders. The legacy of their leadership was one that had the noncommissioned officers intimidated to the point that their performance was in a survival mode. The junior officers — most of whom were two-year obligated volunteers — terminated their service while the two regular Army officers eventually transferred into combat service support branches. This was a battalion that did not perform well.

The point of this vignette is that the leaders were not good and their legacy was one of poorly trained, poorly disciplined soldiers with low morale. The imprint I received as a result of this experience has never been forgotten. I learned how to do things right by watching others make mistakes. Although one can often learn as much from a negative experience as from a positive one, it is important that we, as the leaders of tankers and troopers, provide them with only the very best role models in leadership. They deserve the best that we can give them.

Our leaders of the past — Patton, Harmon, Abrams, Starry — left us with a legacy of audacity and panache — the image of hard-driving warriors who took war to the enemy. There was P. Wood, the revered commander of the Fourth Armored Division, who was a caring commander as well as a brilliant leader. The recently retired "Doc" Bahnsen was a fearless warrior's warrior. And there are many others who have shown the way.

In order to succeed on the modern battlefield, we must have the requisite amount of dash, audacity, esprit, and cohesion that will enable us to take the fight to an enemy that has more equipment and personnel than we have, and whip him. We have the very best soldiers, the very best equipment, and the very best leaders from sergeants to colonels. However, your soldiers must have confidence in you, in their equipment, and in their fellow soldiers. It is your responsibility to ensure they have that confidence.

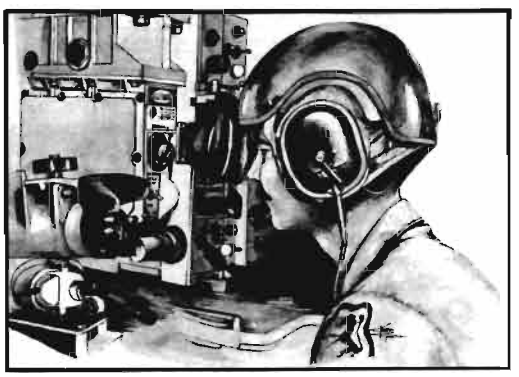
It takes work and a will to win, but, it is my hope that the legacy that each of you Armor/Cavalry leaders leaves when you leave your command, whether as a tank commander or a battalion commander, is a well-trained, disciplined, hard-charging unit. You can do it!

Treat 'em rough!

Thomas H. Tait

The "New" Company Master Gunner

SFC David M. Gray
B Co., 1/7 Cav, 1CD
Fort Hood, TX



The M1 Unit Conduct of Fire Trainer is here to stay, and some battalion commanders are having a tough time finding people to run these very valuable training devices. In most cases, the obvious choice is the battalion master gunner, but even this highly-trained NCO must first attend an instructor/operator (I/O) course before he is qualified to train tank commanders and gunners on the M1 UCOFT.

At the level of the tank company, the problem of finding an I/O for the UCOFT is even more difficult. Current MTOEs have the company master gunner as one of the three tank platoon sergeants. Most of us realize how much work is involved in being an effective platoon sergeant and a good master gunner. If we now put on this soldier the responsibility of instructing the company's tank crews and the running of the UCOFT, are we asking too much from this noncommissioned officer?

In the first place, most units are experiencing a shortage of master gunners. At the company level, those master gunners who are present have the primary job of being a platoon sergeant. While being both a platoon sergeant and the company master gunner taxes the time of the noncommissioned officer, most of us are doing a good job of handling the responsibilities. But with the advent of the UCOFT, we have placed on that master gunner an added, more time-consuming task of being the instructor/operator for the company.

The M1 UCOFT is so good at what it does that I foresee companies spending as much as 25 percent of their time in garrison on it. What platoon sergeant can spend 25 percent of his time away from the soldiers of his platoon and still believe that he is doing an adequate job as a platoon sergeant? This is a dilemma because the company master gunner is the ideal I/O for the crews of the company, yet the company commander needs this NCO in his role as platoon sergeant.

However, there may be a way out of this dilemma. Under the restructuring of CMF-19, the master gunner will be assigned to the headquarters section of the tank company. He will be a sergent first class and the senior enlisted man (except for the first sergeant) of the Headquarters Section. He will serve as the tank company headquarters tank section leader and as the tank commander of the company commander's tank when the company commander is not with his crew. There is a danger, however, to this solution.

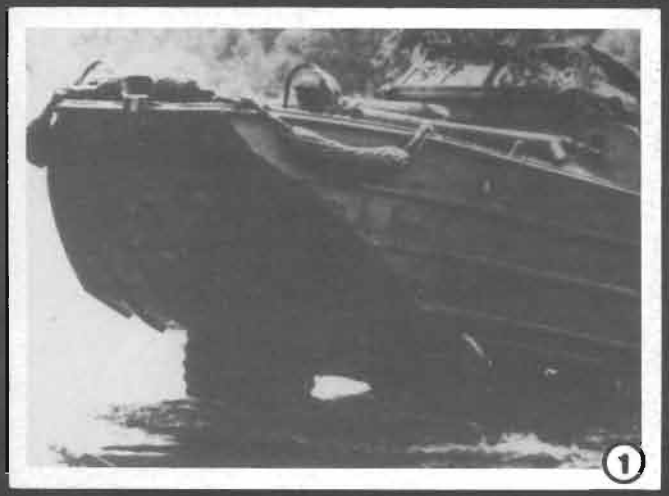
When this restructuring occurs, there is a danger that this master gunner will again assume the duties of a "platoon sergeant" for the enlisted men of the company headquarters section. If we permit this to happen, we have, in effect, put him in the same position, with the same problem that he had before. Hence, the best way to deal with the problem is to put him in a position that most companies "create" and fill with one of their staff sergeants who should be serving as a tank commander — the company training NCO. In that position, he is close to the company commander so that he can advise the commander on matters of training. He can better serve the commander in the planning for ranges and ammunition, and he can ensure that training, especially gunnery training, is planned properly and executed in accordance with doctrinal procedures. Without the many requirements of the "platoon sergeant," he will be free to instruct and operate the UCOFT, and since he is directly responsible for the gunnery training of the company, his work in the UCOFT would be both better integrated into the entire company training plan and, probably, better conducted. If the headquarters *section* needs a section sergeant, a good candidate for that job would be the supply sergeant or the other enlisted tank commander of the section.

The company master gunner's prime function is to assist the company commander in training tank crews who can put steel on target faster than the enemy. The M1 UCOFT is going to be a tremendous factor in the training of such crews. However, the UCOFT will only be as effective as the way we use it, and the first step to proper use will be the selection of the proper person to act as the instructor/operator. The company master gunner is that person, but we must ensure that he has the time to plan and conduct effective gunnery training. As the company training NCO, he will be in the best position to ensure high quality training and the result that we all require: tank crews who are qualified on Table VIII and who are ready to fight on the modern battlefield.

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 47



"...Our heavy task forces have difficulty with the high-speed, fluid nature of meeting engagements..."

Winning the Meeting Engagement

by Major David Ozolek

The Soviets believe the first battles of the next war will be meeting engagements between rapidly moving forces. Their doctrine says that about 80 percent of the subsequent battles will also involve encounters between moving forces. They write voluminously on the subject in their military journals, and most of their tactical exercises involve training in meeting engagements. On the other hand, our own doctrinal manuals only briefly address how to fight and win a meeting engagement.

Exercises at the National Training Center (NTC) have shown that our heavy task forces have difficulty with the high-speed, fluid nature of meeting enagagements. Part of the explanation for this shortcoming may be that while the NTC's OPFOR is well-drilled in the principles of the meeting engagement, it is not an operation that receives heavy emphasis in our own training. If we are to win the first battles, gain the initiative, and continue the fight on our terms, we must understand how our potential opponents plan to fight the meeting engagement, master the principles that will allow us to win these initial battles, and train hard on the subject.

For the Soviets, the meeting engagement is not simply a chance encounter, but an anticipated and probably pre-planned action in which two forces, each engaged in offensive action, collide enroute to their deeper objectives. According to Soviet doctrine, there are three common scenarios in which a meeting engagement may occur:

- Operational maneuver groups, or first echelon regiments, exploiting strategic surprise and rapidly moving forward just prior to or at the beginning of hostilities, will encounter enemy forces moving forward to their initial defensive positions.
- Follow-on echelons penetrating gaps in the enemy's defenses caused by nuclear or conventional fire strikes, or by breakthrough attacks conducted by lead elements, will encounter in the enemy's rear, reserve forces moving forward to contain the penetration and restore the defense.
- Second echelon, or reserve forces, moving forward to stop an enemy penetration may encounter high-speed enemy units attempting to exploit their initial success.

Soviet March Organization When Anticipating a Meeting Engagement

The combined arms regiment is the building block of Soviet tactical operations, but success in the meeting engagement depends primarily on the regiment's lead battalion's use of speed, surprise, the rapid massing of combat power and decisive maneuver to destroy an equivalent or even superior enemy. They know that in order to avoid operational and strategic defeat, they must penetrate to our rear quickly to destroy our nuclear-capable systems and our fire support and combat service support before we can decisively use these combat multipliers against them. In order to maintain as high a rate of advance

Soviet Motorized Infantry Battalion

in the approach march to contact formation

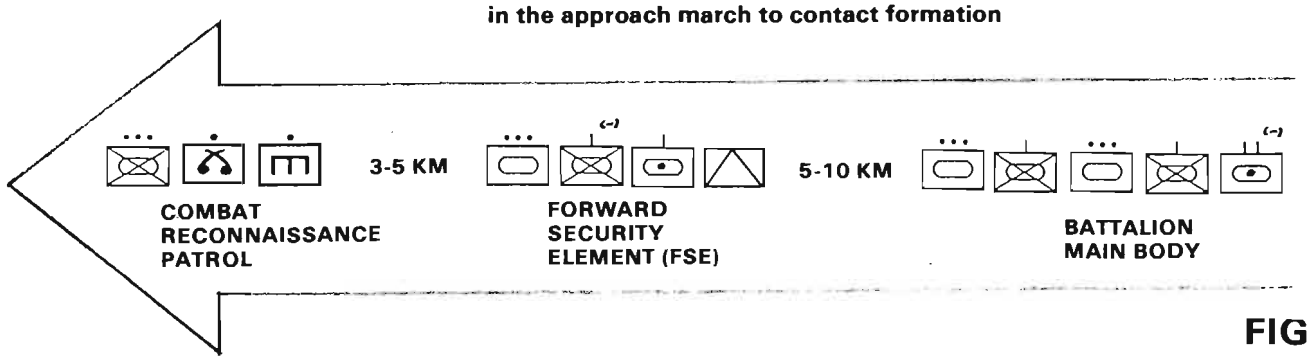


FIG. 1

as possible, the battalion will organize in a column designed to balance speed and the ability to develop the situation. This column consists of three elements: a Combat Reconnaissance Patrol (CRP), a Forward Security Element (FSE), and the battalion main body (Figure 1).

The CRP is the battalion's lead element and is built around a motorized infantry platoon consisting of three IFVs. An engineer squad and a mounted NBC reconnaissance element are normally attached. The battalion commander may also direct the attachment of an antitank or tank section. Moving three to five kilometers (or nine to 15 minutes, at standard march speed) ahead of the FSE, the CRP's principal tasks are to identify the best route of march for the remainder of the battalion, to locate the enemy and provide early warning, and if necessary or opportune, to destroy the enemy's reconnaissance forces.

The second element (the Forward Security Element (FSE)) in the advance to contact formation consists of a motorized infantry company, reinforced with a tank platoon, minus the elements detached to form the CRP. This FSE will probably have an attached self-propelled howitzer (SP-122) battery and may be supported by an antitank platoon. The FSE's mission is to stop the enemy's advance, fight through his initial resistance, destroy as much of the enemy's force as possible, and fix what cannot be destroyed. The FSE travels about five to 10 kilometers (15 to 30 minutes) forward of the battalion's main body.

The main body consists of the battalion's two remaining motorized infantry companies, each reinforced with a tank platoon. If the battalion is the forward element of a regimental march, the remainder of the regiment's organic SP-122 battalion may be attached. The battalion commander may also designate a small combined-arms force of reinforced platoon size to serve as a reserve to deal with unanticipated events.

Soviet Meeting Engagement Battle Doctrine

Soviet doctrine says that winning a meeting engagement requires gaining a reconnaissance advantage, achieving surprise, seizing the initiative, securing advantageous lines and areas, and conducting deep attacks against the enemy's flanks and rear.

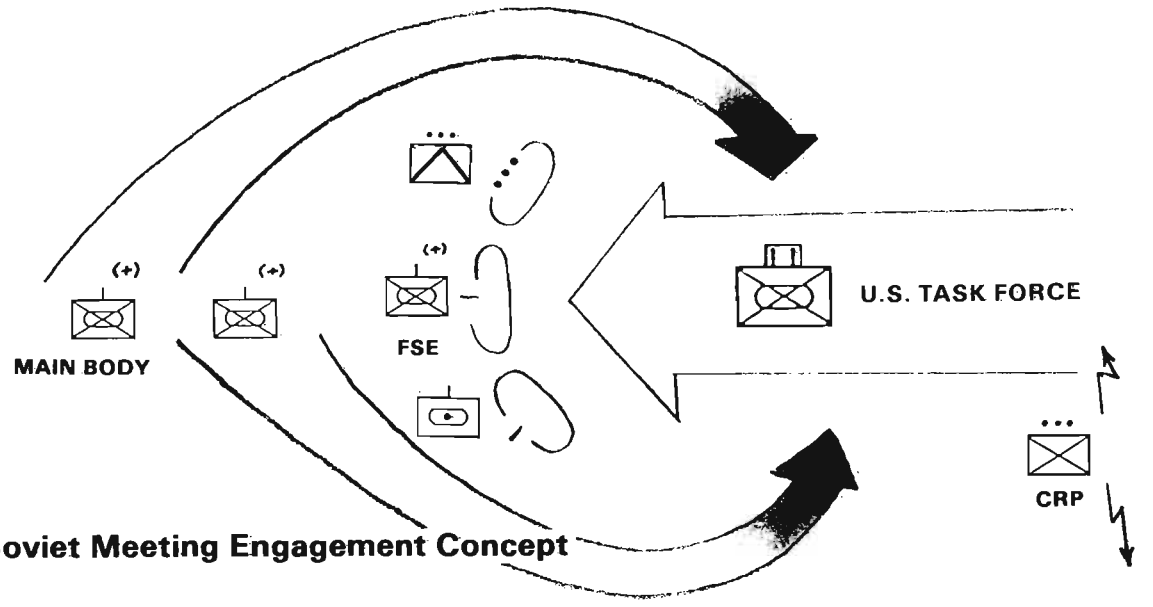
The battalion may receive initial reconnaissance information from the regiment's reconnaissance company, which travels up to 50-100 kilometers forward of the lead battalion. The lead battalion's own reconnaissance effort begins with the CRP moving along the designated route of march to ensure the route is passable and is free of enemy units. Bypasses around obstacles are found and marked or, if necessary, the CRP breaches barriers that cannot be circumvented. The NBC element surveys and marks routes around or through contaminated areas. If small enemy forces, particularly reconnaissance elements, are identified, the CRP may destroy them by ambush — providing that the recon mission is not compromised. If the enemy force is too large for the CRP to handle, the CRP reports the enemy's location, composition, and direction and speed of movement to the FSE commander, who prepares for contact. When the FSE begins to engage the enemy's lead elements, the CRP's next task is to locate the enemy's main body.

The high-speed tempo of the meeting engagement requires gaining surprise and retaining the initiative. The Soviets attempt to maintain momentum and keep the enemy off balance by continuously piling on forces from unexpected directions. This requires achieving an edge in the decision-making process, a difficult proposition for a command, control and communications (C^3) system with definite weaknesses. In order to compensate for their C^3 shortcomings, the Soviets rely heavily on detailed advance planning on how possible meeting engagements along the route of march will be fought. The commander carefully studies the route of march and determines the locations at which meeting engagements are most likely to occur. A contingency plan for each of these areas on the route of march is prepared. If the enemy is encountered near or in one of the pre-planned engagement areas, he is rapidly attacked according to plan, with a minimum amount of further planning necessary.

The pre-emptive seizing of key terrain near the predicted battle sites is seen as a tactical necessity. The battalion's reserve or reinforced antitank elements occupy dominating sites along the route of march and prepare to deliver immediate and accurate long-range antitank fires if contact occurs.

The combat phase of the meeting engagement begins with the FSE deploying on line on advantageous terrain across the enemy lead element's route of advance. The SP-122 battery places direct fire in volleys at specific point targets in the enemy formations. In the direct-fire role these weapons are devastatingly accurate to three kilometers against point targets and five or more kilometers against area targets. Once firepower superiority is gained, the maneuver elements of the FSE assault. If firepower superiority cannot be gained, or if excessive casualties are taken in the assault, the FSE establishes a hasty defense on advantageous terrain to fix and suppress the enemy until the main body arrives.

Using the FSE as a base of fire, the battalion commander uses bold maneuver to move the main body around the FSE to strike the enemy



Soviet Meeting Engagement Concept

force on its flanks or rear. This may be from a single direction, or if possible, simultaneously on both flanks. This maneuver allows the battalion to concentrate all its fires against the enemy, while the enemy is forced to fight in three different directions at once (Figure 2).

Once the main body's assault is underway, the CRP bypasses the enemy's main force and establishes OPs on possible routes of withdrawal or reinforcement to isolate the battle area. The reserve may be sent deep to establish antitank ambushes along these routes to prevent or delay reinforcement or escape. The battalion's other indirect fire support assets, possibly including the two remaining batteries of the regiment's organic howitzer battalion, will also be used to seal off the engagement area by placing fires across the access routes.

If this engagement successfully results in the destruction of the enemy, the battalion regroups in its march formation and continues its advance to the next likely engagement area or to its final objective. If, however, the enemy proves too strong, the entire battalion establishes a hasty defense on advantageous terrain to contain, suppress, and attrite the enemy until the regiment's main body can be deployed against the enemy force.

Soviet Doctrine Strengths

The most important strength of Soviet meeting engagement doctrine is the speed at which it allows them to conduct the operation. The direct benefit of this speed is the ability to mass combat power quickly at key locations on the battlefield. Fresh units are constantly introduced into the fight from new directions, giving the enemy multiple problems to solve and reducing his ability to determine the Soviets' real concept. Doctrinally, it takes only about 30 minutes from the time the FSE makes initial contact until the battalion main body begins its assault.

Because the bulk of his planning was done before the battle began, the Soviet battalion commander can use that 30 minutes to concentrate on the execution of his plan rather than on its development. In the meantime, unless a comparable degree of contingency planning has been done, the opposing commander needs at least that 30 minutes to receive reports from his elements in contact, determine what's going on, develop a concept and issue a plan to his subordinates. And, about the time that plan is issued, new threats from different directions begin to appear, revisions are required, and the whole planning process must begin again. Thus, the advantage of initiative remains with the Soviet commander throughout the engagement, and he is able to act while his opponent can only react.

The continuous reconnaissance effort makes it possible for the commander to ensure the battle takes place where he wants it to. Since the CRP should have located and reported the location, speed, and direction of movement of the enemy's lead elements and main body before the first contact begins. Simply by adjusting his march speed, the Soviet commander can make sure the battle takes place where and how he envisioned it.

Pre-planning also allows the battle to progress according to plan even if the battalion command group is destroyed. In the absence of further orders, the sub-elements continue to fight according to the initial plan until they reach their assigned objectives.

Soviet Doctrinal Weaknesses

In order to gain these advantages, the Soviets have had to make some sacrifices that lead to exploitable weaknesses. Soviet doctrine says that speed is in itself a form of security. Their stress on the importance of quickly getting deep into the enemy's defenses discourages them from employing multiple security units not on the unit's route of march. Since a moving unit must adjust its march speed to that of its slowest element, flank security detachments may slow the main body and may not be used in the high-speed march to contact. Thus, the column's flanks are often vulnerable to surprise attacks.

A weakness that results from trying to fight from a single column is that such a column can be outflanked. Soviet meeting engagement doctrine requires that the enemy's advance first be stopped (the primary mission of the FSE) and then his flanks attacked (by the battalion's main body). Although the FSE is a formidable combined arms force, it fights as a single element and cannot block more

"Victory in the meeting engagement goes to the side that gains the initiative and maintains it..."

than one avenue of approach at a time. Thus, it is possible that enemy elements that are not fixed by the FSE can bypass it and, by spoiling the main body's effort, prevent the Soviet plan from being executed.

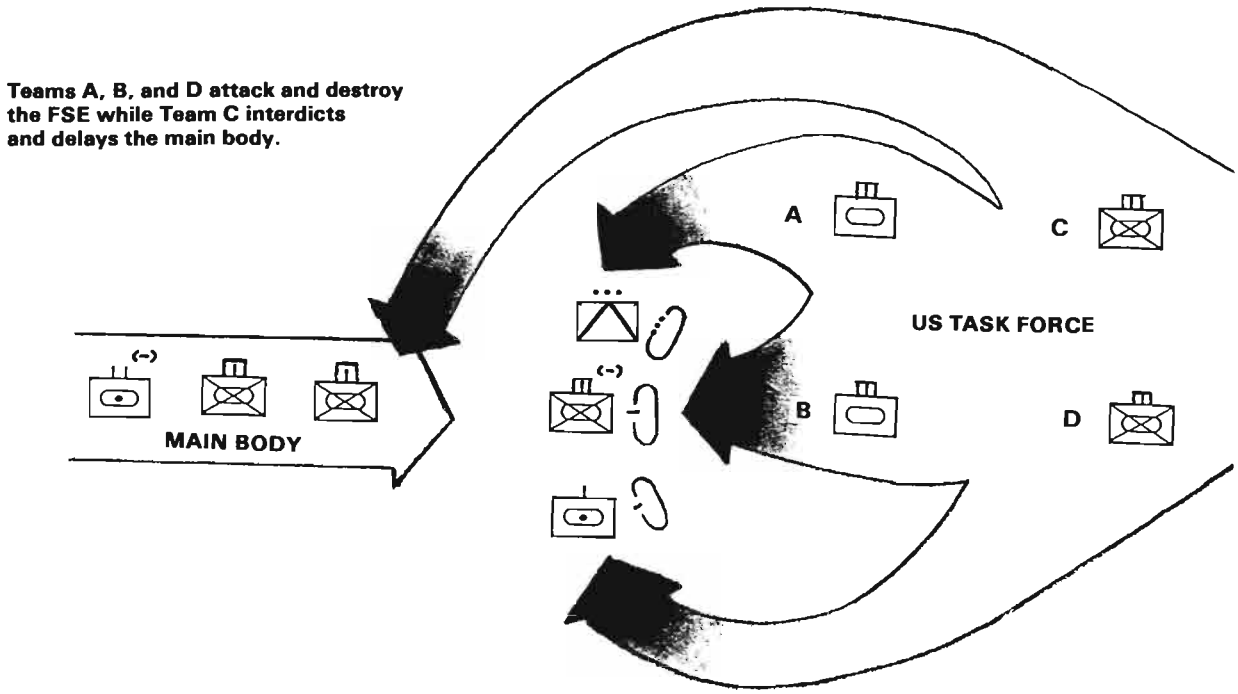
Because of C^3 system weaknesses, extensive pre-planning for the Soviet battalion is not just desirable; it's essential. However, even if the C^3 system is destroyed, the sub-elements will continue to execute the plan. But if the C^3 system is destroyed *and* the parameters upon which the plan are based are changed, the C^3 system's inflexibility does not allow the unit to react to the changes. This is not to say that sub-elements executing what has become an overall inappropriate plan will simply roll over and play dead, for they will continue to fight hard to gain their objectives. But by keeping them from working together to meet changed circumstances, they can be destroyed piecemeal if action is taken before the C^3 system can be restored.

Another weakness results from a combination of the heavy reliance on detailed pre-planning and the "echeloning" concept that is a cornerstone of Soviet doctrine. although the spacing between the elements of the march column (a form of echeloning) allows elements not in the initial contact freedom of maneuver, it also opens "windows of opportunity" that can be exploited to disrupt the Soviet plan. Preplanning is done in great detail and relies heavily on rigid schedules for the coordination of fire support and maneuver. Anything that disrupts that schedule, such as forcing an increase in the gaps between march elements and delaying their arrival at assigned locations, seriously degrades their ability to mass combat power. This gives us the chance to fight the sub-elements one at a time, with a force ratio to our advantage.

Battle Techniques

Victory in the meeting engagement goes to the side that gains the initiative and maintains it by reacting quicker, moving faster, and disrupting the enemy's scheme. The critical period in a meeting engagement is the 30 minutes between the time the FSE makes contact and the main body launches its assault. Thirty minutes is not enough time for the preparation and distribution of an order. Thus, at least the basics of contingency planning must be done in advance. For any operation in which the enemy's situation is not thoroughly known in advance, contingency plans must be made for possible contact in the most likely, most advantageous, and most dangerous locations along the avenue of approach. These plans do not need to be impeccably prepared masterplans; simple sketches attached as annexes to the basic order can suffice. All that's required is a rough overlay with a general statement of the concept and each sub-element's mission, route, and objective. These plans, if needed, can be initiated by simply broadcasting or sending by messenger the code-word title of the plan and the time of execution. Such plans can be put into action before the Soviet commander's plan can get fully underway. *Instead of having to react to what the Soviets are doing. we can make them have to react to what we are doing.*

Next, we must exploit the capabilities of our own C^3 system. Accurate and timely information must be passed to the task force and



team commanders and to the special element leaders from anyone who has knowledge of the enemy. Although the task force command net should be reserved principally for commanders, it must be open for anyone else with important information. Team commanders must learn to talk not only to the task force commander, but also with each other to coordinate their actions. One of the arguments some commanders use against this idea is that the command net becomes too cluttered and when the commander needs to transmit, he can't break into the net. This, however, is a problem that often stems from poor training in communications procedures. Simplified reporting and conscientious use of short, accurate reports can eliminate most of the abuse of such a system.

Whenever possible, the task force should use multiple, mutually supporting axes for its lead elements. Although this will reduce the task force's overall speed to the speed of the slower of the lead elements, unless the higher speed capable on a single axis is absolutely essential, the extra degree of flexibility provided by multiple axes will be a significant advantage in the first minutes of a meeting engagement. Since the FSE can only interdict one avenue of approach at a time, the leading team not in contact is free for other maneuver.

Another useful technique is that of using specially designated antitank elements for the pre-emptive seizure of key terrain along the route. Composed of ITVs with infantry attached for security, or M2s with their infantry squads, these small elements leapfrog succeeding terrain features and provide immediate long-range overwatching fire in the event of enemy contact. Such terrain can also be designated as battle positions for attack helicopters, if available. Tanks are not the best system to use for this task because the mobility and survivability of the tank makes it more crucial for the high-speed assault phase of the operations. And with overwatching fires provided from these positions, the company teams can maneuver with greater speed and increased security.

Exploiting the "Windows"

The most difficult and perhaps the most important task in the meeting engagement is determining and exploiting those "windows of opportunity" presented by the Soviet approach march formations. Left uninterdicted, the Soviet battalion will, on contact, quickly move from the column to its combat formations and rapidly overwhelm our elements with locally superior forces. In order to create favorable local force ratios for our elements, we must keep the Soviets from being able to re-mass by rejoining the separated elements of the column. That five-to-ten kilometer gap between the FSE and the main body is the window of opportunity that allows us to do just that, but two things must occur simultaneously if this is to happen. First, we must mass enough combat power for the quick destruction of the FSE before the main body can enter the fight. Second, we must extend the amount of time it takes the main body to enter the fight, by delaying it on its route. We must also decrease the main body's combat power by attriting it as it moves and exhausting it before it gets to the main engagement area by forcing it to fight a series of minor engagements along its route.

An attacker must have at least a 3:1 advantage in combat power to have a chance of success. Since the FSE is a reinforced company, roughly three teams will be necessary to destroy it. When combined with adequate advance planning, our advantages in mobility, fire control and C^3 can allow us to quickly mass sufficient combat power to provide for a successful attack on the FSE. With rapid, decisive, action, the FSE can be quickly eliminated. At the point that this successfully happens, the enemy loses about one-third of his overall physical ability to fight. The disruptive effect of this loss on the

enemy's overall effort will be even more devastating than the physical losses in themselves, since all of his pre-planning will now be for naught and his relatively inferior C^3 system will make it difficult to compensate for his significantly reduced combat capabilities.

The fourth maneuver company available under the J-series TOE is the key asset for delaying the main body while the other three companies destroy the FSE (Figure 3). Once again, the force ratio necessary for accomplishing a mission is the key factor in determining what type and how large a force to use. Holding up and attriting the enemy's main body should be a moderate-risk delay mission, one that can be successfully accomplished with a force ratio of about 1:3. Thus, a single company-team can provide a sufficient deep-attack force to interdict the enemy's follow-on element. It's important to use the right type of element for each task in the meeting engagement. Having too much combat power where it's not absolutely necessary is almost as bad as not having enough since it means potentially decisive actions at other locations in the battle will be deprived of critically needed assets. The combat characteristics of an infantry-heavy combined arms team make it the unit of choice for delaying the main body in most terrain. This frees the tank-heavy teams for the job they're best suited for — assaulting the FSE.

The infantry-heavy team's delaying mission can be assisted by reinforcing it with the long-range weapons available to the task force that are not necessary for the destruction of the FSE. For example, the task force heavy mortars, because of their limited range, high-volume of fire and trajectory characteristics should support the assault on the FSE. Since the main suppression threat coming from the FSE is the SP-122 battery in the direct-fire mode, the mortars, firing high-angle from behind covering terrain features, can suppress the SP-122s without the 122s being able to return fire. Simultaneously, the task force's supporting long-range artillery can be used to support the interdiction of the follow-on force at greater range, attriting and slowing the enemy's main body.

Attack helicopters are also good weapons for the deep fight. Their firepower and ability to strike quickly from any direction are the ideal complement for the infantry's ability to trap the enemy's motorized and armor elements in anti-armor ambushes established along the enemy's route and to use close combat to fix the enemy for the helicopters to destroy. Working with the task force's ground-mounted ATGM systems, which provide long-range fire against the main body from key terrain features at optimum stand-off distance, the combination of close infantry anti-armor ambushes, the helicopter's firepower and mobility, and the ground-mounted ATGM's long-range accuracy, the Soviet follow-on force faces a threat of insurmountable depth that it can neither bypass nor fight through at a high rate of speed. The time these deep elements buy by slowing and attriting the main body gives those elements that have been in contact with the FSE time to complete its destruction and reorganize, and then to move and assault the main body under the suppressive fires of the deep elements.

As the final phase of the meeting engagement begins, the task force commander must also look past the immediate battle to anticipate what will happen next. Reconnaissance elements must move forward to determine if the way is now clear for immediate exploitation of the success in the meeting engagement or if the regiment's main body is on its way to continue the attack. If the regiment is not an immediate threat, the task force must reorganize into its movement formation and penetrate as deeply as it can, throwing the enemy's major force off balance. But if the main body's attack is imminent, the task force commander may have to elect to form a hasty defense to reduce the combat power advantage of the enemy regiment's main body.

Quick reorganization, continued reconnaissance, and rapid decision making are essential in preparing for the enemy's next move. The task force must keep in mind that a meeting engagement with a regimental lead battalion is only the enemy's opening move and not an end in itself. It will invariably be followed either by another enemy offensive operation that will also have to be defeated or by an enemy defensive reaction that can be attacked and exploited. In either case, the successful conclusion of the meeting engagement is not an opportunity for the task force to sit on its laurels, but a stepping stone for continued and probably more decisive action.

Conclusion

This discussion has only touched the surface of what may possibly be the most difficult operation we would face in a fight with a Soviet or Soviet-trained force. The principles and techniques that have been offered here may be of some immediate help to units training at the NTC. However, to be fully prepared for the day that we might have to fight a Soviet-instigated meeting engagement in real combat, we must more fully develop our doctrine on the subject and elevate the meeting engagement mission to a much higher place in our training plans than it now seems to occupy. As General DePuy said a decade ago, "If we don't win the first battle of the next war, we won't be around to fight the second."

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AMBUSH!

Troops Must Be Trained to Mass Counterfire Immediately

by Captain Andrew F. DeMario

It is asserted by those who have made the profession their study that an army is exposed to more danger on marches than in battles. In an engagement the men are properly armed, they see their enemies before them and come prepared to fight. But on a march the soldier is less on his guard, has not his arms always ready, and is thrown into disorder by a sudden attack or ambuscade. A general, therefore, cannot be too careful and diligent in taking necessary precautions to prevent a surprise on the march and in making proper dispositions to repulse the enemy, in case of such accident, without loss.

— Vegetius
The Military Institutions of the Romans[1]

Imagine, if you will, a US Army mechanized march column cautiously moving on a narrow road through a defile in mountainous terrain. Suddenly, the lead tank erupts in flames and stops, blocking the passage and halting the rest of the column. Immediately, the surrounding cliffs light up with the flashes of machine guns, recoilless rifles, rocket-propelled grenades, antitank missiles, and mortar fire. There is no room for maneuver, and vehicle after vehicle is torched in the deluge of fire. The infantry swarm out of their carriers and assault the heights, only to run into mine fields and a wall of automatic fire that drives them back into the kill zone — and certain death.

The tanks are helpless; they can't elevate their guns high enough to reach the ambush force. Every tank commander dies before he can drop down inside the tank and button-up the hatch. Later, the few survivors claim that they never saw a single enemy soldier.

The scene I've described can be only too real. History is full of examples of military units that suffered immense loss of men, materiel, and morale from sudden assaults into their march columns.

One such attack occurred during the American Revolution. In August 1777, a strong force of British and Indians ambushed General Nicholas Herkimer and his column of militia as they crossed a creek in a heavily wooded area near Oriskany, New York. The ensuing battle cost General Herkimer his life and the lives of over a third of his men.

In Indochina in 1954, Regiment 803 of the Viet-Minh Communist army attacked French Mobile Force 100, a regimental-size unit consisting of motorized infantry, tanks, mobile artillery, and a long column of cargo trucks, near the town of Ankhe in southern Vietnam. The ambush cost French forces over 900 casualties and 200 assorted armored and wheeled vehicles damaged or destroyed.

In 1964, Viet Cong guerrillas attacked and overran a South Vietnamese Army ammunition convoy at the foot of the monument commemorating the loss of Mobile Group 100 ten years earlier. All of the South Vietnamese were killed and the ammunition captured.

Our soldiers lack the training to survive that kind of attack. Training manuals and instruction in our service schools must address that problem in detail. One solution is to add REACT TO AMBUSH to the MOVE mission in the Army Training and Evaluation Program and emphasize it during tactical road marches. The current TAKE ACTION ON CONTACT task is inadequate in that it doesn't readily apply to a unit in an immobilized column, nor does it address the need for infantry to dismount immediately and assault in such a situation. We must also rewrite current doctrine on the column or traveling formation to state that it is when a march unit is in column that it is most vulnerable. The notion that a column formation is used when the enemy threat is

small could lead to fatal relaxation of security.

In every campaign in US military history, our columns have been subject to surprise attack by the enemy. A scan of current Army training manuals for guidance on how to overcome that threat shows that we forget our Vietnam experiences, and other lessons in history, and give counterambush doctrine hardly a page in our texts. For instance, the only reference that pertains to ambush of a mechanized task force march column appears in Field Manual 71-2J. It states:

> Ambushes will be fought through without delay. In the event the battalion is ambushed, the march unit in the kill zone will increase speed, fight through, and report the ambush. The battalion commander may order that march unit to return to the ambush site and conduct a hasty attack to clear it of the enemy or to establish a blocking position on the far side of the kill zone while a following march unit conducts the hasty attack.
>
> FM 71-2J
> *The Tank and Mechanized Infantry Battalion Task Force*[2]

Equally scant guidance is available to a company team commander in Field Manual 71-1J. It states:

> If the company is engaged by the enemy during the conduct of a road march, the commander should make sure the platoons are trained to: return fire on the move; submit spot reports; evade antitank missiles; move rapidly to a covered and concealed position and continue to engage; use smoke to screen movement if cover or concealment cannot be reached; update spot report with additional information.
>
> FM 71-1J
> *The Tank and Mechanized Infantry Company Team*[3]

By themselves, those references will not prepare a mechanized march column commander to face and overcome an ambush prepared by experienced, disciplined soldiers. In addition, the guidance those references provide will be useful only if the element caught in the kill zone has the freedom to maneuver — a situation hardly ever found in a well-laid ambush.

Counterambush training must begin with an understanding of the prnciples of ambush, which are surprise, concentrated fire, prevention or restriction of maneuver of the target, and security.

"...If maneuver in the kill zone is impossible, soldiers must understand that the only recourse for survival is to gain fire superiority..."

Understand those principles, and you will have an appreciation of the countermeasures needed and the leadership challenge you will face.

Soviet soldiers understand those principles all too well. The Soviets are gaining first-hand experience right now at the hands of truly expert ambushers: Afghan guerrillas. You can bet that Soviet military instruction is full of wisdom gained from those experiences.

The US Army experience in Vietnam and other wars showed that once an ambush occurred, the most important countermeasure to take was counterfire with all available weapons. Since a mechanzied column is pregnant with weapons of every description, the challenge is to convince our soldiers to use them, for the first reaction of green soldiers is to run and seek cover, very seldom to fire back. Also, if maneuver in the kill zone is impossible, soldiers must understand that the only recourse for survival is to gain fire superiority. Without it, even if they can move, they won't escape the kill zone. Gain fire superiority over the enemy, and he suddenly loses the initiative and becomes vulnerable to counterattack. That is the time to assault the ambush site. While an assault might force the enemy to withdraw, to stay in the kill zone means certain death.

As in all combat operations, counterambush requires well-drilled, confident, aggressive, and — above all — disciplined soldier teamwork. The job of leaders is to build that disciplined team and make it work. Marshal de Saxe, an experienced combat soldier of the 18th century, noted in his book about the art of war:

> The Romans conquered all peoples by their discipline. In the measure that it became corrupted, their success decreased. When the Emperor Gratian permitted the legions to quit their cuirasses and helmets, because the soldiers complained that they were too heavy, all was lost. The barbarians whom they had defeated during so many centuries vanquished them in turn.
>
> de Saxe
> *My Reveries Upon the Art of War*[4]

The standard of training needed to defeat an ambush is high and demands constant practice. we must give our soldiers the needed edge to survive. Let us give them the skill they need to overcome an ambush NOW.

Footnotes

[1]Phillips, T. R. Brig. Gen., *Roots of Strategy*. Harrisburg, Stackpole Books, 1985, p. 132.

[2]FM 71-2J, *The Tank and Mechanized Infantry Battalion Task Force*, 1984, appendix C, para C-14-f.

[3]FM 71-1J, *The Tank and Mechanized Infantry Company Team*, 1985, appendix B, section 4.

[4]Phillips, T. R. Brig. Gen., *Roots of Strategy*, Harrisburg, Stackpole Books, 1985, p. 229.

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What Infantrymen and Tankers Need to Know About Serving as Armored Cavalrymen

by Captain John N. Lesko, Jr.

Preface

As an armored cavalryman attending the Infantry Officer Advanced Course, I have found a general misunderstanding by my contemporaries of "things cavalry." With only a two-hour block of instruction on missions found in FM 17-95(H), *Cavalry Operations*, with most of our tactical problems starting at the forward edge of the battle area, and with the changes in both our doctrine and Corps/Division 86 force structure, I can easily understand why this confusion exists. The purpose of this article is to try to explain the resultant changes to the cavalry unit force structure and to educate both the infantryman and pure tanker on the roles and function of cavalry. Combined arms leaders must think as cavalrymen.

Introduction

Three combat imperatives, found in the early chapters of FM 100-5, *Operations*, capture the essence of "things cavalry":

- Direct friendly strengths against enemy weaknesses.
- Designate and sustain the main effort.
- Move fast, strike hard, and finish rapidly.[1]

It is through the understanding of these imperatives, and in the aggressive execution of armored cavalry missions, that armored cavalrymen earn their spurs.

AirLand Battle doctrine emphasizes the concepts of *Auftragstaktik*,[2] risk-taking, and the marriage of firepower with maneuver. These concepts further define "things cavalry." Armored cavalrymen are weaned away from detailed operations orders and are quickly thrust into the vague and fast-paced world of combined arms operations. Mission-type orders come in the way of fragmentary orders and maybe a copy of the squadron's overlay. Battle drills and standard operating procedures reduce the risk-taking somewhat at platoon or troop levels. Early on, the young armored cavalry officer learns to "deploy, report, and develop the situation." Doctrinal changes, due to FM 100-5's adoption, and structural changes found in the Corps 86 and Division 86 force will result in non-cavalry units performing traditional cavalry missions. ARTEP 71-2 and FM 71-2 both need to include reconnaissance and security missions to complement the missions of move, attack, and defend.

A Very Short Cavalry History

> US Cavalry tradition was established by a Virginian, "Light Horse" Harry Lee, during the Revolutionary War.... His cavalry was used in what we now call an economy of force role, because of the numerical inferiority of the colonial troops to their opponents. Lee's cavalry were masters of reconnaissance, delay, trap, and charge, operating both mounted and dismounted. Because of Lee's skill, the expression "you never see a dead cavalryman" became common.[3]

Numerous books have been written on cavalry throughout the ages. There have been books on Napoleon's cavalry, the Confederate cavalry, the Polish Lancers, and countless others. The purpose of this paper is not, however, to retell stories of saber charges and thrown horseshoes, but to discuss armored cavalry missions and their function. Major Robert W. Grow, a horse cavalryman who became a key figure in the mechanization of cavalry in the 1930s, had this to say about his branch:

> One of the principal reasons for the success of some of the great armies of former times is again apparent. From one-sixth to one-fourth of their fighting strength was vested in highly mobile units.... (This) highly mobile fighting element of an army is its cavalry.... The application of (technology) to warfare has not altered missions, but its application to cavalry has materially assisted the latter to carry out its missions. We hear of "moto-mechanized" divisions, "mobile" divisions, the "Panzer Corps," etc. It seems to be the fashion of the times to apply a (new) name to these units. But have new missions been developed for them? Not at all. They are designed to carry out cavalry missions.... The skillful commander has his cavalry in hand for its primary mission, to fight.[4]

Cavalry fights in many different ways, but primarily:

> Cavalry fulfills three basic and closely related functions: reconnaissance, security, and economy of force. These traditional functions are inherent to warfare. They are valid on today's (AirLand) battlefield and will still be valid on tomorrow's. Some force must fulfill them, and the force that does so is cavalry, whether called so or not.[5]

Throughout history there have been foot cavalry and mounted cavalry. WW II saw:

> Thirteen mechanized cavalry groups, thirteen mechanized cavalry squadrons organic to the light armored divisions, two armored reconnaissance battalions belong to the heavy armored divisions, one unattached mechanized reconnaissance squadron, and forty-two mechanized cavalry reconnaissance troops organic to the infantry divisions, a total of seventy-one units.[6]

But this proliferation was not true for all sides during the 1930s and 1940s. After the war, in perfect 20/20 hindsight, BG Hawkins wrote in the *Cavalry Journal* that:

> The Germans failed to take Moscow in 1941 largely because they lacked

enough cavalry to protect the flanks of their spearheads against the attacks of the Russian cavalry. The subsequent German disasters...were due in large measure to the activities of the Russian tank-cavalry teams and the lack of German cavalry which might have neutralized their efforts....

It is not pleasant to contemplate what the Germans could have done if they had had a large force of cavalry available when they broke through our lines in the Belgium Bulge.[7]

This is not to say that the proper or improper use of cavalry caused the outcome of WW II. What did influence the outcome, at the end of both world wars, was the mechanization of land forces. The birth of armored cavalry resulted from a massive staff study. At the end of WW II, a general board was created to study:

...the strategy, tactics and administration employed by the United States forces in the European Theater.... Two of the studies are significant to the cavalry...., Study number 48, "The Organization, Equipment, and Tactical Employment of the Armored Division" and Study number 49, "The Tactics, Employment, Techniques, Organization, and Equipment of Mechanized Cavalry Units." The mechanized cavalry study was the genesis of modern cavalry organizations. That is, until the Division 86 Cavalry Squadron came along....

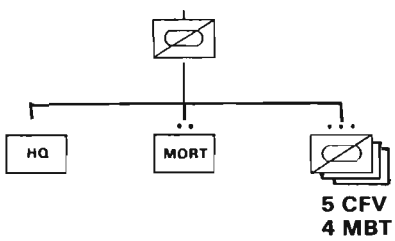
....Although originally intended for use in pure reconnaissance roles, "the (WW II) study classified (cavalry) missions into five categories — offensive combat, defensive combat, reconnaissance, security, and special arms."[8]

That reconnaissance was the least-assigned mission of all listed will be addressed later.

The Seeds of Controversy

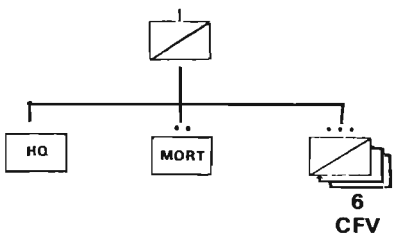
Tracking the tables of organization and equipment from WW II until the present shows a steady growth from separate reconnaissance companies up to and including a corps armored cavalry regiment. Rather than reproduce these TO&Es, the diagrams below illustrate today's variations of the armored cavalry troop.

CURRENT (H-SERIES) ARMORED CAVALRY TROOP.



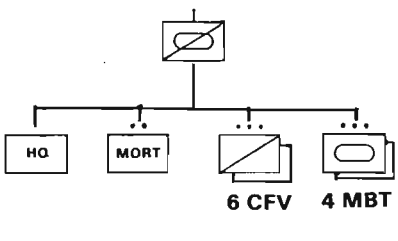
This troop is found in both divisional and regimental units equipped with older M60 and M113 family vehicles.

DIVISION 86 (J-SERIES) DIVISIONAL CAVALRY TROOP.



Note the loss of the main battle tanks (MBT). The CFV stands for the M3 Bradley system.

ARMY 86 (J-SERIES) REGIMENTAL CAVALRY TROOP.



"Heavy" cavalry found in the Corps 86 armored cavalry regiment (ACR). Squadron composed of three troops, a tank company, HHT, and a howitzer battery.

There are three ground squadrons in an ACR, as well as a combat aviation squadron, a support squadron, and five separate troops (one each of nuclear, biological, and chemical (NBC); engineers; air defense; combat electronic warfare and intelligence; and a regimental headquarters). Divisions find their cavalry squadrons within their organic air cavalry attack brigade (ACAB).[9]

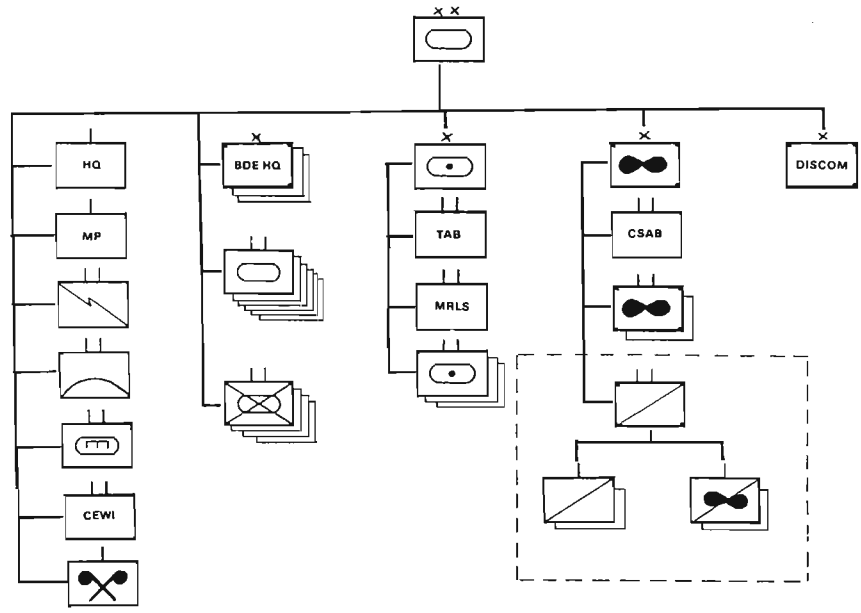
All this may seem a bit confusing. The key is to focus on ground cavalry assets and think about functional relationships or missions.

In August 1980, the Army Chief of Staff approved the Division 86 cavalry squadron operational and organizational concept. This action:

Deletes the missions of *guard* and *cover* from the repertoire of the Division 86 cavalry squadron and includes the following:

- Detailed ground/air reconnaissance *within*, and to the front, flanks, and rear of the division.
- Command and control liaison.
- Screening.
- Internal surveillance to facilitate rear area protection (RAP) operations (rear area combat operations (RACO) and area damage control (ADC)).
- Emplacement and monitoring of remote sensors.
- NBC reconnaissance.

ARMORED DIVISION 86



Of all missions and tasks, its primary function is detailed ground and air reconnaissance *within* and to the front, flanks, and rear of the division.[10]

This action sparked considerable controversy among armored cavalrymen. One school of thought claims that the division will now rely on corps armored cavalry to carry out cover and guard missions. The counter-argument is that "the corps's ACR will be used in fighting the corps commander's fight, and this leaves the division to form its own economy forces."[11] The first group of armored cavalrymen fall into a "pure reconnaissance" school. The second group claim "security and economy of force." as the chief cavalry functions.

Reconnaissance Is Everyone's Job

It is here that I must side with school number two. I choose this approach because "reconnaissance

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is an integral part of all missions"[12] for all branches. Reconnaissance does not belong solely to cavalry units.

The difference between the outlook of each group of cavalry follows in that:

> ...Scout platoons perform reconnaissance by stealth in order to survive, but cavalry platoons are organized to fight for intelligence. The fight for intelligence is violent, offensive in nature, and highly fluid. It requires high tactical mobility, aggressive maneuver, and sustained, all-weather combat power. Only one weapons system so dominates the battlefield as to provide the edge needed to win the intelligence fight: the main battle tank.[13]

Restated by another author:

> It is of limited interest to the force commander to know where the enemy's first line of security outposts is located. (The commander) is more interested in where the main body is, how it is disposed, and what it is doing. To penetrate enemy security and gain this information (called "developing the situation") the cavalry must be able to fight.[14]

This means *fight* — using tanks and scouts together as a team.

Generally speaking, reconnaissance historically makes up but 10 percent of the various missions assigned to cavalry units.[15] Attack, defend, guard, cover, screen, pursuit, protect, exploit, fillling gaps, constituting a mobile reserve for other forces, and providing liaison between larger units account for the other 90 percent.[16] The question becomes: Can the aviation assets found in the division commander's "fourth brigade" — the ACAB — take the place of the main battle tank? The answer is no. Scout and attack helicopters are neither all-weather capable, nor can they hold terrain. Until technology permits all-weather flying, the division commander is forced to supplement his ground cavalry with line infantry and/or armor.

The Main Point

> The contributions of armored...cavalry to modern combat are: Reconnaissance to enable the commander to "see the battlefield" in clearer detail than his sensors can yet achieve and to develop the situation to react to the resultant intelligence over a broad front without diverting other combat forces from their primary missions; Security to ensure the main body against surprise and interference in either offense or defense, again without diverting other fighting units from their tasks; and economy of force as the division and corps commander's "fire brigade" to cover gaps, secure risk areas, seize opportunities, and respond to sudden threats, all without distracting other units from their roles at the critical point.[17]

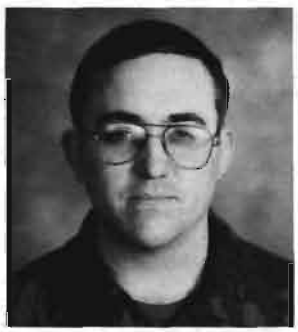
Armored cavalry serves this purpose by allowing for the three combat imperatives mentioned in the introduction to be realized. Infantry and armor units will no doubt be called upon to either work with divisional cavalry or to serve as cavalry in an economy of force mission.

There are inherent limitations to employing infantry and armor battalions in an economy of force role. Training will be necessary to operate over extended distances. Task organizing into LP/OPs, and mobile reaction forces will have to be practiced. Enemy identification skills and reporting procedures will need more frequent drilling. *Auftragstaktik* must become the natural way of doing business as units are required to operate with less guidance than they may otherwise be used to.

Summary

> "....the modern army commander... must be in a position continually to adapt his ideas of warfare to the facts and possibilities of the moment. If circumstances (or missions) require it, he must be able to turn the whole structure of his thinking inside out."[18]
>
> — Field Marshal Erwin Rommel

In this paper, I have briefly covered the history and organization of the present armored cavalry. I have tried to capture a little of the spirit, or *modus operandi*, of the cavalry. In addressing the few ground cavalry units, I have suggested that infantry and armor may have to assume the role of cavalry. In short, I have written of "things cavalry" in an attempt to share its elan, aggressiveness, and will-to-fight.



CAPTAIN JOHN N. LESKO was commissioned from West Point in 1979 and has served in the 11th ACR as a tank platoon leader and cavalry platoon leader. He was the Black Horse modernization and development officer and served as M Company commander. He is a graduate of the AOBC, Advanced Infantry Officer Course, Airborne and Ranger schools. He is presently assigned to the Materials Technology Laboratory, Watertown, MA, where he is working on advanced materials applications in armor vehicles.

Footnotes

[1]FM 100-5, *Operations*. 20 August 82, pp. 2-8 - 2-9.

[2]"*Auftragstaktik* is the theory and practice and training in the use of mission-type orders, in order to amplify the advantages which flow from the full exploitation of the battlefield initiative of the German officer and soldier." *Generals Balck and von Mellenthin on Tactics: Implications for NATO Military Doctrine.* 19 December 80, p. L5-II-21, as published by the BDM Corporation under contract by the Director of Net Assessment, Office of the Secretary of Defense.

[3]Rozelle, LTC H. Joseph. *The Armored and Mechanized Division Armored Cavalry Squadron.* CGSC masters thesis. 10 June 77, p. 12.

[4]Grow, Major Robert W. As quoted by LTC H. Joseph Rozelle, *Ibid.*, pp. 17-18.

[5]Battreall, Col R. R. "Cavalry Roles and Missions." U.S. Army Armor Center, Fort Knox, Kentucky. 31 July 79, p. 3.

[6]Baker, LTC Ronald L. "What In the Hell Did They Do to the CAV?" U.S. Army War College Military Studies Program. 28 April 83, pp. 6-7.

[7]Hawkins, BG. "General Hawkins' Notes: The Germans Had No Cavalry." *The Cavalry Journal* (Vol. LIV, No. 4, 1945), pp. 42-43.

[8]Baker, *op. cit.*, pp. 3, 7.

[9]"Division 86: Final Report." U.S. Army Combined Arms Combat Developments Activity. Fort Leavenworth, Kansas. Oct 81. (Organizational chart extracted from this report.)

[10]Bush, Major Robert P. "The Division Commander's Eyes and Ears," *Armor*, Sep-Oct 83, p. 13.

[11]Dials, Major Thomas A. "Economy of Force — the Cavalry Connection," *Armor*, Jul-Aug 83, p. 45.

[12]Baker, *op. cit.*, p. 17.

[13]Dials, *op. cit.*, p. 45.

[14]Battreall, *op. cit.*, p. 5.

[15]Baker, *op. cit.*, paraphrase of statistical analysis of cavalry mission performed during WW II.

[16]FM 2-15, *Cavalry*, paraphrase from 8 April 41 issue, Chapter 1, paragraph 4.

[17]Battreall, *op. cit.*, p. 8.

[18]Rommel, Field Marshal Erwin. *The Rommel Papers*, edited by B. H. Liddell Hart. DaCapo Press, New York, 1953, p. 204.

The Ten Lean Years

From the Mechanized Force (1930) To the Armored Force (1940)

by Major General Robert W. Grow, USA, Retired

(Ed. Note: This remarkable and enlightening manuscript has only recently come to ARMOR Magazine. It is full of facts, the personal observations of a very astute officer, and generally heretofore unknown or limited information, and it deserves the widest possible dissemination to the Armor Force. General Grow passed away in November, 1985.

ARMOR Magazine will present "The Ten Lean Years" in serial format over the next four issues. We strongly suggest that our readers keep all pertinent issues readily at hand for future reference on the very turbulent decade from 1930 to 1940, when the major doctrinal changes regarding mechanization came first into being and then into effect, eliminated the horse as a cavalry mount, and introduced the armored, tracked vehicle into the Army's arsenal.

This is history, first person in the vernacular of the participant; it is armor history from the beginning, when world events and the vision of a few dedicated officers laid the foundations of the U.S. Army Armor Force as we know it today.

The staff of ARMOR Magazine is proud to present THE TEN LEAN YEARS.)

Throughout the decade from 1930 to 1940, it was my good fortune to serve in positions that called upon me to play a considerable role in the development of mechanization; its application to cavalry; its acceptance, as well as lack of acceptance, by the Cavalry Branch; and the eventual development of a separate Armored Force. My personal diary, recording both events and my reactions and hopes; many official directives and reports; as well as press clippings in my possession, are my sources for the following account of the creation of the Armored Force.

This account is an attempt to piece together the history of the

period as I saw it at the time. I quote liberally from both documents and diary. From my relatively junior position, I doubtlessly failed to understand or correctly interpret many actions or expressions of my superiors. However, my close personal contact and friendship with Generals Van Voorhis, Chaffee, Henry, Kromer, and Herr, as well as countless junior officers with whom I worked, gave me an unusual opportunity to observe, as well as to take part in, the evolution that took place during the decade of the Thirties. The reader should remember that the Army was very small at this time and that the great majority of officers — certainly those in field grade — were personally acquainted with each other and, especially within each branch, were on a first-name basis.

Contradictions appear in the following pages. These reflect changes in thinking as development progressed. The reader should bear in mind that quotations represent my understanding or thought at the time and not in retrospect. If I have misquoted or misinterpreted any action or statement of others, I can only offer my humble apologies. This is the way it appeared to me at the time.

The decade of the Thirties comprised "ten lean years" for the military establishment, as well as a period of economic depression for the country. It was also the critical decade for Cavalry more than for any other branch. The long history of the soldier on horseback was coming to an end. Among cavalry officers there emerged two schools. One hung tenaciously to the dying hope that somehow, some way, the horse would prove indispensable to the Army. The other school — for the most part younger officers, believing firmly in the value of the mounted soldier — sought eagerly for a replacement for the horse. In spite of the success of Sir Edmund Allenby's Egyptian Expeditionary Force in Palestine in 1917 and 1918, World War I had proven conclusively that "there are no foxholes for horses," and that horse units could operate, at best, only on the fringe of battle and in an ever-diminishing role.

The divergence of opinion within the Cavalry Branch brought clearly into focus the true meaning of the term "cavalry". Whereas the older, more reactionary group held firmly to the definition (supported by *Webster's Dictionary*) that cavalry was that branch of service whose soldiers fought on *horseback,* the younger and more far-sighted faction held that cavalry was that branch of service whose soldiers fought *mounted.* The latter were concerned only that the mount enable the soldier to employ his weapons effectively in battle. To these officers, the distinction between infantry and cavalry was that the former fights on foot and the latter fights mounted. This distinction is basic and fundamental. The distinction does not, nor did it ever, imply that Cavalry could not (or should not) often fight dismounted. Simply put, the far-sighted officers felt that a significant portion of the Army should consist of troops organized, trained, and equipped to fight mounted whenever the situation permitted.

Following World War I, the Army settled back, having been reduced first to 280,000 and then to 125,000 men. The Cavalry School and the 14 cavalry regiments, far from any battlefield, resumed the posture of the days of Pancho Villa and General Pershing's Punitive Expedition into Mexico in 1916. A few trucks and some scout cars were added to their organization, although they still maintained mule-drawn trains. Allenby's brilliant campaigns in the Middle East had "proved", to the believers, that horse cavalry was still in effective force. The infantry had a few tanks but these were recognized as an asset to the dismounted soldier confronted by machine guns. George Patton, who commanded our tanks that took part in the fighting of World War I, remained with the Tank Corps at Fort Meade, Maryland, until it was disbanded in 1920 and the tanks were assigned to the Infantry Branch. He maintained his strong interest in tanks and kept himself well-informed of progress overseas, but largely through personality clashes he was shifted about and did not take a significant part in cavalry mechanization. I met him on numerous occasions and was impressed by his wide knowledge, but I never became aware of any influence that he exerted on the development of mechanization in the Army until the Armored Force was formed. Then, as a protege of General Marshall, he quickly came to the front. Later, under his command, I learned to admire and respect him as a great tactician and, in my opinion, the greatest fighting leader of World War II.

During the Twenties, a few far-sighted officers in the War Department were venturing opinions that the Army must take advantage of the progress being made in the automotive industry. They felt that foreign armies were devoting more than just thought to mechanization. Lack of funds precluded extensive procurement, however, and the absence of a real research program handicapped development. In Rahway, New Jersey, J. Walter Christie was working on a convertible tank, but the Ordnance Department gave him no encouragement while they puttered around making some improvements on the French Renault and designing something of their own.

"...Foreign armies were devoting more than just thought to mechanization..."

The Mechanized Force is Born

Enough interest had developed by 1930, principally at Fort Meade where some limited tank and motorized training was conducted, to induce General Summerall, in his last year as Chief of Staff, to take positive steps toward the development of a mechanized force. In the belief that a mechanized unit, designed for mounted combat, would naturally assume a cavalry role, he visited Fort Brown, Texas, the home of the 12th Cavalry, and selected its commander, Colonel Daniel Van Voorhis, to head a provisional force made up from detachments from all arms and services. As the operations officer of the 12th Cavalry at the time, I eagerly accepted the opportunity to accompany Colonel Van Voorhis in the same capacity in this new but promising field. I thus became closely involved with mechanization for the next twenty years. The troops were assembled at Camp Eustis, Virginia, in the fall of 1930.

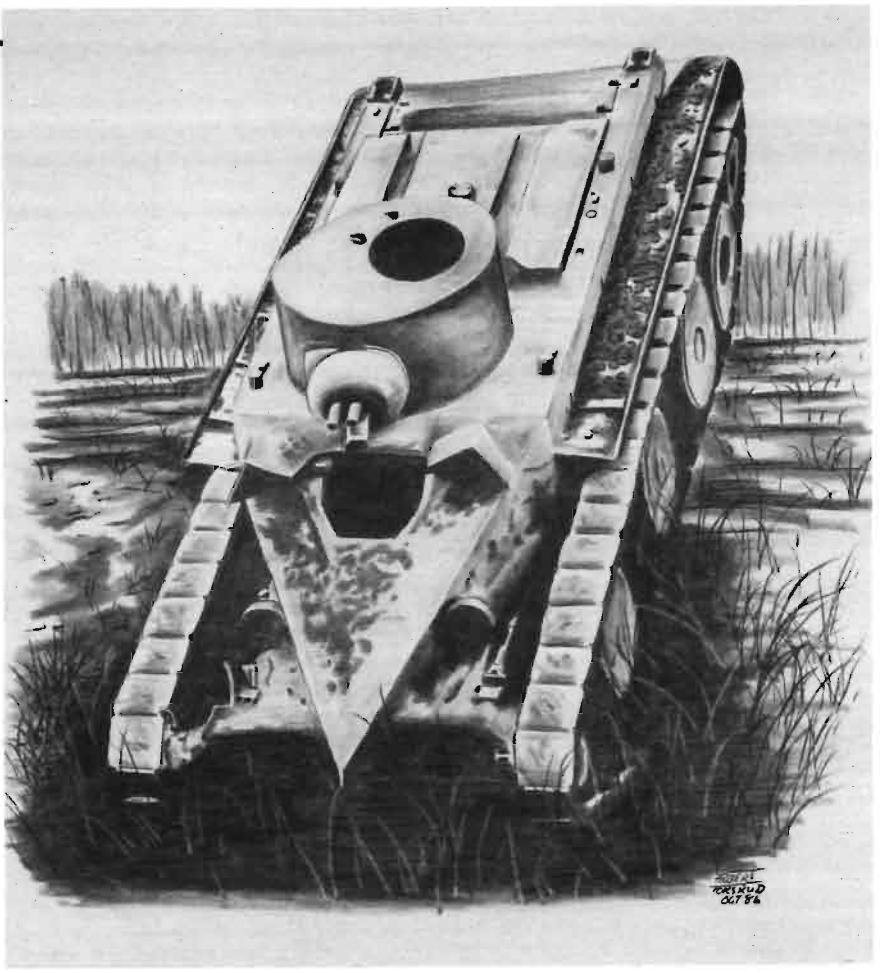
It would have been difficult for General Summerall to have selected a man with less knowledge of mechanics than Colonel Van Voorhis. On the other hand, he could have selected no one with a clearer insight into the need to develop a better cavalry "horse" and yet retain the principles of mounted combat. My mechanical knowledge was equally limited, but I had acquired at Fort Riley, where I served for five years, a profound conviction that a soldier who fights mounted can defeat one who fights dismounted, provided his mount affords a good base of fire and can maneuver effectively on the battlefield. We agreed from the beginning that our mission was to give the mounted soldier a decisive role in battle. As Adna Chafee was to remark later, "The mission of cavalry is to fight."

The Mechanized Force at Eustis was not cavalry. Although the commander and the S3 were cavalrymen, and the armored car troop was a cavalry unit, the Force was a composite group of all arms and services. The executive officer, Jimmy Brett, was an infantry tanker whose battle experience had been with the World War I Tank Corps under George Patton. The tiny Renault tanks maneuvered at a foot pace. In the first demonstration given to orient Van Voorhis and me, Brett led the attack on foot with colored signal flags.

From this demonstration, we made our first basic decisions: all equipment must be capable of high battlefield — as well as road — mobility and, most importantly, leaders must learn to think and to command while mounted. Neither of these aims were satisfactorily accomplished during the twelve months that the Mechanized Force existed, although much progress was made under difficult conditions. Ordnance made some improvements in the old tanks, but the real impetus to modernization was given by Mr. Christie. Delayed by lack of funds and professional jealousy, seven tanks were finally procured during 1931.

Mechanization Approved — In Theory

By late spring, 1931, enough progress had been made for the War Department to accept the concept of mechanization for the entire Army. The Chief of Staff, General MacArthur, announced the policy that all arms and services would adapt motorization and mechanization to their traditional roles. The Mechanized Force was to disband in the fall and its elements to return to their basic assignments. Since it was apparent that the Cavalry Branch would be the chief beneficiary of the more mobile mechanized equipment and since the Chief of Cavalry was willing and anxious to develop it, Colonel Van Voorhis with the nucleus of his headquarters and the armored car troop, plus the engineer, ordnance, and quartermaster units, were transferred to a new cavalry post — Camp Knox, Kentucky. There they were redesignated as the "Detachment for Mechanized Cavalry Regiment." The Detachment included four of Christie's new tanks.



Four of J. Walter Christie's tanks arrived at Camp Knox with the Detachment for Mechanized Cavalry Regiment in early 1931.

In the meantime, the press reported on 11 January 1931:

> Announcement of the training program of the experimental Mechanized Force at Fort Eustis, Va., for the purpose of studying the mission in war of the mechanized units of the Army, has been made by the War Department. During the period Jan. 1 to June 30 the new force... will participate in 10 field exercises and marches...The primary mission of the Mechanized Force, as laid down by the War Department, is to provide a powerful weapon of high tactical and strategic mobility, high hitting power, high mobile defensive power, limited holding power, capable of independent action... Several European nations, especially Great Britain, have created independent organizations composed of these mechanized weapons and designed to take the place formerly allotted to Cavalry of dealing quick hard-hitting blows away from base. For the first time, the United States Army has collected the many mechanized features now serving as auxiliaries and has formed an experimental mechanized force which will operate as a unit.

It seems ironical that such a sound doctrine, developed in the War Department in late 1930 and announced in January 1931, should require almost ten years to be implemented in the Armored Force of

1940. The "ten lean years" were beset with acrimonious debate between horse and machine advocates, including General Staff officers; extreme budgetary limitations; failure of the supply services to encourage and use fully the United States' vast industrial potential; and the failure of the War Department to follow up the farsighted policy announced in January 1931.

The Role of the Chief of Cavalry

War Department organization in the Thirties included an element under the General Staff called "Chiefs of Arms and Services." The chiefs of combat arms, among whom was the Chief of Cavalry, were limited in command authority to their respective service schools and boards but had the responsibility for the development of organization, training, and equipment recommendations. Thus, to the Chief of Cavalry at Fort Riley, Kansas, fell the highly important responsibility of recommending the manner and means to develop mechanization in his arm. Throughout the decade of the Thirties, the progress of mechanization within the Cavalry Branch was largely dependent upon the desires of the Chief of Cavalry.

In 1931, Major General Guy V. Henry was the Chief of Cavalry. He welcomed the opportunity to mechanize and supported the mechanization of one horse regiment and later of a second regiment and a brigade headquarters. However, beset by serious opposition to the conversion of horse units by horsemen of his own branch and even by Congressmen, and by extremely limited funds for either development or procurement, and by the reluctance of the Ordnance Department to accept ideas from the automotive industry, General Henry made relatively slow progress in mechanizing the Cavalry Branch. The slow pace of mechanization within the Cavalry Branch tended to confirm the belief of both Van Voorhis and Adna Chaffee that mechanization could not succeed under cavalry sponsorship and that it develop as a separate agency or arm under the War Department. Although their feelings were not openly expressed, there existed a certain coolness between them and General Henry. At Fort Knox, a lack of full confidence in the Chief of Cavalry at Fort Riley persisted throughout the ten-year period. In my opinion, General Henry was mechanized-minded and did as well as could be hoped under the conditions that existed during his tour as Chief of Cavalry and later during his tenures as the Commanding General of Fort Knox and as Commandant of the Command and General Staff School at Fort Riley.

In 1934, Major General Leon B. Kromer was appointed Chief of Cavalry and encountered the same difficulties as his predecessor. Some progress came in the development of the 7th Cavalry Brigade (Mechanized) and in the attitude of a large number of cavalry officers. In 1936, during General Kromer's tour, the project for a mechanized cavalry division, which originated in the Chief's office, was first brought forth. If nothing else was accomplished during his tenure, this project was a major step in getting both cavalry and the War Department to think big. Changes in officer assignments, however, as well as continuing outright opposition, prevented any major development during General Kromer's tour.

In March 1938, Major General John K. Herr succeeded Kromer as Chief of Cavalry. He came from command of the 7th Cavalry at Fort Bliss, Texas. He remained fully committed to the retention of all horse units, although he accepted mechanized cavalry as a significant element of the arm and urged its development and expansion, as long as no horse units were sacrificed. Since expansion without conversion was impossible within budgetary limitations, he effectively blocked the development of mechanized cavalry on the scale demanded by conditions in Europe.

My firm belief is that had General Herr, from the beginning, taken a strong stand for the mechanization of the Cavalry Branch, the Armored Force would never have been created. The General Staff, certain that a mechanized force was necessary, was ready to support the Chief of Cavalry. The General Staff had nowhere else to turn. General Lynch, Chief of Infantry, did not want any "panzer" divisions, although some other infantry officers did. As late as 25 May 1940, when I left the Chief's office, I still believed that the new mechanized force might be brought into being under the Cavalry banner, since Herr was weakening and promised me that he would recommend some conversions. I was wrong. Generals Van Voorhis, Chaffee, and others, discouraged by the attitude of Herr, prepared for the break which had to come, and in June 1940, the Armored Force was born. It was still cavalry, except in name, although to the public and "officially" it was a new arm (or rather "force" since only Congress could create an arm). It was, however, controlled by its own chief. The last Chief of Cavalry had lost it all.

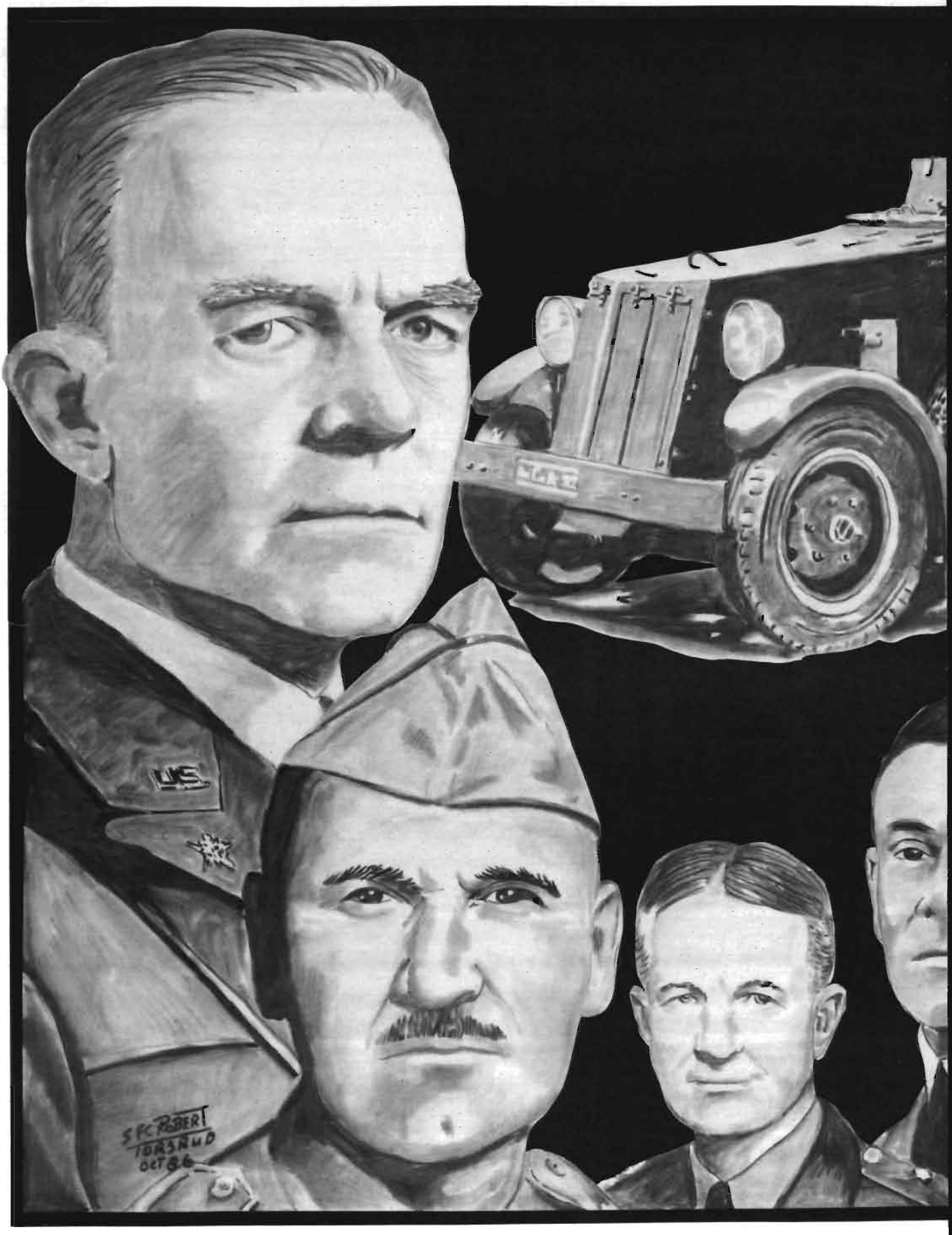
The Mechanized Force, 1930-1931

Given this brief historical outline of the evolution of the Armored Force, we will once again turn back the clock to the year 1930 and the birth of the Mechanized Force. The intentions of the War Department with respect to a role for the Mechanized Force were expressed in a letter from the Adjutant General, dated 3 November 1930, which stated in part:

> It has been organized on the theory that modern tanks, through their armament, speed, marching radius and mechanical reliability, are now capable of extended maneuver beyond the immediate support of divisional infantry, and may be so employed. It is believed that its principal role will be the execution of those tactical missions presenting an opportunity for a force capable of tactical and strategical mobility and quick, hard-hitting striking power. In connection with troops of other arms, it should be assigned missions which call for the display of the above qualities,

The series of portraits on the following center-spread are from left, COL Adna R. Chaffee, MAJ Robert W. Grow, MG Guy V. Henry, MG John K. Herr, MG Leon B. Kromer, and COL Daniel Van Voorhis.

Story continues on page 28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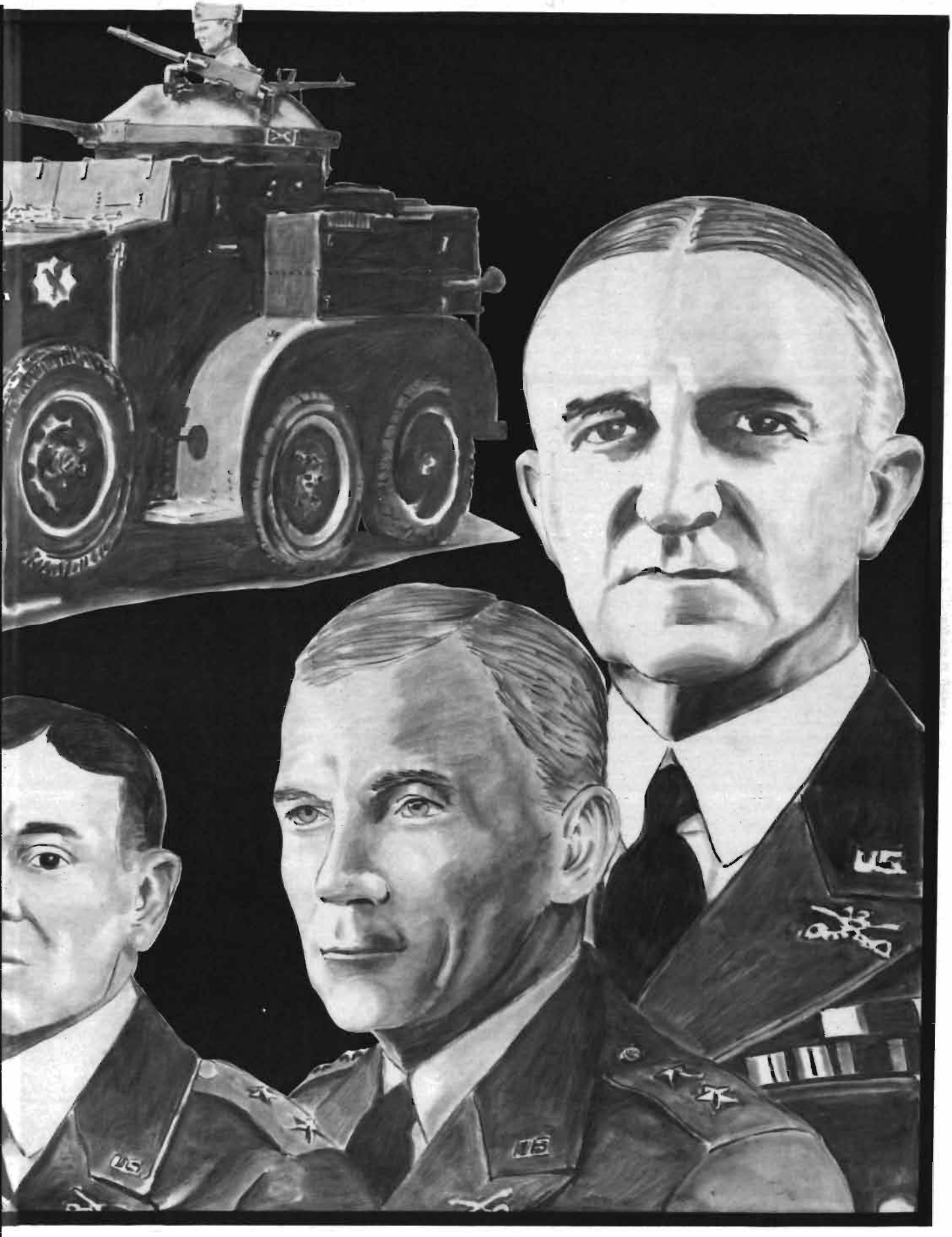


"...For the time being, the future of mechanization in the Army was tied to the Cavalry branch..."

such as the seizing and temporary holding of distant key positions; attacks involving turning and enveloping movements; counterattack, wherein the elements of success are speed, surprise and decisive direction; missions such as advance, flank or rear guard; missions in the breakthrough, and exploitations. *The ability to crush its way forward over highly-organized ground in the face of stabilized resistance is secondary* [emphasis added]. Its employment in no wise diminishes the role of infantry tanks.

This was a clear-cut cavalry role, as cavalry was taught at Fort Riley following World War I. Unfortunately, it was not accepted by the "horsemen," either in Washington or in the field.

The Mechanized Force consisted of the following elements, some of which did not reach Camp Eustis until early in 1931:

- Headquarters and Headquarters Company
- Antiaircraft Detachment (1st Plt, Btry E, 69th CAC)
- Armored Car Troop (Trp A, 2d AC Sqdn)
- FA Battery (Btry A, 6th FA, portee)
- Chemical Section (Det, 1st Chem Regt)
- Engineer Company (Co C, 13th Engr)
- Machine Gun Company (Co H, 34th Inf)
- Ordnance Company (19th Ord Co)
- Motor Repair Section (28th Motor Repair Sect, QMC)
- Tank Company (Co A, 1st Tk Regt)

During the winter and spring of 1930-1931, we held a continuing series of marches, command post exercises (CPXs), field exercises, ceremonies, and demonstrations. The individual units were well-trained so that our problem, according to my notes, was basically two-fold: "...to develop a combined tactical team, and to determine appropriate organization and equipment." The lessons learned from each exercise were assembled during the spring of 1931 and tables of organization and equipment (TO&E) prepared for a mechanized brigade of 190 officers and 2,900 men with 845 vehicles of which 420 were in the combat echelon. The combat echelon included 230 tanks, 50 self-propelled guns and mortars, 90 halftracks, 19 armored cars, plus engineer and antiaircraft vehicles on tank chassis.

The Christie tank was accepted in March (cost: $54,000) and set up for field tests. It reached Camp Eustis in April and was shown to the Ordnance Advisory Committee, where it performed very well. At this time Major General Van Horn Moseley, Deputy Chief of Staff, told the Committee that the future of mechanization lay along the lines of an auxiliary to the established functions of the line, rather than as a separate entity for battle maneuver.

Notes from my diary indicate some of our thinking in January 1931:

> We must stop talking miles and use minutes.
>
> Engineers must have cross-country vehicles. Small obstacles delay this Force. Light power machinery will help.
>
> The biggest antiaircraft job is to cover defiles. Each vehicle needs an antiaircraft weapon. The antiaircraft battery should be dispersed in the march column.
>
> We must have uniform signals throughout the Force.
>
> _____ thinks 'follow the leader' principle will not work. Don't think he understands Cavalry.
>
> S-3 must have accurate maps with time-distance of each element.
>
> Talked over medical detachment with S-4. Casualty collecting end is the most difficult.
>
> _____ thinks cal .50 a fine weapon. Will try it shooting at tanks. Wonder if 25-lb bomb will do them much damage.

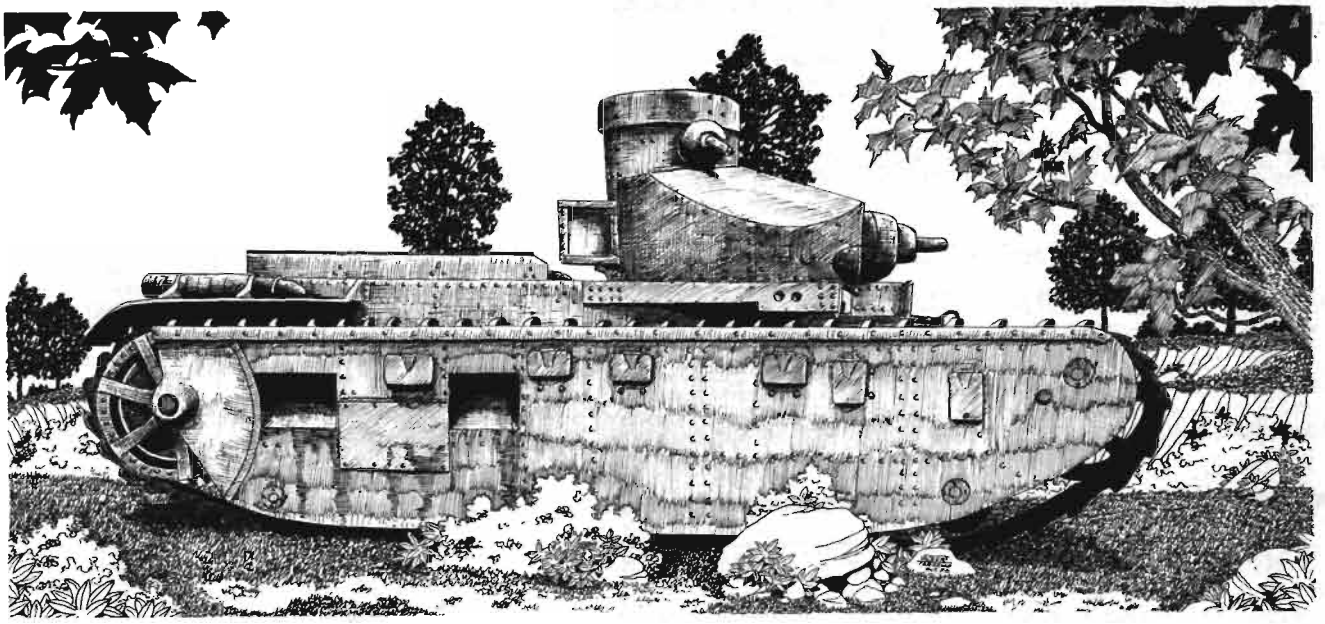
These quotations indicate the scope and variety of problems that were under consideration at that time.

Following the first long march — Camp Eustis to Fort Bragg, North Carolina, where we held two demonstrations (Fort Bragg was then a field artillery post) — I noted that the new T1E1 tank did well. The field artillery officers were convinced that we needed close, fast gun support. Meanwhile, decisions were being made in Washington which would affect the future of mechanization within the Army.

Cavalry Branch Given Proponency Over Mechanization

In May, Van Voorhis took the TO&E for a mechanized brigade to Washington. We had little hope of its acceptance, since we were aware of the tentative plan to put the Force under the Chief of Cavalry as a mechanized cavalry regiment with artillery and maintenance attached. Although rumors filled the air and kept us confused, we continued to carry out our training schedule, including small arms range practice. By the end of May, the decision came and our hopes for a strong independent mechanized brigade of all arms and services were dashed. In a letter to a friend, I described my feelings, which were torn between branch loyalty and what we considered the best interests of the Army:

> In regard to mechanization, we did our best to keep it out of the Cavalry, both for the good of cavalry and mechanization, but there are good arguments for the proposition as finally adopted...I think the idea will be welcomed by a large proportion of cavalry officers who have seen the handwriting for some time. Of course it was a choice of a cut in Cavalry in either case and, in this way, the cut really occurs only in the horse element. We do not know yet which cavalry regiment will be mechanized or where our station will be...There is no doubt but that the employment of a mechanized force and cavalry are so similar that only a physical inspection to see whether a command had wheels or horses could tell the difference... The development in the next few years will be revolutionary to our Arm, but I have no doubt that the Cavalry will handle the situation well, for we have the most important characteristic, built up through



The T1E1 tank performed well in the experiments of the early 1930s.

the centuries and which no other Arm possesses, i.e., mental mobility...We have found that the most important element to date.

For the time being anyway, the future of mechanization in the Army was tied to the Cavalry Branch.

The Chief of Cavalry, Guy V. Henry, now became deeply interested in the developments at Eustis. With his executive officer, Colonel Oliver, he accompanied the Force on a march to Camp Lee and a field exercise there in mid-June 1931. My comments after our return, taken from my diary:

> Tea for Henry at Van Voorhis quarters at 1600. Nothing new came up. Henry rather lukewarm on Knox. Oliver favors it. Henry seems rather imbued with the magnitude of the thing, since he has seen it and I think wants to get away by himself where he can digest it. He saw everything: good weather and bad, good road and mud, a real snappy attack with delay caused by carriers (tank transporters), and he saw some good driving and maintenance. The radio was poor the first day and excellent the second. We couldn't have asked for more. Oliver is much impressed and I think we will get sympathetic treatment.

General Henry's attitude was shown by his memo to Moseley on 3 July 1931 by which he transmitted a proposed TO&E for a mechanized cavalry regiment:

> All tables are only tentative...I can assure you that as soon as the matter is definitely approved and turned over to the Cavalry, no stone will be left unturned to make it a success.

Despite his good intentions, General Henry was to have mixed results in getting the Cavalry Branch to accept mechanization during his tenure as Chief of Cavalry.

Lieutenant Colonel Adna Chaffee joined the Force in July and Jimmy Brett left on 1 September. Our training program continued through the summer and fall, although we knew that the Force was to be broken up soon. The *Army-Navy Journal* carried this comment on 1 August:

> What is hoped for in organizing the cavalry regiment (mechanized) is that the unit will be able to demonstrate that it can perform the functions and normal duties of a

A Christie tank is recovered during a field problem at Camp Knox, KY, in the early 1930s.

cavalry regiment in warfare, nothing more, nor for the time being, nothing less, if it is to be considered a success.

I commented that "this sounds like Moseley" and added that the decision was a "blow for Van Voorhis who has worked so hard for a real independent Mechanized Force."

Mechanized Force Disbanded

By September, the decision to base the mechanized cavalry regiment at Knox had been made, but we were finding difficulties in salvaging motor equipment from the Force to take there. On 18 September, my diary relates:

> Van Voorhis and Chaffee were told by Moseley that cavalry mechanization would be one regiment only, to be selected and sent to Knox this winter (1931-32). [Actually the 1st Cavalry did not get to Knox until a year later.] We take no track-laying equipment from Eustis.

The Christies were shipped by rail. We were to leave Eustis about 1 November with Headquarters, Armored Car Troop, and the Ordnance Company. The Quartermaster Detachment and the Signal Corps Detachment would come along for post duties and the Engineer Company would go to Knox for awhile to work on buildings and post facilities. The Tank Company and the Machinegun Company would return to their parent infantry units and the Field Artillery Battery, Antiaircraft Detachment, and Chemical Detachment would return to their former stations. From a practical standpoint, this was the end of the Mechanized Force.

The breakup started in October, 1931. Men who wished to stay with the unit were transferred into the Detachment. Troops and equipment to go to Knox were inspected and passed in review on 24 October. On the 26th of October, the Field Artillery Battery left for Fort Hoyle and the Tank Company for Fort Meade. Van Voorhis was much affected, especially by the loss of the tanks.

As viewed from Force Headquarters and expressed in our "Consolidated Report of Operations," our conclusions were:

> a. That a mechanized force is a powerful instrument in the execution of the mobile missions of war.
>
> b. That a mechanized force, if properly organized and equipped, can accomplish the missions set forth in the War Department directive of 3 November 1930.
>
> c. That experience has shown that the present Mechanized Force is not suitably organized, equipped, or of sufficient strength.
>
> d. That experience has shown that all elements of the present Force are essential to a mechanized force, and should form integral parts thereof, to assure the development of that peculiar technique of training and of the control which is essential to the full development of the powers of the Force.

Our final recommendation was:

> e. That a mechanized brigade, organized as shown in the attached tables, be organized on the present Mechanized Force as a nucleus with a definite project of completion in personnel and equipment in a fixed period of time, and that the force be stationed at a location providing suitable terrain and housing.

The final recommendation was not adopted, however, and the Mechanized Force ceased to exist at midnight on 31 October 1931.

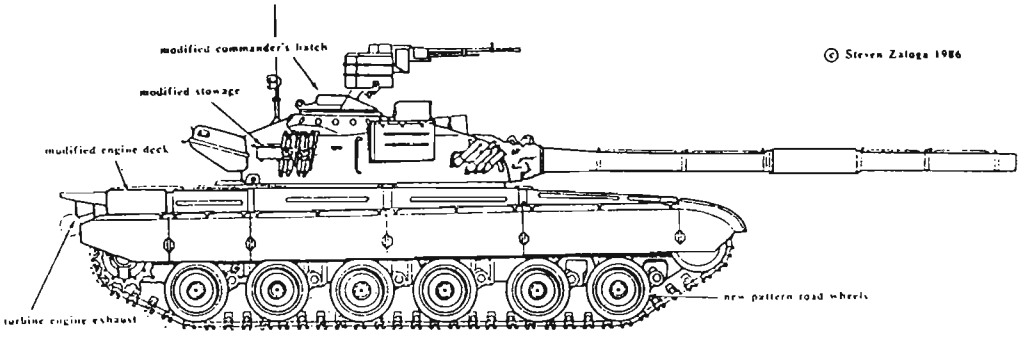
In retrospect, we can now say that in spite of equipment that varied from obsolete tanks to passenger cars framed in boiler plate, to commercial trucks, we had been able to develop tactical doctrine which, in large measure, withstood the test of World War II.

MAJOR GENERAL ROBERT W. GROW, whose career began as a horse cavalryman, became one of the pioneers in the mechanization of the U.S. Army. He was the first S3 of the Mechanized Force under Chaffee and Van Voorhis in the early 1930s and later commanded the 6th Armored Division in the European Theater during WWII. He retired as a major general in 1953 after serving as military attache in Moscow during the postwar years. General Grow died in November, 1985.

Two editors who are not members of the ARMOR staff made major contributions in preparing the "Ten Lean Years" manuscript for publication:

CAPTAIN PETER R. MANSOOR was commissioned in Armor from West Point in 1982, the top cadet in his class. He was also an honor graduate of the Infantry Mortar Platoon Course and the Armor Officer Basic Course, and is also a graduate of the Airborne course at Fort Benning, GA. He served as a tank platoon leader with D Company, 3d ACR, as cavalry platoon leader in A Troop, XO of D Company, and as S3 of that unit. He recently attended the Armor Officer Advanced Course and is now assigned to the 11th ACR.

KATHY CAST GARTH earned a BA in English at Old Dominion University in 1981, later working for a newspaper and an advertising agency in the Fort Hood area. She is currently residing in Radcliff, KY, while her husband attends the Armor Officer Advanced Course.



T-80: The Soviet Solution

The Tank's Missile System Is Aimed at NATO's ATGM Vehicles, Not Tanks

by Captain James M. Warford

The first battles had been fought four days ago. Now, on the 8th of July, Team Alfa is set up in defensive positions on BP Eagle, overlooking Engagement Area One. Captain Wilson was pleased with his battle position and his team's sectors of fire. He felt lucky that BP Eagle was one of the few in TF 2-10 AR's area that provided long and clear shots into one of the designated kill zones. Captain Wilson had just called his platoon leaders to go over the plan for tomorrow's attack, when he heard a loud explosion.

The call on the radio confirmed that one of his attached M901 ITVs had been hit and destroyed. Suddenly, there were two more explosions — and two destroyed M2 Bradleys. The Bradleys had pulled out of their hide positions to try to find out what had killed the ITV. The team's two tank platoon leaders called in spot reports that identified enemy tanks approaching rapidly from the east. As the number of enemy vehicles increased and closed to within range, the M1 tanks opened fire. The team's remaining ITVs and Bradleys had already started firing into EA One, but with limited success. As Captain Wilson realized that some of the enemy tanks were opening fire from beyond their normal maximum effective range, he got the last spot report from his mech platoon leader: the third Bradley had been lost. For some reason, it appeared that the long-range fire of the enemy tanks was being concentrated on Team Alfa's Bradleys and ITVs...

The Soviet Army's preoccupation with NATO's antitank guided missile (ATGM) development and deployment is well-known and well-founded. This is not only because of a long-standing interest in modern antitank weapons — an interest the Soviets have had since the 1940s — but more specifically, they have closely watched the increasing capabilities of high explosive antitank (HEAT), or hollow-charge, warheads. These HEAT warheads, attached to a missile or rocket, could destroy almost any tank. While this technology was developed during WW II, it did not come into its own until much later. The Soviets have been partially successful in dealing with this threat, but their concern over HEAT-armed weapons remains a priority.

It was this concern, combined with their development of the Operational Maneuver Group (OMG) concept, that caused the Soviets to develop and field tailor-made weapons systems. In the area of tank development, they specifically needed to field a system capable of performing as the cutting edge of the OMG tactical concept. With the T-80, this requirement has apparently been satisfied.

Background

Before the capabilities and characteristics of the T-80 main battle tank can be discussed, the tank's evolution and relationship to its predecessors should be examined.

Ever since the fielding of the T-34/85 medium tank in 1944, Soviet tank designs have been a series of successive steps on the same ladder. The first tank in this series — a tank used in combat in some countries as late as the 1970s — started an evolutionary design process that created several other new tank designs and established a consistent theory for Soviet design bureaus. This pattern was unbroken from 1944 until the mid-60s.

All of the tanks fielded during this period, with the exception of the T-44, were produced in large numbers and went through a constant series of changes and modifications. The base models, and their years of introduction, are listed here:

T-34/85	1944
T-44	1945
T-54	1949
T-55	1958
T-62	1961[1]

It was not until work started on the T-62 MBT that a problem was

encountered. The responsible design bureau had developed a new hull for the new tank, but design problems "prevented it from being ready for the introduction date set for the T-62."[2] The result was that a slightly modified T-54/55 hull was used. Work apparently continued on the new hull design while the T-62 was produced and supplied to most Soviet client states. (An interesting point about the development of the T-62 is that very few are used by the non-Soviet Warsaw Pact member countries, and as a result, most of them ended up in the Middle East.)

Was T-70 the T-64 Test Bed?

It did not take the Soviets long to correct the problems in the new hull design, because "prior to the first public appearance of the T-62 in 1965, a new Soviet tank — designated the M1970 or T-70, was identified by Western intelligence sources."[3] Several sources also identified another tank, seen prior to the T-70, designated the T-67. This vehicle, which was used for tests only, "consisted of a T-62 on the T-64 (T-70) chassis."[4] The tests were apparently unsuccessful and the T-67 disappeared from view.

The T-70, however, was a completely different story. That tank has clearly been associated with the start of the T-64 MBT program and has appeared in several unclassified books and periodicals. The limited information that has been released suggests that the T-70 was the prototype of the T-64, and as such, would be the key vehicle in the "detour" that was about to change Soviet tank design theory.

According to various sources, the T-70 prototype was produced in very small numbers during the early 1960s. The tank mounted the T-62's 115-mm main gun, but carried it in a new turret that was mated to the new hull mentioned earlier. There is still some confusion and disagreement concerning the T-70, including a discussion in past pages of *ARMOR*. The unresolved question has to do with both the T-70 and the follow-on production model of the tank, which has since become known as the T-64. The earlier of the two tanks was identified years prior to 1967, the year that several sources claim to be the debut year for the T-64. There are other sources, however, that report the start of T-64 production as early as 1964 or 1965. Based on confirmed sightings of the T-70 prototype prior to 1965, the latter is the more likely of the two possibilities. The appearance of the T-70 prior to the T-64 going into production may also explain why the initial intelligence reports of the T-64 mislabeled the tank as a failure. The reports concentrated mostly on the tank's automotive performance, but also went as far as to say that the automatic loading system sometimes "ate" Soviet tankers, and that "few gunners are excited about the prospect of having their arm fed into the breech of the cannon..."[5] More recent information, however, when combined with the timetable above, indicates that these early assessments were exaggerated and may not have been references to the T-64 at all. The most likely answer is that these well-publicized problems were related to the T-70 prototype, and that the majority of these problems had been solved by the time the T-64 was put into production. What took the Western intelligence community several years to realize has now been confirmed: by detouring from established procedures, the Soviets were able to field a truly innovative tank that had no real counterpart in the West.

The T-64, eventually identified as the best or current main battle tank in the Soviet Army, allowed the Soviets to realize what they had wanted from the beginning. They now had a true main battle tank capable of both operating on the modern battlefield against the huge number of NATO ATGMs and — as required — assume the role of the heavy tank. As a result, the coveted but obsolete heavy tanks could be retired from front-line service.

The performance capabilities of the T-64 were the key characteristics the Soviets would carry forward into the next Soviet tank (NST). The firepower of the T-64 is well known and consists of the Rapira 3 125-mm main gun. The capabilities of the standard gun have been widely discussed elsewhere, so more specifics are not required here. But suffice to say that this new gun allowed the Soviets the room they needed to take the firepower of the T-64 a step further with a new capability to be discussed a bit later on.

The mobility requirements of the modern battlefield were met by equipping the T-64 with an unconventional engine, a flat 5-cylinder design with horizontally opposed pistons.[6] This 750-hp engine provides the 38-ton T-64 with a cross-country speed high enough to accompany the BMP-1 and BMP-2 IFVs. It may have been this drastic improvement in mobility that sealed the fate of the slow-moving Soviet heavy tanks. It is interesting to note here that one of the features that tie the T-80 to its immediate predecessor, the T-64, is the location of the tank's exhaust system. The T-64 and the T-80 are the only two tanks built since the T-34/85 that emit their engine exhaust from the rear of the engine compartment.

Perhaps the most discussed — and to the Soviets, the most important — aspect of the T-64 is the tank's frontal armor protection. The possible configurations and designs of this armor have been the subject of heated discussion for several years. While it is known that the Soviets have been working on composite steel-ceramic laminate armor as long ago as 1940, the exact design that reached the field with the T-64 is difficult to second-guess. Some sources have chosen to overcome this difficulty by concluding that the Soviets have not used an advanced armor design at all. One factor that these sources cite is the retention of the cast (apparently) all-steel turret. But as previously discussed in the pages of ARMOR, the employment of a cast turret does not in any way rule out the use of composite armor. It is possible, however, that the Soviets decided not to use advanced armor and simply continued with the cast steel turrets in use since the T-34. This theory, if true, would mean that the Soviets chose to ignore one of their own tank design priorities, the ability to survive hits by modern HEAT-armed antitank weapons. A much more likely theory is that the T-64 employs an effective design of advanced armor for both the glacis plate and the turret front. This composite armor is probably a modern development of the early Soviet (and American) designs pri-

The actual T-80 design proved to be more conventional than an artist's M1-like sketch.

marily intended to defeat the HEAT-armed weapons of their day. Several sources, including *International Defense Review,* agree that the latter theory is probably correct. According to *Soviet Military Power 1986* the latest models of Soviet main battle tanks (to include the T-64) are fitted with "improved armor incorporating laminates and composites."[7] Perhaps the best indicator of the defensive capabilities of the T-64's frontal armor is the massive effort that has been taken by NATO countries to develop new and effective ways to defeat it. The success of this effort is questionable, however, since the newest Western antitank weapons are being designed specifically for top attack, thus avoiding the frontal armor of the tank altogether. A final word about the armor protection of the T-64 concerns the Soviet use of reactive armor. Intelligence sources have confirmed that T-64s are being fitted with add-on reactive armor plates, an armor that appears similar to the Israeli Blazer reactive armor used successfully in Lebanon in 1982. "If the Soviets are fitting reactive armor to tanks already fitted with laminate armor, then they could well have complete protection against most of the antitank guided weapons on which NATO relies so heavily for much of its antitank defensive capability."[8]

Identification Problems Develop

When Western intelligence sources were suddenly faced with two new Soviet tanks, upon the appearance of the T-72 in 1977, the problem of correct vehicle designations became a heated issue. The problem continued to be even more of an issue with the appearance of the T-80.

The NATO armies had been anticipating a still newer tank after the T-64 came on the scene. Defense sources began to talk about the next Soviet Tank (NST), called the T-80, in the mid-'70s. According to one source, a tank called the T-80 was undergoing troop trials in 1977.[9] Information about this tank became available and NATO anxiously awaited the release of a picture of the new tank. In 1977, the T-72 was shown on parade and was subsequently exported, so the T-72 was clearly not the T-80. Speculation on this elusive tank continued, speculation made more complex by a new flow of information pointing to a Soviet tank with a large, box-like turret. This data seemed to indicate that the new tank would incorporate some form of Chobham armor in its turret. *Soviet Military Power* published an artist's impression of this tank, an M1 Abrams lookalike, in 1981, but some sources decided — based on recently released information — that the Abrams-like tank never really existed. This judgment may well prove to be incorrect, but only time will tell.

The T-80 designation problem continued with the publication of the next two editions of *Soviet Military Power,* in 1983 and 1984. The square-turreted vehicle was gone. The tank labeled earlier as the T-80 was now shown as a modified T-72, called the T-72M1 by the Soviets.[10] In spite of the appearance of the T-72M1, the designation of T-80 was still being heard. The confusion was finally put to rest with the publication of *Soviet Military Power, 1986* and the release of a few actual photographs of the long-awaited T-80. The tank is very real.

Family Resemblances

As mentioned above, the direct predecessor of the T-80 was the T-64. If the few pictures that have been released are examined, the relationship between the two tanks is clearly more than coincidence. In fact, the only recognition features of the T-80 that are not on the T-64 are the T-80's T-72-style, rubber-rimmed roadwheels and the right-hand-side mounting of the primary IR searchlight on the turret. Beyond these two exceptions, the family resemblance is so strong that some sources have described the T-80 as a "modernized version of the T-64 tank."[11]

As is true with any Soviet weapon system, detailed information concerning the T-80 is very scarce. In spite of this, using some of the details recently made available, an assessment of the tank can still be made. The firepower of the T-80 is probably the single most discussed characteristic of the tank. Based on unclassified information from several sources, the main armament carried by the T-80 has been confirmed to be a combination gun/missile launcher designed from the

standard 2A46 Rapira 3 125-mm cannon. This is not only the most controversial feature of the tank, but also the most criticized, in light of the various unsuccessful American attempts at the same type of tank armament. These American missile-firing tank programs, begun in 1961, included five vehicle designs and resulted in one vehicle being fielded in 1974. The most interesting of the designs that were not fielded were the MBT70/KPZ70 and the XM803, test bed tanks that incorporated several new technologies. The most important innovation was the 152-mm cannon/missile launcher, which differed from the short-barrelled gun/launcher on the fielded M60A2; the gun/launcher on the MBT70 and XM803 was capable of firing a high-velocity 152-mm APFSDS-T round in addition to the HEAT-armed Shillelagh missile. This may have led the Soviets to develop a similar dual-capability main gun.

American Missile-Firing Tank Programs

VEHICLE	YEARS	TOTAL PROCUCED	STATUS
T95(turret only)[1]	1961	3 turrets	Not fielded
MBT70/KPZ70	1963-1970	unknown	Not fielded
M60A2	1964-1971 (1973-1975)[2]	526-540	Fielded in 1974; later withdrawn from service
Chrysler K-Tank	1968	mock-ups	Not fielded; had promise
XM803	1970-1971	unknown	Not fielded

[1]Mated to M48 hulls for tests only.
[2]Years the M60A2 was in production.

From *PATTON, A History of the American Main Battle Tank* by R. P. Hunnicut.

How the AT-8 Kobra Fits In

The wisdom — or lack of it — concerning this choice of main armament has been heavily criticized by Western defense sources who contend that the days of the gun/missile launcher are past. The reason for this, cited by these sources, is the advent of Chobham-type and reactive armors which can negate the missile's shaped-charge warhead. These sources go on to say that this limitation has already been noted by the Soviets and points to the fact that the Soviets have already begun to add top armor to the T72M1 in realization that a newer era of top-attack weapons has begun. Finally, the small diameter of the HEAT warhead that such a missile would carry (because it must be fired through the 125-mm gun tube) would have little or no effect on the advanced frontal armor of NATO's newest MBTs. According to one source, "The combination of gun/missile-capable main armament would present more drawbacks than assets, even if the ammunition fired were of an advanced type and using laser guidance to achieve superior effect."[12]

While it is true that the unclassified press has published several pictures of the T72M1 fitted with "non-metallic" add-on armor bolted to the turret and hull (above the driver's position), and the West is developing a new series of top-attack weapons, there is no reason to associate these developments with the 125-mm gun/missile launcher. The sources mentioned above have failed to bring out the most likely reason the Soviets have opted for such a combined system. The AT-8 "Kobra" antitank missile fired by the T-80 *is not intended to kill modern NATO tanks from the front.* It is, more likely, designed and employed to destroy the numerous ATGM delivery vehicles deployed by NATO. While there is a secondary capability to engage tanks like the M1 Abrams and the Leopard II from the flank or rear, the missile's primary targets are the M2 IFV, the M901 ITV, and the Jaguar I and II. These targets are not only much more within the destructive capabilities of a 125-mm HEAT-armed missile, but are also of the utmost concern to the Soviets. The elimination of vehicles like the ITV and Jaguar from a distance beyond the maximum effective range of concurrently deployed NATO tanks, may be just the capability the Soviets have been waiting for.

Two final points about the AT-8 "Kobra" concern the missile's guidance system and the T-64. Several sources have linked the T-80 with a laser-guided missile. The missile guidance system is reportedly housed in an armored box or cover on the right side of the turret, in front of the commander's cupola. One source went so far as to suggest that the T-80 could use its laser to designate for helicopter-launched ATGMs. While it is possible that the AT-8 is laser-guided, it is more likely that the missile is radio-frequency guided. This is not only a less sophisticated system, but would require less training and support, since the Soviets have been fielding the radio-frequency-guided AT-2 Swatter and AT-6 Spiral for some time. Finally, it should be mentioned that the T-80 is not the only missile-firing tank the Soviets are currently fielding. The earlier tank is designated T-64B, and "has been in service with the Soviet Army for many years."[13] This tank, the latest variant of the T-64, has many of the same capabilities as the T-80. One theory about the T-64B carries the strong family relationship between the T-64 and the T-80 one step further: this theory brings out the possibility that the T-80 could be a combination of a new hull and suspension system, mated to the turret of the T-64B. While this conclusion is possible, more information will have to be released before it can be confirmed.

Engine and Armor

Compared to the amount of discussion about the T-80's main armament, very little has been released about the tank's engine. Several sources have confirmed that the tank is powered by a turbine engine rated at approximately 900-980 hp, which gives "a power-to-weight ratio of 3:1 tons/horsepower, superior to that of the T-72."[14] This would imply a weight of about 45 tons for the T-80. Although the T-80 is the first Soviet tank to be fielded with a turbine engine, the Soviets have been interested in these engines for some time. According to one source, the Soviets "had tested

The MBT-70, a joint U.S.-German testbed project, pioneered use of a fin-stabilized kinetic energy round in a gun-launcher system. The gun also fired HEAT rounds and the Shillelagh missile.

a turbine-powered tank in the late 1960s and early 1970s, but it had proven a failure."[15] Even less information has been released concerning the T-80's armor protection. The most significant known feature here is the use of the cast armor turret. The characteristic Soviet turret appears to have changed very little. Western intelligence sources must be careful, however, to give the tank the assessment it deserves. If the Soviets were capable of designing a composite armor turret for the T-64, as long ago as the tank was designed, it follows that they are capable of doing the same for the T-80. It can be safely stated that the T-80 is fitted with at least the same level of protection as the T-64. Even more likely, however, is that the Soviets have taken advantage of the most recent technological breakthroughs and have improved at least the tank's frontal armor accordingly. If this proves to be the case, the T-80 can be expected to cause as much of an impact in the West as the T-64 did so many years ago.

Finally, two conclusions can be drawn from the long-awaited, secretive appearance of the T-80 (and the first Moscow parade appearance of the earlier T-64).

First, since very few photgraphs have been published — and all of these by Western sources — it is highly unlikely that the T-80 will be exported to any other country. This pattern has been well established by the T-64. If the T-80 is someday exported, it will be only after another as-now unidentified new tank has replaced the T-80 as the current or best main battle tank in the Soviet Army. This status was confirmed by the sudden appearance of the T-64 in a parade through Red Square in Moscow on 7 May 1985. This was not only the first Moscow parade to feature the T-64, but also provided a first look at a previously unseen version of the tank. Sources have identified this tank as a version of the T-64B that is "not fitted with the guidance equipment for the Kobra guided missile system."[16] Now that a T-64 has been photographed in Red Square on parade, it can be expected that the T-64 will soon be seen in service with a Soviet ally.

Conclusion

The picture of a mass of Soviet tanks rapidly approaching NATO defensive positions marked by knocked out and burning ATGM vehicles is a grim one. This prospect, as well as the new Soviet ability to engage NATO vehicles at beyond the NATO tanks' maximum effective range is what now faces the armies of the West. The Soviets have a main battle tank that is based on the successful technology they fielded with the T-64, as well as the acquired technology the U.S. Army pioneered with the combined gun/missile launcher. It is this new threat that the armies of the West must understand and counter prior to occupying BP Eagle.

The T-80 has allowed the Soviets to finally solve the NATO ATGM problem that they feared for many years. With a new main battle tank that does not require the support of a heavy tank or tank destroyer (a feature that was carried over from the T-64B), plus the speed required to exploit a breakthrough into the enemy's rear area, the Soviets finally have the tank they have been long awaiting. The T-80 is the Soviet solution.

Footnotes

[1]Jenkins, D.H.C., "T-34 to T-80: The Evolution of Soviet Battle Tanks, plus IDR's T-62 Test Report," *International Defense Review,* December 1981, p. 1652.

[2]Ibid., 1651.

[3]Warford, Captain James M., "T-64, IT-122 and IT-130: The Soviet Advantage," *ARMOR,* September-October, 1985, p. 40.

[4]Gratzl, J., "T-64- Some Thoughts on the New Soviet Battle Tank," *International Defense Review,* Vol. IX, No. 1, 1976, p. 54.

[5]Burniece, Joseph R., and Hoven, Paul A., "Newest Soviet Armor: Super Tanks or Super Myth?!," *Eagle,* April, 1986, p. 56.

[6]Warford, Captain, James M., "The T-95: A Gamble in High Risk Technology," *ARMOR,* September-October 1983, p. 41.

[7]Secretary of Defense, *Soviet Military Power,* U.S. Department of Defense, April, 1986, p. 67.

[8]Russell, Simon O., "Soviets to Deploy T-64 Reactive Armor," *Jane's Defense Weekly,* May 17, 1986, p. 863.

[9]"T-80 Tank on Troop Trials in U.S.S.R.," *International Defense Review,* Vol. X, No. 6, 1977.

[10]"The T-80 Tank Unveiled," *Jane's Defense Weekly,* May 3, 1986, p. 803.

[11]Ibid.

[12]Eshel, David, "The T-80 Enigma," *Defense Update International,* Number 71, p. 6.

[13]"T-80 MBT with Laser-Guided Missile?," *Jane's Defense Weekly,* July 6, 1985, p. 29.

[14]Eshel, David, "The T-80 Enigma," *Defense Update International* Number 71, p. 6.

[15]"The T-80 Tank Unveiled," *Jane's Defense Weekly,* May 3, 1986, p. 804.

[16]Ibid.

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Light wheeled vehicles like the HMMVW provide light cavalry mobility.

Cavalry and the Light Division

by Captain Mark B. Chakwin

In a quick radio exchange, the platoon leader confirms the clear zone to the front with the air cav scout helicopter moving slowly through the sector. On command, his two HMMWV-mounted scout teams clear through the next series of checkpoints. Suddenly...contact — reported by the motorcycle scout on the ridge to his flank.

This is cavalry, but with a twist. It is light. Although light cavalry has existed for years, only recently has it taken off with a focus of its own. Grenada, the Falklands, and actions in Lebanon all have driven home the lesson that not all significant military actions are fought by heavy forces in conventional arenas. With this in mind, General Wickham's White Paper authorizing the development of light infantry divisions has opened the door for light cavalry to come of age.[1]

The light infantry division is designed to deter our adversaries (i.e., demonstrate U.S. resolve) and respond to combat threats in a low to mid-intensity conflict. For reconnaissance, surveillance, and security operations, the division has one reconnaissance squadron. The squadron is structured under the combat aviation brigade (CAB) and has two air cavalry troops, a long-range surveillance detachment, a headquarters and headquarters troop, and one light cavalry troop.

The squadron operates to the front, flanks, or rear of the division and conducts limited security and screening operations. With the publication of FC 17-102 (Reconnaissance Squadron) and FC 17-101 (Light Cavalry Troop) the squadron and troop have clear guidance for organization, employment, and support of the cavalry mission in the light environment.

The light cavalry troop performs reconnaissance, security and related missions, normally in conjunction with the air troops. Independent and combined reconnaissance operations include zone, area, and route reconnaissance. With augmentation, the troop can also perform NBC reconnaissance. In the low to mid-intensity conflict scenario, the troop can screen for a moving or stationary force with patrols (mounted/dismounted) and OPs. The unit is ideally suited for high-mobility operations and the sustained security required for rear battle operations. In addition, the troop may perform passage of lines with other maneuver elements and execute link-up operations as part of the squadron.

The troop is organized into four platoons and a headquarters section. Headquarters consists of the commander (and driver) in one High Mobility Multipurpose Wheeled Vehicle (HMMWV) and the 1SG (and driver) in a second HMMWV. The 1SG is dedicated to the logistic and support missions. There are two scout platoons, each with six scout HMMWVs, and two TOW platoons, each with four TOW HMMWVs. Additionally, there may be a motorcycle assigned to each of the scout platoons.

The light cavalry troop internally task organizes according to the factors of METT-T. FC 17-101 offers five variants for platoon configurations and other less typical combinations have been practiced. With light, wheeled vehicles (HMMWV), motorcycles, and a conspicuous absence of a dedicated FSE, the troop is designed for reconnaissance with the capacity to conduct the covering force or guard-type missions.

Typical employment may go as follows: Troop A (light cavalry troop) and Troop B (air cavalry) will execute a zone reconnaissance in sector with the light cavalry troop clearing the zone in detail "underneath" the air troop. If time is critical, the air troop may direct the light cavalry troop forward to-

wards specific features in the zone. Normally, coordination is completed between ground and air troops based upon the squadron commander's intent.

In squadron operations, air/ground contacts are: preplanned (by time/place); by chance (confirm visual identification); or as required (to develop contact, clear danger area). Close or impassable terrain will be cleared by air elements while thick, or jungle-like environments may call for dismounted or motorcycle scouting.

Since the same aircraft cannot remain "on-station" for long periods of time, each changing of the guard requires a reestablishment or confirmation of positions and the present situation. For rear battle (RB) missions, air and ground sections or platoons are aligned in a reaction force. This force may be prepositioned at a central or convenient position. The RB mission may be a contingency of another mission.

Although suited for the RB role, the primary focus of the light cavalry troop is on reconnaissance. It is characteristic of so many low to mid-intensity scenarios that the roads are quite often the major, if not the only, avenues of mobility in close or impassable terrain. It is the wheeled vehicle that can take best advantage of these conditions.

A sharp example of cavalry mobility was demonstrated by the Honduran cavalry which moved two platoons more than eighty kilometers, then deployed and conducted a successful security operation against a low-intensity threat at the Amatillo bridge of the Pan American highway. (See "Cavalry Action in Central America," September-October 1984 *ARMOR*.) An important consideration there is that the cavalry went from notification to contact in less than an hour![2]

Certainly, light vehicles are vulnerable to ambush. But scouts with suppressive capability of automatic weapons with a reasonable effective range (in this case, the M2 machine gun — 1,800+ meters), moving with aeroscout support, should fix probable threat positions without loss of vehicles or mobility.

The present overwatch vehicle is the TOW HMMWV. Although not strictly oriented towards the low or mid-intensity conflict, it offers second generation thermal optics as well as the TOW antitank system that can be imaginatively employed.

Troop mobility has also been enhanced by the military motorcycle. One motorcycle per platoon provides the ability to rapidly clear close or thickly vegetated areas. It enhances the platoon leader's command and control and offers a flexibility which, once experienced, is difficult to do without.

More than any other factor, the manning of the light cavalry will influence its success. With only 73 men (5 officers and 68 enlisted) there is no redundancy in any position. Everyone has to contribute 100 percent, or the troop will not achieve its goals. Leadership is stressed from the most junior squad leader right up through the commander. In the unconventional, low to mid-intensity situation, it is self-reliance, as practiced through innovation, imagination, and flexibility, that must be the norm.[3]

Training goes beyond task, condition, and standard to encourage the development of aggressive, disciplined soldiers who are not only proficient but who willingly seek greater responsibility.

In this short introduction to the light cavalry troop, it bears noting that the search for the optimum mix of personnel and equipment is not over. But the cavalry's mixture of new technology, streamlined organization, and high quality troopers meets the challenges of readiness, deployability, and mission envisioned in the White Paper, and that is now the standard for excellence in our modern army.

"...More than any other factor, the manning of the light cavalry will influence its success. With only 73 men...there is no redundancy at any position..."

Footnotes

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[2]Lieutenant Colonel S. Menzel and Colonel W. Said: "Cavalry Action in Central America." *Armor*, Sep-Oct 1984, pp. 10-12.

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What Would You Do?
(Third of Three Parts)

The Regimental Armored Cavalry Troop

Delay in Sector

(This is the third part of a three-part problem which began in the September-October 1986 issue. Some reference to the two earlier parts may be necessary.)

Your troop has engaged and driven off the Combat Reconnaissance Patrol of a motorized rifle regiment and now awaits the arrival of the Forward Security Element (FSE), due to hit your obstacles in about four minutes.

You and your platoon leaders are in turret defilade positions to observe the enemy approach and the FIST has prepared a suppression mission to be fired at your command. The tanks of 2d Platoon have moved up into firing positions while tanks of 3d and 4th Platoon are in hide positions. The 1st Platoon scouts report the FSE traveling on either side of Highway 457.

Situation

The 2d Platoon tanks unmask and move into hull defilade positions. You order the FIST to fire your suppression mission, timing the impact to coincide with the leading T-64s hitting your minefields. Order 2d Platoon to fire into the flanks of the Forward Security Element (FSE), targeting the mine roller tanks, the enemy platoon leader BTRs just behind the lead tanks, and the FSE command BTR. The FSE detects the tank fires and begins to battle drill towards the 2d Platoon, which quickly backs into defilade.

The enemy tries to advance north and northeast but runs into your mines and is blocked by the railroad embankment. With their movement disrupted and now flanked by the 3d Platoon scouts, you order 3d Platoon to attack by fire into the flanks of the BTRs and tanks with TOW and cannon fires. You are now looking for the opportunity to counterattack once the enemy shows signs of stopping, occupying hasty defensive positions, or withdrawing. You deal your final blow by ordering 4th Platoon to conduct a counterattack by fire against the remaining elements of the FSE, which is trying to establish a hasty defense. As you observe 4th Platoon unmasking and assaulting by fire to the north, you shut down 3d Platoon's direct fires. You should order the FIST to lift indirect fires, and place smoke along the west side of Hungen to screen 4th Platoon's firing positions. During this troop fight, push the 1st Platoon scouts back out to the flanks around Hungen to provide early warning of the advance guard main body.

Problem No. 1

4th Platoon's firepower completes the total destruction of the FSE. You have accomplished a part of the Squadron Commander's intent, but your mission is not over yet. What should you expect next from the enemy and what are you going to do about it?

Solution

Following 5 to 10 kilometers behind the FSE, will be the advance guard main body. The advance guard main body constitutes the bulk of the combat power of the advance guard BTR battalion. It consists of two BTR motorized rifle companies (22 BTR 70s), a T-64 tank company minus a platoon (9 tanks), an antitank platoon of 4 BRDMs, an antiaircraft section of probably two ZSU-23-4s, and an artillery battalion of 122mm D-30s. The advance guard main body has the mission of either eliminating enemy opposition, permitting continuation of the march, or fixing the enemy force to permit flank attack by the main force. You should expect to see him maneuvering in company prebattle formations in about 20 to 30 minutes.

You now must reposition your troop to take on this advance guard main body in your prepared engagement between PL BAT and PL DOG. Instruct 1st Platoon to make contact with and provide early warning of the advance guard main body. Instruct them to work with the FIST to suppress enemy units with indirect fires 3.5 kilometers forward of defensive positions to slow down their rate of advance and disrupt tactical formations. You may have to employ smoke to prevent the advance guard main body from observing the troop's rearward bound to PL DOG. You want to buy any additional time you can to prepare your subsequent platoon positions.

As 1st Platoon begins to fall back towards PL BAT reporting the advance of the enemy, they must make and maintain contact at CP 3 and CP 7 with A and C troops defending forward along PL BAT.

Move 3d Platoon scouts back to PL DOG to occupy battle positions along the edge of Lich and wooded area. 2d Platoon tanks should occupy a battle position vicinity 890965. 4th Platoon tanks can take up positions on the east side of Birklar near CP 5.

Reposition the troop mortars behind Lich to support your next engagement area.

Go ahead and bounce your CP and combat trains back behind Lich in the northwest corner. Check with your XO and 1SG to get an update on the logistical status of the troop. You should keep the troop leaders informed on the enemy situation as you perceive it and the success of the troop delay. Keep the morale up.

Situation continued

1st Platoon scouts make contact with the advance guard main body as it moves west around Hungen. Your other platoons and mortars report "set" in their new positions. Troops A and C report having good success in defending forward of PL BAT. Troop C reports there is a battalion-size force vicinity 9589 moving in company columns northwest towards Hungen. The squadron commander announces his intentions to counterattack this 2d echelon battalion with Co D forward of PL BAT. He tells you to hold strong at PL DOG and on order to assist passing Co D through CP 3 to an attack position. Begin coordination for battle handover and rearward passage lines.

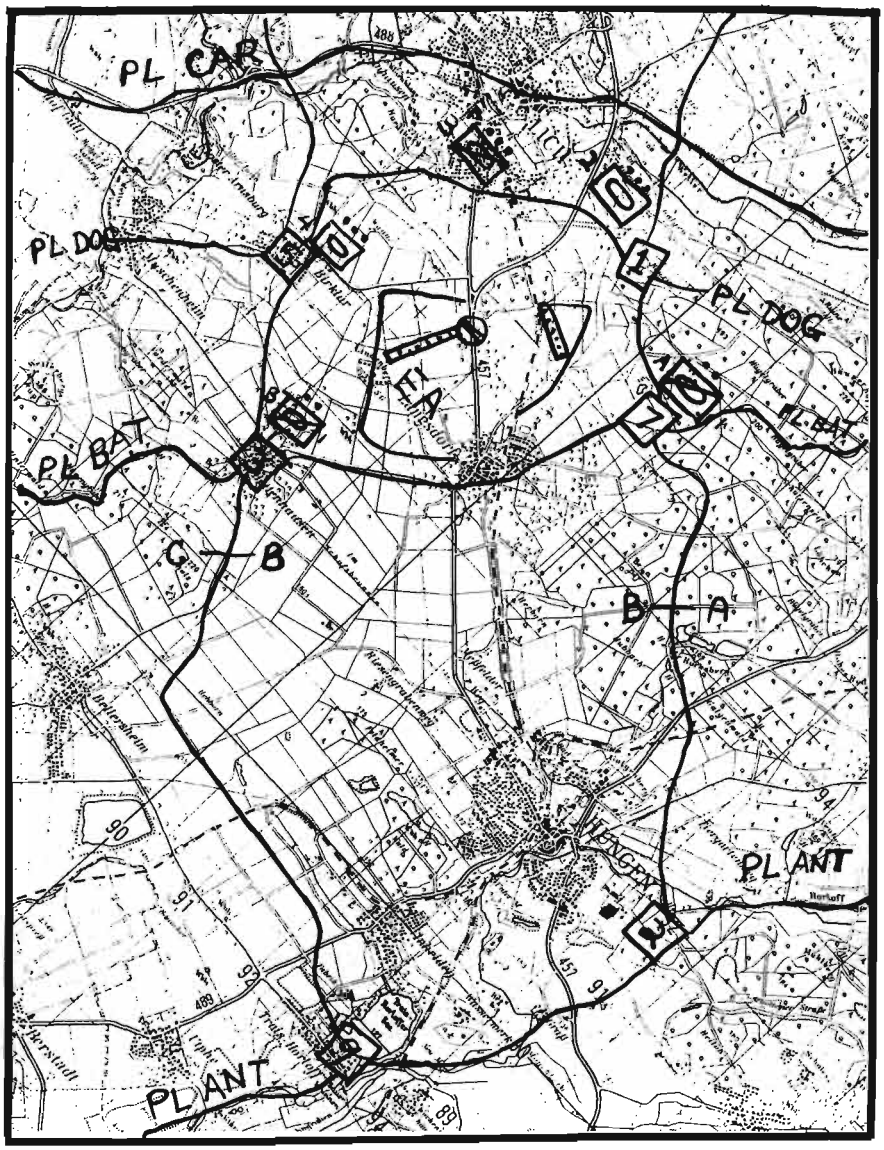
Problem No. 2

In this final phase of the battle, how are you going to conduct the fight?

Instruct your 1st Platoon scouts to continue to maintain contact with this advance guard main body and utilize the FIST to disrupt and slow the enemy's rate of advance. The advance guard main body may deploy down to platoon columns, expecting a fight from the area where the FSE was destroyed. You should allow the advance guard main body to move up to and cross PL BAT without drawing any direct fire from your platoons.

Do not give up the element of surprise until the last moment. Deceive the enemy. Make him think that he has perhaps made a successful penetration. Attempt to draw him deep into your planned engagement area in company or platoon columns, *NOT* in attack formations. Hold your direct fires until the entire advance guard main body appears in your engagement area. Let him roll into your kill zone and pile into your obstacles.

Then, let him have it. Mass the fires of the troop and deliver one punishing decisive blow. Fire your indirect artillery group target covering the kill zone. Unmask your 2d and 4th tank platoons to attack by fire into the flanks of column formations. Target engagement priorities already announced are the ZSU-23-4s, T-64s, command BTR



70s following the tanks, and BTRs. As the enemy begins to turn his flanks, due to the obstacles and tank cannon fires, let 3d scouts open up with TOW and 25mm cannon fires from your base line.

Survivors of this advance guard main body begin to withdraw back into Langsdorf. With your scouts providing overwatching fires, you should order 2d and 4th Platoons to counterattack by fire to destroy the remnants of the advance guard main body. Firing on the move, the tank platoons fix the remaining crews and vehicles.

You should order 1st Platoon to push a section back out to the woods forward of PL BAT to identify that 2d echelon battalion. Make sure the other section has guided Co D to a good attack position. Get 2d and 4th Platoons to occupy hasty defensive positions along PL DOG. You anticipate being the anvil as the squadron commander hammers with Company D and a JAAT on the 2d Echelon battalion forward of PL BAT. Have 3d platoon begin preparations for battle handover and rearward passage of lines in coordination with your XO.

Conclusion

This scenario for the troop delay may be a bit simplistic, but its purpose is to generate some serious thought on the subject. For a cavalry troop to successfully delay, the leaders and troopers must understand the Threat and the critical tasks which must be accomplished when delaying in troop sector.

This three-part article was prepared by CPT John L. Ballantyne during his assignment to the Command and Staff Department, USAARMS. He is currently assigned to the 11th ACR in Germany.

The Two-Man Tank:
An Idea Whose Time Has Come

by Lieutenant Colonel Linwood E. Blackburn

Introduction

The tank has been the focal point of modern land warfare since its introduction on the battlefield at Cambrai in 1916. The lumbering machine gun platforms of WW I required a ten-man crew and had an operating radius of only a few miles. In WW II, tank crews had been reduced to five men, and the reliability of the tanks had improved to the point that tactical thought now focused on their employment. Today's modern tanks feature four-man crews, awesome firepower, improved mobility, and the most modern technology. Our current doctrine, the AirLand Battle, attempts to structure the battlefield so that an armor-heavy task force or brigade can strike deep into the enemy's rear, disrupting his communications, his command and control and, ultimately, his timetable for success.

Advances in technology have enabled tank developers to employ the most modern fire control and propulsion systems. Laser rangefinders, turbine engines, and integrated solid-state fire-control systems, packaged in a 60-ton body, have prompted some experts to predict that the tank has reached its developmental potential. The two most common reasons given for this prediction are the tank's high cost and its ever-growing logistics tail.

Are these experts correct? Has the tank become so expensive as to make it an unaffordable luxury? No! Now, as never before, the time is right for another evolutionary change. Tanks must cost less, be smaller, and use the most reliable aspects of state-of-the-art technology. The next main battle tank needs to be a two-man tank that can, more cheaply and effectively, accomplish all of the aspects of any future doctrine.

Current Design

The trend in past tank design has been to develop a basic tank model, using the best existing technology, and then product-improve that basic model over time. But, as a report published in England points out, "With few exceptions, tank design has changed very little in the last 35 years. The basic concept consists of a turreted vehicle with the driver in a hull compartment and the remainder of the crew located in the turret."[1] Even the M1 tank with its turbine engine, vastly improved suspension, and improved levels of protection, still has a four-man crew. Currently, all Western main battle tanks (MBT) feature four-man crews, and, not surprisingly, all have basically the same weaknesses. They are all big, expensive, and hard to handle when they must be transported out of the theater in which they are deployed.

Advantages

A two-man tank, on the other hand, possesses several distinct advantages over a four-man tank. These are: reduced size, reduced vulnerability, reduced costs, and improved strategic transportability. I will discuss each of these advantages in detail.

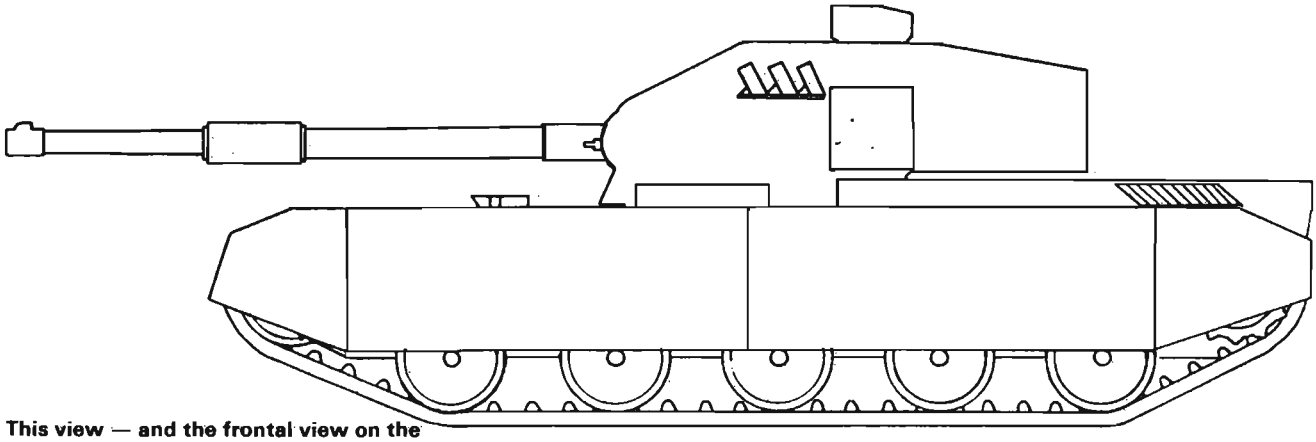
Reduced Size

The large size of current MBTs makes them relatively easy to detect and easy to hit, given the excellent accuracy of current antitank (AT) weapon systems, munitions so lethal that a tank that is detected and hit stands a very good chance of being destroyed. As a recent *International Defense Review* article notes,

> "The size of the present-day conventional tank turret makes it such an outstanding target for enemy identification and fire. In addition to being too high and too wide, turrets have also become too long, exposing large areas of only moderate armour protection to enemy flank attack."[2]

A two-man tank would reduce the overall size of the tank by moving the crew compartment from the turret into the hull. With the crew in the hull, the main gun, with an automatic loader, would be the only portion of the tank above the hull. This reduced crew compartment size would also reduce the volume of the tank that would have to be given maximum armor protection. Some people estimate that this configuration would not only reduce the size of the vehicle, but would also reduce the vehicle weight by at least 15 percent. This weight reduction would occur by eliminating the need for the bulky mass of armor that now protects the crew above the turret ring.[3]

The relocation of the crew into the hull assures that a reliable automatic loader can be developed for a 120-mm main gun. This is important because in the heat of battle a crew member will not be able to leave his protected compartment to clear a jammed autoloader or repair a broken part. A crew with an inop-



This view — and the frontal view on the following page — is of the Gemini 2-man tank, a British design study.

erative autoloader will have to displace from their fighting position to a protected, relatively secure area where they can repair the malfunction. The Army Tank Automotive Command (TACOM) is currently developing a tank test bed with an externally mounted 120-mm gun and with an automatic loader to validate the feasibility of such a system.[4] The Swedish Army has fielded the S-Tank, a tank with a reliable automatic loader, but the gun is fixed in the hull rather than mounted in a rotating turret.[5] The point of mentioning the S-tank is not to imply that the two-man tank should have a fixed gun mounted in the hull, but to demonstrate that the technology does already exist, in the Western world, to produce a reliable autoloader.

Another advantage derived from an autoloader is loading speed. Although a man may beat an autoloader over a short time, he will slow down as fatigue sets in. The autoloader will keep loading rounds until the ammunition is expended. This fact has already been demonstrated in the S-Tank, according to an article in *ARMOR Magazine:* "The automatic loader of the S-Tank already gives a considerably higher rate of fire than that possible with manually-loaded guns and makes all 50 of its rounds ready to fire."[6]

Reduced Vulnerability

The second advantage of a two-man tank is its reduced vulnerability to enemy detection and to being hit. This is passive protection rather than active protection, but the net effect is decreased vulnerability. The two-man tank would employ hull defilade in defensive positions, as today's tanks do. This concept allows the entire hull of the vehicle to be parked behind a hill or a berm, or in a dug-in fighting position. (As an article in *Defense Week* recently stated: "The concept is called 'hull defilade.' Army strategists say that a heavily armored hull with an elevated gun would be easier to conceal in trees and bushes, yet more survivable in the open battlefield."[7]

The in-hull crew compartment provides increased levels of protection over the current in-turret crew compartments. Because there are fewer men to protect, comparable or increased levels of protection can be achieved at reduced cost over a tank with a four-man crew.[8] It would also be possible to completely separate the crews from all main gun ammunition, thus decreasing the vulnerability of the crew and the tank to ammunition fires. With the crew in a separate compartment which has no rotating seals or holes for guns or ejection ports, NBC protection would be much simpler. Less power would be required to maintain an uncontaminated crew environment, making it easier to produce an overpressure protection system for the crew. The crew could be effectively sealed into their fighting compartment, protected from the dangers of ammunition fires and NBC contamination, and could realistically expect to fight the battle that way.[9]

Another advantage gained by reducing the overall size of the tank would be the ability to increase the armor protection to meet the threat of a future enemy "super-weapon." It is generally agreed that current MBTs have reached the upper limit of armor growth potential, given current size, weight, and cost constraints.[10] A smaller, less expensive, tank does not suffer those limitations. Its growth potential in armor protection, especially to top-attack munitions, is virtually unlimited.[11]

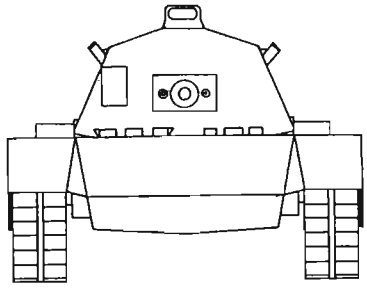
Decreased Cost

Today's tanks possess capabilities unheard of 20 years ago. As cited in the *Annual Report to Congress-Fiscal Year 1986,* "The M1 tank's superior agility, advanced fire control system, and modern armor will make it an effective and survivable counter to Soviet armored forces through the 1990s and beyond."[12]

Ironically, the very capabilities which make modern tanks so formidable also threaten their very existence. High systems costs not only add to budget deficits but limit the number of tanks that can be produced. The United States plans to produce only 7,467 M1s and M1A1s by the early 1990s.[13]

One solution to increased cost is a smaller tank. A smaller tank with a two-man crew will cost less than the current M1 tank with a four-man crew. The most significant reduction in cost will be due to the reduced size of the crew. Only half the number of tank crewmen will have to be trained to man the tank fleet; or, looked at another way, you can crew twice as many tanks with two-man crews as you can with four-man crews. The savings will also embrace training costs, salary costs, medical costs, dependent support costs, and retirement costs. In this era of shrinking budgets and reduced manpower pools, these advantages become more and more significant.[14]

Smaller tanks would also reap cost-benefits in other areas. As mentioned above, a two-man tank



would not only expose less surface area to the enemy, but would also reduce the crew compartment size. Both of these reductions would contribute significantly to the reduced cost of the tank. Since only the main gun and portions of the autoloader would be exposed above the level to the hull, less of the tank would have to be afforded the levels of protection that would ensure crew survival. *International Defense Review* had this to say about a tank with a hull-located crew: "If the opponent merely destroys a gun and autoloader, but the vehicle itself is still mobile and the crew is intact, then survivability takes on a different meaning."[15]

Less area to protect means reduced armor costs and a lighter tank. Lower overall weight because of less armor will make it possible to use a smaller, less expensive, and more efficient engine to power the tank. Smaller engines reduce fuel consumption, thereby reducing the cost, not only of the fuel, but of the numbers of refueling vehicles that must be purchased. These reductions should require fewer personnel in the logistics train to refuel the fleet, but it is dangerous to extrapolate a cost saving on their account. Some of the personnel spaces saved in the fuel hauling arena may be necessary in the organizational maintenance arena.

Strategic Transportability

Strategic transportability is one facet of tank design that has been sacrificed in the current generation of MBTs. Tanks have become so large and heavy, and they require so much support equipment, that strategic airlift for a tank battalion is almost out of the question. As the Fiscal Year 1986 budget states, "Heavier forces, such as armored and mechanized units, cannot be transported rapidly by air in the numbers needed for either a European or Southwest Asian conflict. It is simply too expensive to buy that large an airlift force."[16] As the budget document goes on to explain: "Yet we must be able to move such units quickly, particularly in a NATO reinforcement, given the heavily armored forces they would face. Large armored and mechanized forces can be deployed rapidly only by combining airlift with extensive pre-positioning."[17] The pre-positioning discussed in the budget works only if the equipment happens to be located in the right theater. If not, then the strategic planners must make some critical decisions on priorities of air transport and the perceived need for armored vehicles early in the conflict. The C-17 aircraft is being developed to rectify this strategic airlift deficiency and to augment airlift capabilities within theaters. As described in the budget document:

> "Though smaller than the C-5, the C-17 will be able to carry the full range of military equipment, including all armored vehicles and most other outsized cargo. Unlike most other intertheater aircraft, however, it will be able to operate on austere airfields, thereby increasing the amount of cargo that can be delivered directly to operating forces."[18]

Equipment that cannot be transported by air, or pre-positioned, must be shipped by sea. Even with the use of fast sealift, goals for the deployment of U.S.-based forces are challenging. For southwest Asia alone, the budget document states: "Our objective is to be able to deploy a major joint task force and required support within six weeks of being asked for assistance."[19] Even if the two-man tanks were unable to show a significant enough weight decrease over the current family of MBTs to make it a viable candidate to be airlifted, its weight and volume reduction could substantially reduce the fast sealift requirements. In addition, its lighter weight would make it easier to move across unimproved beaches. Equally as important, the vehicle's lighter weight would reduce the overall weight classification for any bridging needed during the employment of the two-man tank unit.

A smaller, lighter, tank would greatly reduce the problems associated with strategic transportability. Ideally, these two-man vehicles would meet the volume and weight constraints of a C-141, thus adding another dimension to strategic power projection. In any event, reduced weight would, in turn, reduce the number of sorties necessary to transport a tank battalion, and the reduced number of refueling vehicles would also reduce the size of the logistics support "tail" that would have to be deployed to support the battalion. Any significant reduction of the airlift requirements would greatly assist future planners in preparing for worldwide contingency missions and could eventually reduce the need for some of the pre-positioned stocks that are currently maintained overseas, and for fast sealift that would be included in future budget requests.

Potential Problems

As with any new concept, there are potential problems that could detract from the overall effectiveness of a two-man tank. Foremost among these is the reliability of the autoloader. Without a safe, reliable autoloader, the basic concept of the two-man tank is not feasible. As has already been stated, however, much research and development is taking place in that important area. Experts have written recently that "the message is very clear: autoloaders will be used, and it is more than likely that they will be incorporated in the next generation of main battle tanks."[20]

Crewmen, although reduced in number, must be completely cross-trained in each other's jobs. The two crew stations would have identical controls to enable each crewman to fight and drive the tank from his position in the hull. The crewmen's level of technical expertise will have to be increased. This increase in training is to be expected since the two men will now be performing all of the tasks that are currently those of a four-man crew.[21]

Crew maintenance duties, especially hull maintenance and repair will have to be closely examined to ensure that all of the tasks that a crew will have to perform are within the physical capabilities of a two-man crew. The heavy components of a tank hull must either be assembled in small manageable sections (like the side skirts on the

M1), or the crew must be given special tools, winches, or jacks, to allow them to perform the necessary heavy maintenance. Much thought must also be given to developing more reliable components to reduce the need for crew replacement of critical parts.[22] Consideration should also be given to revising the maintenance allocation charts to direct that some of the heavier tasks be performed at organization level rather than at crew level.

A two-man crew's ability to acquire targets would be degraded as four eyeballs cannot be expected to perform as well as eight. Certain technological advances must be incorporated into a two-man tank that normally might not be placed in a four-man tank. A panoramic, stabilized camera must be mounted on the turret roof to ensure 360-degree vision for both crewmen. This will necessitate two television viewing screens, but they can be electronically linked to the thermal sights to improve the thermal viewing capability.[23] These electronic aids would assist the two man crew in target acquisition and identification and in some measure make up for the loss of two sets of eyeballs.

Revised doctrine for the tactical employment of the two-man tanks could also aid in overcoming the degradation of target acquisition. Two-man tanks could be employed as mutually supporting two-tank sections. These sections, after appropriate section training, would then have the equivalent number of eyeballs as one four-man tank, but would possess twice the firepower.

Conclusion

As a recent article in *Defense and Foreign Affairs* notes: "There is nothing which dictates that an MBT must be large and heavy; what is important is that it be a survivable system capable of delivering mobile, effective, firepower on the battlefield."[24] The next MBT must possess reduced vulnerability, increased protection, and improved strategic transportability. In addition, current budgeting trends indicate that it should cost substantially less than current tanks.

A two-man tank not only fulfills all of the requirements for the next generation tank, but it does so with the real promise of a true reduction in costs — not only the costs associated with the production and fielding of the vehicle — but those associated with the highly trained force that would man the vehicle.

If we are to continue to field an elite tank force, capable of deploying anywhere in the world to support the national strategy, then the next MBT developed for our forces must be a two-man tank.

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LIEUTENANT COLONEL LINWOOD E. BLACKBURN, a 1969 graduate of West Point, has served in cavalry and armor units in Vietnam, CONUS, and in Germany. He holds a master's degree in industrial engineering and operations research from Virginia Polytechnic Institute. In addition, he is a graduate of the British Army Long Armour Infantry Course, the Command and General Staff College, and the Armed Forces Staff College. He is currently an instructor in the Defense Resources Management Education Center, Naval Postgraduate School, Monterey, California, and is now on orders for the 4th Battalion, 67th Armor in the FRG.

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Preparing for the Advanced Course

As your time approaches to attend the Armor Officer Advanced Course, you should take a few moments to reflect on exactly what you hope to gain from your attendance. There really is something available for everyone.

If your primary motivation is just to attend and have a good time, don't read any further. Put this down, throw it away, or give it to someone who may need it. The amazing point about the "just attending" attitude is that near the end of the course, many students find themselves struggling simply to achieve a certificate of completion. If you truly care about the outcome of your course, read on.

Of key importance is your mental and physical well-being. Those individuals who have participated in a good PT program will find it very easy to cope. No matter how many times students are told to be in shape when they report, there is the continual influx of students who are overweight or marginal and cannot pass the diagnostic PT test. On the first day of your course you'll meet the scales, so prepare now and avoid the embarrassment. A specified PT score (ours was 280) will allow you to conduct PT on an individual basis. Otherwise, you must take organized PT three days a week. With everything else going on, you'll enjoy the freedom that an individual program can provide.

The Army Writing Program is alive and well at AOAC. In the first week, you will receive an English Diagnostic Test. Successful completion of this test will free your nights from the drudgery of remedial training. The writing program for our class (the initial class facing this requirement) was 16 hours of writing on various military documents. Any advance preparation you do now will greatly ease your pain. Most officers have to do a lot of writing, but do it very poorly.

There are several assignments the student can prepare for ahead of time, including several book reviews, a research paper or staff study, and an oral presentation. If your oral presentation skills are weak, practice. During the course, you will have numerous chances to excel, both voluntary and involuntary. The program was very productive and long overdue as part of the instruction. A positive attitude about the writing program will make it enjoyable for the student and bearable for the instructors.

Those officers who have not served as executive officers or motor officers should bone up now. Maintenance of forms and records is of key importance. The in-class work is fast and furious. Should you fall behind, get help. The results of not preparing or keeping pace could be disastrous. Several graded, out-of-class assignments are included in the program of instruction. These are time-consuming and critical to your success in the maintenance exam. The main element of success is the student's ability to reference the required publication, and there are many involved. The maintenance instruction accounts for a large part of the comprehensive exam administered during the fifteenth week.

HINT: Tab your publications when first issued. This small effort early on will save you much aggravation as the pace picks up.

By preparing ahead of time for land navigation, the student can also salvage considerable free time. A pre-test was given to our class on a Friday afternoon in the field. Successful completion of this test excused the student from several of the land navigation classes the following week. Additionally, the retest is given on a Saturday.

Weeks 7 through 12 of our course included many classes that would prepare the student for future tactical instruction. These classes included Soviet doctrine and tactics, NBC operations, engineer support, fire support planning and execution, intelligence preparation of the battlefield, and command and control at battalion level and below. All of these subjects are addressed from the standpoint of their role in the preparation of combat orders and plans. This skill is used in all future tactical instruction, and a clear understanding of the operations order is critical.

An oral operations order is given by the student and graded during the company/team instruction. All of the remaining orders are written. The grading of all orders is very thorough, as combat orders and plans make up the majority of the points available during the course. The ability to write and communicate a tactical plan is a combat-critical skill. The pace at this point is fast and furious. Repetition will seem endless, but all classes are pyramidal, culminating with the brigade-level examination. Many students took these weeks of instruction lightly; then when the task force examinations were given, the smell of smoking brain cells filled the room. The vast majority of failures and low scores can be attributed to the students' failure to complete the requirements in the allotted 4½ hours. Proper organization and preparation is a must. Study groups are useful and highly recommended.

A thorough understanding of military symbology is essential. The grading of all tactics exams is accomplished in two ways. The written order is compared to the student's graphics, completed on an onion skin overlay, and a grade is computed. If the student's written intentions are clearly evident on the overlay, then the instructor's evaluation of the results is simplified. At the completion of each exam, a very thorough review of the exam is available to the student. The end result, however, depends on the ability of the student to transfer his thoughts to paper.

One of the most useful, but untapped, resources available to each class is the level of experience present. Some students have time

with troops, staff experience, and even command time. There are Allied students — many with combat experience — and sister service students, all with valuable information to share. There is the possibility of becoming an Allied Student Sponsor. This chance to learn and share the life and experience of someone from another part of the world should not be passed up. These soldiers are here to learn about our culture as we blend it with our military life. Take on the challenge; it is one you will long remember.

As you prepare for what lies ahead, remember, ATTITUDE is the key. You can still have a good time and learn a lot in the process. After all is said and done, what you experience in your 20-odd weeks may well benefit soldiers in the field, Active, Reserve, or Guard. The bottom line is that you are taking this course to learn to be a more effective leader. And the soldiers who you will lead, at whatever level, are depending on your knowledge and commitment to be the best, tactically and technically. Make a commitment now and enjoy your course.

WAYNE K. HAMBERGER
CPT, Armor
Richmond, VA

The Tank Fighting Position Versus the Dying Position

Tankers rarely have the opportunity to train with combat engineer earthmover support. As a result, they often fall prey to a few simple mistakes made in the preparation of dug-in tank fighting positions as well as mistakes made while fighting from them. These simple mistakes, (each with a simple remedy) will prove fatal on the battlefield.

The "Kill Me" Mound

The "kill me" mound is a one-and-a-half meter high pile of dirt pushed up by the bulldozer because, "There just wasn't enough time to dig the tanks in..." You will discover it is just as easy to hide an elephant in your bathtub as it is to hide your tank behind a "kill me" mound. The freshly-turned soil of the "kill me" mound serves only to attract the enemy's eye to the three-meter-high tank attempting to take cover behind it. Modern tank projectiles can penetrate several meters of loose dirt and still retain enough kinetic energy to penetrate your tank, so don't count on this dirt pile for any sort of protection. You must dig in deep — at least to cupola depth. A tank behind a "kill me" mound will most likely end up a burned out hulk in combat.

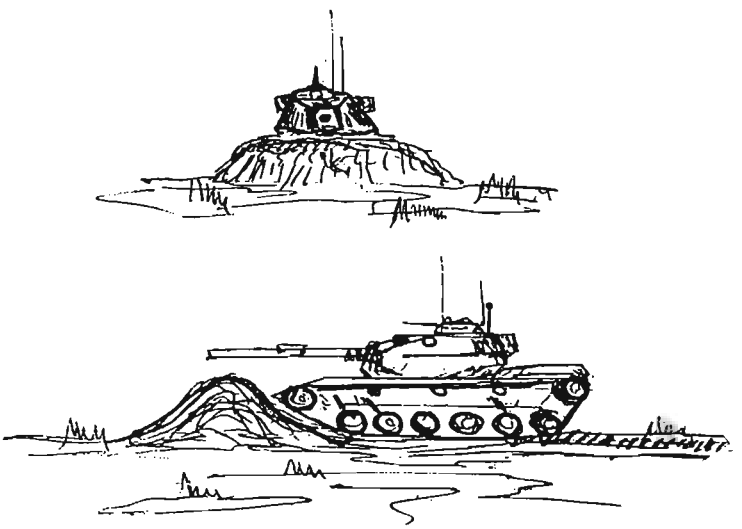

Figure 1

The Spoil

The spoil displaced in digging the position is often left in a huge pile to the rear of the tank, where it becomes another version of the "kill me" mound. Not only does it advertise the tank's otherwise hidden position, it also hinders the tank's ability to withdraw should circumstances take a turn for the worse. (Figure 2)

The remedy is to flatten the spoil. Spread it around behind your position, and camouflage it if possible. Sweep the spoil from the front and sides of the position down into the hole itself.

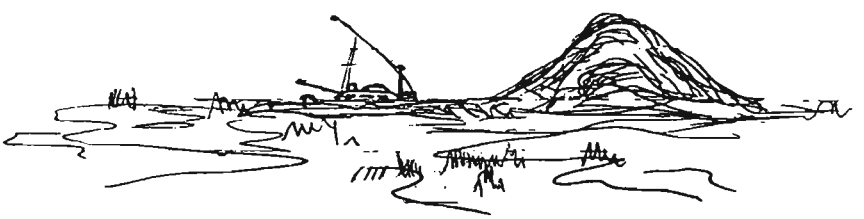

Figure 2

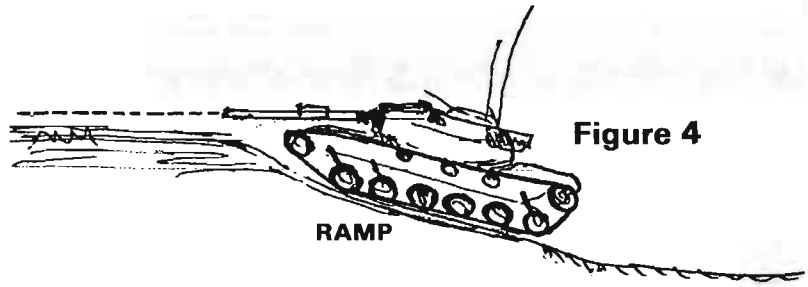

Figure 4

The Firing Ramp

The hardest part in digging a tank position is creation of a proper "firing ramp" (Figure 4). All too often, the ramp from the "hide" position to the "firing" position is inclined so steeply that the tank's main gun cannot be depressed enough to bear on enemy targets (Figure 3). A tank in that predicament is forced to move forward all the way to ground level to shoot. A fully-exposed tank will not last long on the battlefield.

You can prevent this by making sure your "firing ramp" is at least long enough to accommodate the tank's first through the fifth roadwheels. The ramp should also be inclined at about 8 to 10 degrees (Figure 4).

You can measure the proper ramp angle by lowering the main gun to its maximum depression angle and then elevating one full turn of the manual elevation handle. Drive the tank onto the ramp to a good hull-down position. The gun should parallel the ground with the muzzle about one foot above ground level (Figure 4). If the gun is still pointed too high, lower the incline of the ramp with shallow passes of the dozer blade. If you cut too deeply, you will have to start the ramp over again. Check the incline this way until the main gun appears level, then have the gunner check his field of fire with his telescope. Do not release the bulldozer to work elsewhere until you have verified that your tank can fire into your assigned area and maintain a good hull defilade position at the same time.

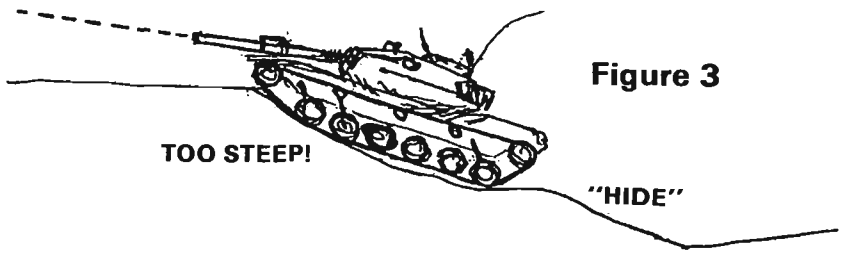

Figure 3

Limit Your Exposure

All your preparation will go for naught if you expose your tank needlessly. You must expose as small a portion of your tank as possible when you are searching for targets. Let the tank commander and loader search while the vehicle stays in its "hide" position, if you can. If you must use the thermal sight or laser rangefinder, pull forward only far enough to expose the periscope heads on top of the tank. There is no need to show the entire turret to the enemy until you are actually going to shoot. Pull forward, fire, and then *get back down.* When not shooting, you must stay in a turret-down position. Stay up too long, and you will get shot.

The simple mistakes I have mentioned here are repeated every day by U.S. Army tank crews at the National Training Center. As armor leaders, we must make our crews aware of these simple mistakes, and their simple remedies, lest our "fighting positions" become our "dying positions."

EDWARD N. WAGAMON
Captain, Armor
Fort Knox, KY

Recognition Quiz Answers

1. **BAV 485 AMPHIBIOUS TRUCK (USSR).** Crew 2 + up to 25 troops; drive, 6 x 6; combat weight, 9.650 kg (21,278 lbs); maximum cargo load, 2,500 kg (5,500 lbs); maximum road speed, 60 km/hr; maximum water speed, 10 km/hr; maximum range, 480 km; engine, 6-cylinder, water-cooled, gasoline, 100-hp ZIL-123. Model shown has optional armament, 1 x 12.7-mm DShK machine gun.

2. **FOX ARMORED CAR (UK).** Crew, 3; combat weight, 6,386 kg (14,000 lbs); maximum road speed, 104 km/hr; maximum water speed, 5 km/hr; fording, 1 meter; engine, 6-cylinder, 195-BHP, 4.2 liter gasoline Jaguar; armament, 1 x 30-mm Rarden cannon, 1 x 7.62-mm coaxial machine gun, 2 x 4 smoke dischargers; armor, proof against small arms and shell splinters.

3. **M60A3 (U.S.).** Crew, 4; combat weight, 51,500 kg (113,557 lbs); maximum road speed, 48 km/hr; maximum road range, 480 km; engine, 12-cylinder, air-cooled Continental AVDS-1790-2A 750-BHP diesel; armament, 1 x 105-mm main gun, 1 x 7.62-mm coaxial machine gun.

4. **SU-122 (USSR).** This is a VISMOD as used at the National Training Center. An M551 Sheridan chassis had been visually modified to resemble the Soviet SU-122 M-1974 SP howitzer. The real SU-122 has a 4-man crew and is armed with a 122-mm main gun..

5. **M114A1 Command and Recon Carrier (U.S.).** Crew, 3-4; combat weight, 6,928 kg (15,276 lbs); maximum road speed, 58 km/hr; maximum water speed, 5 km/hr; maximum range, 480 km; engine, V-8 liquid-cooled, gasoline, 160-BHP Chevrolet; armament, 1 x .50-caliber machine gun and 1 x 7.62-mm machine gun..

6. **ROLAND MOBILE AA WEAPON (U.S.).** Crew, 2; surface-to-air tube-launched guided missile; autoload system onboard; warhead, HE with proximity fuze; missile weight, 63 kg (135 lbs); speed, up to Mach 1.5; range, 6,000 meters; combat weight, 25 tons on M12A truck.

MEMORIAL NEWS

Granite bas-relief memorial to the late MG Ernest N. Harmon is unveiled at Norwich University, where he served as president for 15 years.

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Harmon Memorial Unveiled at Norwich U

The late Major General Ernest N. Harmon, a graduate and later president of Norwich University, VT, was honored at that institution with the recent unveiling of a bas-relief granite memorial. General Harmon served in the cavalry in WW I and commanded the 1st and 2d Armored Divisions in WW II. He went on to be named deputy commander, U.S. Army Ground Forces, a post he held until his retirement in 1948.

General Harmon was president of Norwich U from 1950 to 1965 and served on its Board of Trustees until his death in 1979. Among those attending the ceremony were Mrs. Jeanne H. Oliver, daughter; Halsey Harmon, son; and Mrs. Barbara M. Roll, daughter. Mrs. Roll was wearing the gold medal of the Honorable Order of St. George, awarded by the U.S. Armor Association, that was presented to her brother on behalf of their father.

11th Armored Cavalry Regiment Updating Rolls

The Blackhorse Association is currently attempting to compile a complete listing of surviving troopers who served with the regiment at any time during their careers. If you have service with the 11th ACR, contact: The Blackhorse Association, P.O. Box 11, Fort Knox, Kentucky 40121.

Additionally, the Blackhorse will conduct its annual reunion on 22-23 May. For more information contact CSM Bill Squires, (502)624-2247.

12th AD Association Reunion

The 12th Armored Division Association will hold its annual reunion in August at Louisville, KY. Details may be obtained from Paul R. Hempfling, Sr., 11418 Hillcroft, Houston, TX 77035. Phone: (713) 729-7586.

Become a Member

Just because you're not currently riding a tank or a scout vehicle doesn't mean you're not Armor or Cavalry. Join one of the largest chapters of the Armor Association — the Abrams Chapter of the U.S. Armor Association.

Commissioned and noncommissioned officers in the Washington, D.C. area, or who are being assigned there, and who have an interest in joining the Abrams Chapter of the Armor Association should contact BG Philip Bolte (USA, Ret.) at 703-250-8966 or COL Howard Gloch at 703-898-0001.

Official Photo Requirements Revised

A recent change to AR 640-30 directs that all officers in the rank of first lieutenant or higher, all chief warrant officers, and all soldiers in the rank of staff sergeant or higher, now have their official photos taken every third year during their birth month. All newly-appointed officers will have their photos made during their basic branch course.

The official photo is one of the three major documents in your personnel file, along with the evaluation reports and personnel qualification records. The importance of having an up-to-date photo in your personnel file cannot be overemphasized.

General Clarke Honored

General Bruce C. Clarke, USA, Ret., wartime commander of Combat Command "B", 7th Armored Division, was honored on 18 October with the award of the 7th Armored Division Association's Grand Cross of Homage, Military Order of the Ardennes. The award was made at the Clarke Reading Room of the Engineer School Library at Fort Belvoir, VA, and honored the general for the "leadership displayed by him while serving as the commanding officer of Combat Command "B", 7th Armored Division during the period December 16, 1944 to January 25, 1945 in the Ardennes Campaign."

1-33d Armor Shoots A Thousand

The 1st Battalion, 33d Armor, set a new high in USAREUR Gunnery standards for the M1 Tank Table VII in July when tank B34 (TC: SSG Felker, Gunner: SGT Harbst) fired a possible 1,000. The 1-33d also surpassed the previous record of first-run qualified crews when it qualified 54 out of 58 crews, during which Alfa Company qualified 14 of 14 crews. The "1st Men of War" amassed 11 distinguished crews, 26 superior, and 17 qualified, with an average score of just over 838 points.

The 1-33d is presently competing to be the V Corps representative to the CENTAG Team for the Candian Army Trophy (CAT) 87 competition. The competition is between the 1-33d and the 3-33d.

10th Armored Division Memorial

A polished 7-foot high granite pyramid has been erected at Ft. Gordon, GA, in honor of the 10th Armored Division. The memorial was dedicated on 16 May with some twenty surviving members of the 10th AD WW II force in attendance.

The monument is embellished with the 10th AD Association insignia on one side, the 10th AD's major campaigns in Europe on a second side and a list of the unit's organizations, with dates of activation and inactivation, on the third side.

Composite Hull Concept
For Bradley Fighting Vehicle

Composite Hull Vehicle Under Study

A four-year, $13-million contract has been awarded for a demonstrator composite hull (outer shell) by the U.S. Army Materials Technology Laboratory in Watertown, MA, to FMC Corporation, Ordnance Division, in San Jose, CA. A molded composite (reinforced plastic) hull structure, shown here, will be evaluated using the Bradley Fighting Vehicle chassis.

Don Stivers' painting, "The Brave Rifles in World War II."

A Birthday Celebration

The Third Armored Cavalry Regiment recently marked its 140th Anniversary with a traditional slate of Organization Week activities, highlighted by a formal regimental dining-in. At this event, GEN James H. Polk, (USA, Retired), Honorary Colonel of the Regiment, unveiled "The Brave Rifles In World War II," a painting commissioned by the Regiment in honor of its anniversary. The painting, by Don Stivers, depicts an armored reconnaissance patrol halted in a small village on the banks of the Saar River, where the 3d Cavalry Group (Mech) operated during the winter of 1945. Colonel James M. Lyle, the 61st Colonel, presented the painting to the Regimental Museum in the name of the officers and troopers currently assigned to the Regiment. Prints of the painting are available at a cost of $110.00. Proceeds from the print sale will go to support the newly-renovated regimental museum. Anyone interested in obtaining the print may obtain an informational brochure by contacting: The American Print Gallery, 219 Steinwehr Avenue, Gettysburg, PA 17325; toll-free phone 1-800-448-1863.

U of Hawaii Student Asks For Help

Howard C. H. Feng, a graduate student at the University of Hawaii, is researching his master's thesis on the 3d Army of the Republic of Vietnam Infantry Division 1971-1972 in Quang Tri Province and later during the 1972 Easter Offensive.

Mr. Feng would like to hear from MACV, XXIV Corps/FRAC, USAVR and from U.S. Army advisors who served with MACV Advisory Team 155 from the fall of 1971 to the fall of 1972. Interested personnel may write to Mr. Feng at: Howard C. H. Feng, 1342 8th Avenue, Honolulu, HI 96816.

Iron Knights Fire at Graf and Draw M1A1s

The Iron Knights, 4th Battalion, 66th Armor Regiment, 3d Infantry Division, fired their last rounds from their M1 tanks at Grafenwoehr in September and posted 17 distinguished, 18 superior, and 13 qualified crews on Tank Table VIII. The unit had trained on Conduct of Fire Training (COFT) simulators prior to their firing runs at Graf and went straight to Table VIII on the range.

The battalion fired again at Graf in January when they tried out their new M1A1 main battle tanks with the 120-mm smoothbore main gun. First firing for record with the new tanks will be in June.

New "EM Gun" Works Well in Lab Test

This quarter-inch thick steel plate was penetrated by an 11-ounce plastic cube fired from the EM gun under development at Picatinny Arsenal, NJ. Two cube projectiles are shown in front of the plate held by Gregory Columbo, a mechanical engineer. The one on the left has not been fired; the one of the right has been fired.

EM Gun Projectile Travels 14,200 FPS

An 11-ounce plastic cube fired by an electro-magnetic (EM) gun under development at the U.S. Army Armament Research, Development and Engineering Center at the Picatinny Arsenal, Dover, NJ, has been fired at velocities up to 14,200 feet per second (FPS) during tests, said Jerry Whitaker, spokesperson for the Arsenal. In comparison, an M16 rifle bullet travels at slightly more than 3,000 fps.

The EM gun has two opposing, copper rails to conduct electricity and the projectile has a copper base that contacts both rails. Upon triggering, an electrical current goes up one rail to the projectile, through its copper base to the other rail, and the projectile is hurtled out of the barrel. Plastic projectiles have ripped through steel plates (see picture).

The EM gun is big, about 20 feet long, and weighs 12 tons. In addition to its 12-foot long copper rails, the gun is comprised of a homopolar generator, a motor, an inductor and a switch. Some 2 million amperes of current are needed to fire the gun, enough to light San Diego for a fraction of a second, said Dr. Ted Gora, physicist and chief of ARDEC's electro-magnetic propulsion lab.

The Army is exploring the use of EM propulsion in tactical weapons to include tanks, howitzers and, eventually, hand-held weapons. With a potential muzzle velocity of 14,200 fps, no lead would be required to hit a moving target.

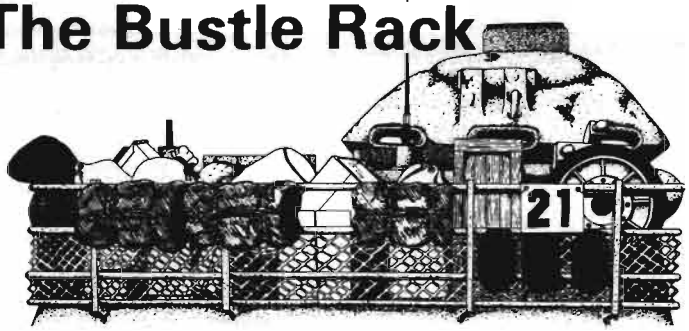
Full development of the EM propulsion gun and its hand-held variations may take up to 10 years, said Dr. Gora. "Right now, we're a little beyond where the Wright Brothers were," he said. "We think with a strong push, very advanced electromagnetic weapons can be around in about 10 years."

Revised Armor Advanced Course Dates Set

The Armor School has decided to implement a revised Armor Officer Advanced Course (AOAC). Beginning with Class 87-3, 24 January 87, small group instruction will be used. AOAC class size will increase and the number of classes held yearly will drop from eight to four. The even-numbered advanced course classes (87-4, 87-6, and 87-8) will be deleted. The following FY 87 advanced course classes have been scheduled:

87-3	24 Jan - 16 Jun 87
87-5	19 Apr - 9 Sep 87
87-7	12 Jul - 4 Dec 87

The Bustle Rack



Low Intensity Conflict Symposium

The United States Southern Command (SOUTHCOM) and the U.S. Army Material Command (AMC) are jointly sponsoring a symposium on Low Intensity Conflict (LIC) in cooperation with the American Defense Preparedness Association.

The symposium will be conducted 4 and 5 March 1987 at the Naval Training Center in Orlando, FL. The symposium will address these aspects of LIC: The political-military perspective; global aspects of the LIC threat; implications of LIC for U.S. forces; DOD organizational structure for LIC; logistics and engineering; C3I; combat and mobility (land forces, aviation, and "brown water"); materiel requirements and future development for LIC; and training.

The symposium is unclassified except for one session on C3I which will be Secret/No Foreign. The purpose of the symposium is to apprise industry of LIC developments and materiel requirements. More than 400 managers, engineers and scientists from the DOD RDA community, as well as industry, are expected to attend. For additional information call AMC's Project Office for Low Intensity Conflict, located at the Belvoir Research, Development and Engineering Center on Autovon 354-6873 or commercial (703) 664-6873.

1st Armored Division Gets M1A1s

First Armored Division ("Ironsides") tank battalions have begun accepting the M1A1, the improved version of the M1 Abrams main battle tank. The complete changeover from the M60A3 series is expected to be completed within two years, said Major Thomas Van Wormer, USAREUR systems coordinator.

The changeover will be made at 7th CATC, Vilseck, Germany, where crew and mechanic training will be held. Master Gunners will take the M1A1 Master Gunner Course at Fort Knox, KY, and radio mechanics will be schooled at Bad Toelz, Germany.

The M1A1 mounts the new, U.S. version of the German 120-mm main gun with a muzzle velocity of 5,400 feet per second. The new tank has "additional armor with increased ballistic protection to enhance crew survivability," and weighs 62.9 tons compared to the M1's 60 tons.

"The M1A1's 120-mm gun will destroy anything on the battlefield for years to come," said Major Wormer. "It (the tank) is easy to maintain. It's even easier to maintain than the M1, and that tank is significantly easier to maintain than the M60-series tanks," he said.

BOOKS

TO THE HALLS OF THE MONTEZUMAS: The Mexican War in the American Imagination, by Robert W. Johannsen. Oxford University Press, New York, 1985. 363 pages. $25.00.

This is not a conventional military history of the Mexican-American War of 1846-1848. It has little to do with the strategy, tactics, and military leadership of that war. Rather, what is examined is the popular perception of that war, or what that war meant to the American people. In following this vein, the author presents a fascinating picture of mid-Nineteenth Century Americans, along with a glimpse of the origins of our contemporary attitudes toward war.

The Mexican-American War was this country's first foreign war and it was our first war to produce a voluminous literature written primarily by the participants. That war provided many Americans with their first look at a foreign culture and this had two results. For some, it created a greater understanding of the Mexican people, but for others, it reinforced ambient racist attitudes, that the Mexicans were incapable of governing themselves without the enlightment provided by American democratic institutions.

The writings of that period reflect the contemporary fascination with romanticism and patriotism. Officers who died in battle were often glorified and likened to heroes of the American Revolution. The reason for this, Johannsen says was the anxiety felt by many Americans of that period over their national identity. Many Americans felt that the war proved that the virtues of democratic republicanism were still strong in an age when materialism seemed to be replacing the lost ardor of the Revolutionary era. The fact that Republican America had to prove itself by conquering another country is a contradiction which seemed to escape Americans of the 1840s.

The book is well worth reading for two reasons: Not only for its insights into the minds of Americans of that period, but also for the way in which it challenges the reader to think about the popular perceptions of today's military. The American people of the 1880s identified their democratic institutions with progress and their army with conquest: How do we regard our form of government and our armed forces today? What do today's expressions of patriotism tell us about how the American people view their armed forces? Here we have a good starting point for the consideration of these and other important questions.

ROBERT E. KELLS, JR.
CPT, Infantry
Ft. Monmouth, NJ

Education in the Desert

Dragons at War, 2-34th Infantry in the Mojave, by Daniel P. Bolger, Presidio Press, Novato, CA. 338 pages. $18.95.

Dragons at War is the closest thing to being at the National Training Center (NTC) without having to strap on the MILES harness and going toe-to-toe with the dreaded Opposing Force (OPFOR). This book is well-written and provides a comprehensive look at the 2-34th Mechanized Infantry Battalion's (Dragons) preparation and performance during NTC rotation 1-13 (October 1983). Captain Bolger provides enough basic information about the NTC, observers/controllers (OCs), the Multiple Integrated Laser Engagement System (MILES) and the equipment and men of the OPFOR, so that everyone will enjoy reading about the Dragons' NTC experience.

Bolger provides a candid look at the leaders of 2-34 Infantry and their actions, good or bad. At the NTC, every error is detected either by man or electronic monitors, and after the first scathing after action review (AAR), all participants realize that no mistake is overlooked or ignored. Captain Bolger pulls no punches and explains in stark detail how mistakes in decision-making and leadership ultimately cause defeat and loss of life, even if the death is an artificial one caused by the MILES.

Tacticians often advise to never violate a principle of war, but they seldom explain why. In *Dragons at War,* one can read how breaches of a principle, such as lack of security, can cause a battalion to fall victim to the ever-watchful OPFOR. Company- and battalion-level doctrine is explained, and Bolger recounts the various tactical missions (e.g. movement to contact, night attack and others) given to the Dragons. This book provides examples for the reader to learn and applies the doctrine in realistic and understandable tactical situations.

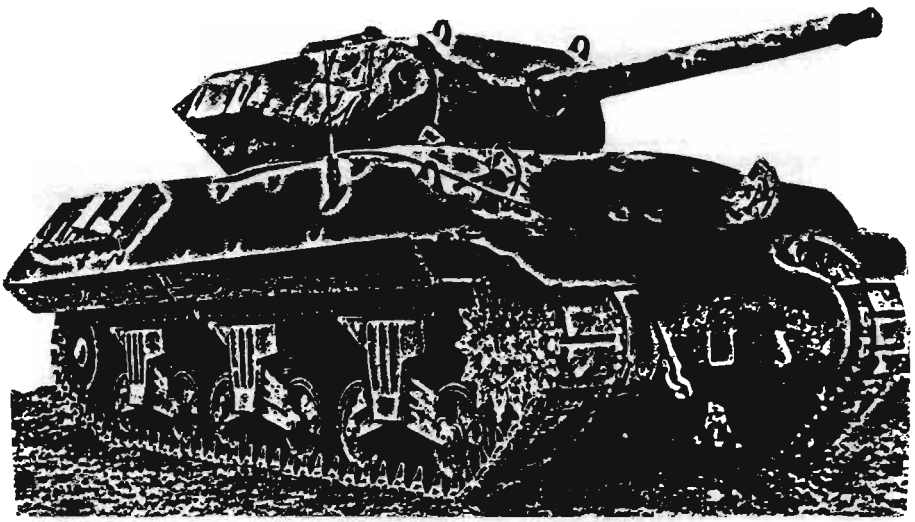
Although the battles are elaborately explained, the graphics should have been in more detail. All of the battle illustrations look as if they were computer-generated, and this look of artificiality detracts from the book.

The reader may or may not agree with Bolger's philosophical view of the "Great Game" and that many officers think they must play it in order to win or advance their career. But the fear of being portrayed as an incompetent officer during an AAR in front of senior officers causes NTC participants to think they are playing a "Great Game."

I recommend this book to all leaders and especially for officers who are preparing for an NTC rotation. This is a book that several officers desired to have authored after their own experience at the NTC, but were either too dazed or exhausted to write. Bolger views the NTC as leader training, and everyone who reads this book will benefit from one leader's viewpoint of his education at the NTC.

ARMOR D. BROWN
CPT, Armor
Garlstedt, Germany

SEEK, STRIKE, DESTROY: History of the 636th Tank Destroyer Battalion, by Tom Sherman. Tom Sherman, Rt 1, Box 129, Marquette, NE 68854. 243 pages. $27.00.



Most unit histories are written by retired officers, often generals. This one, however, comes from the typewriter of an ex-enlisted man and probably has more truth in it about the 636th's battles than any formal history could possibly include.

The 636th was a separate battalion that got around a lot during WW II. It served, primarily, with the 36th Infantry Division, but it — or units from it — served with the 3d, 45th, 34th, 1st and 14th Armored Divisions. It was with the Sixth and Second Corps on occasion and also with the New Zealanders and the British. It took part in seven campaigns and two D-Day landings while a part of the 5th, 7th, and 3d Armies, and collected its share of unit decorations, including the French Croix de Guerre with Palm.

It seems to be a truism that most books written about WW II have been written by people who didn't know the difference between a tank and a tank destroyer. Tom Sherman explains: A tank is a tank and a tank destroyer destroys tanks — and provides direct and indirect fire support to the infantry, acts as a reconnaissance force, and does a lot of other things that the tank destroyer designers never thought of.

Sherman's history is necessarily written from the enlisted man's point of view and it loses nothing by that. He was a sergeant in the reconnaissance platoon of the 636th and saw his share of action and hilarious incidents. He worked for a number of years collecting anecdotes and remembrances from former 636th members, as well as from official histories, and has turned out a very creditable account of the 636th's war years, one that will be an outstanding item for all ex-tank destroyers to own, whether or not they called the 636th their own.

ARMOR Staff

KRINKELT-ROCHERATH: The Battle for the Twin Villages, by William C. C. Cavanagh. Christopher Publishing, Norwell, MA, 1986. 193 pages. $22.50.

The Battle for Krinkelt-Rocherath, two connecting villages in eastern Belgium, will not roll off the tongue or be instantly recognized by Americans. It should. The brilliant and bitter defense of these small villages and their approaches was the key to the failure of the German Ardennes offensive. St. Vith and Bastogne have captured history's headlines but both would probably have been overrun before their defenses were organized if the 99th and 2nd Infantry Divisions had not stopped the German *main* attack.

The 99th Division had been in Europe only a month and had suffered the same difficulties as the 106th Infantry Division, which lay to the south. When the 14th Cavalry Group disintegrated under the attack of the 1st SS Panzer Division, both divisions had an open flank, the 99th to the south, the 106th to the north. Unlike the 106th, however, the 99th Division was able to prevent encirclement. Fighting back, inch by stubborn inch, the 99th and 2nd Infantry Divisions defeated the attacks of two SS panzer divisions, three Volksgrenadier divisions, and a parachute division and destroyed at least 111 enemy tanks, assault guns and armored vehicles. With the 6th Panzer Army defeated, German effort shifted to the south to what had been the supporting attack of the 5th Panzer Army. This is a great story.

Mr. Cavanagh has written a good book on this key part of the Battle of the Bulge. He has corresponded with many of the participants and has drawn on the official sources as well. The text is brief but supplemented by many photographs that convey more than another 100 pages of prose could. The maps, unfortunately, do not support the narrative. Some places discussed in the text are not included in the maps. This is to be expected, since the maps are reprints from Charles McDonald's *A Time for Trumpets,* which tells the whole story of the Bulge. As a long-time resident of the area, the author could have done better by his reader. The book is a good one, however, and the many photographs make it worth the price — barely.

CHARLES D. MCFETRIDGE
MAJ, Armor
Ft. Knox, KY

MODERN SOVIET ARMOR, by Steven J. Zaloga. Prentice-Hall, Inc., Englewood Cliffs, NJ, 1979. 88 pages. Hardcover, $14.95.

This thin book contains in brief form an excellent history of the development of Soviet armor from World War II through the late 1970s. Photographs and drawings have been skillfully used, and the text flows interestingly despite the wealth of technical detail presented. Tables of characteristics are well-organized, with the major vehicles receiving extensive treatment. Although concentrating on major types, the author has provided insight on many minor variants. Included are vehicles of distinctive type developed by the Warsaw Pact nations and China.

In order to cover the subject matter in a logical sequence, the book is divided into sections on battle tanks, infantry combat vehicles, airborne combat vehicles, reconnaissance vehicles and tank destroyer derivations, mechanized artillery, and mechanized air defense. These are at times difficult divisions, as the Soviets borrow freely from various chassis, hull, and automotive families to produce vehicles for different uses, but the author handles this problem well.

Particular note should be taken of a series of sketches on page 16 which provides a means of identifying the several variants of the easily confused T-54/T-55 tank family. These alone are worth the price of the book. It is also interesting to note the drawing, picture, and text concerning the SU-130 and ISU-130 assault guns. This is likely the first time these vehicles were seen in such detail in U.S. publications, but they have been subsequently described in various places — even confirmed by Victor Suvorov. The comparisons between Warsaw Pact and NATO tanks on pages 28-30 are very fine, although points made and conclusions drawn may provide room for experts to generate discussions of their own.

Tankers, historians, armor buffs — this is a good book for your book shelf. In a single, inexpensive volume there is no better book which covers the spectrum of Soviet armor at this time, even though the book is six years old.

LEO D. JOHNS
COL, USA (Retired)
Newport News, VA

New Book Is a Guide to Self-Development

THE CHALLENGE OF COMMAND, by Colonel Roger H. Nye, Avery Publishing Group, Wayne, NJ, 1986.

Johann Ewald, a Hessian officer posted with the British forces during the Revolutionary War, wrote in 1777 that "I must admit that when we examined a haversack of the enemy [American Revolutionary officers], which contained only two shirts, we also found the most excellent military books translated into their language."

Those first American officers had to train themselves, for only a few had seen service during the French and Indian War some twenty years previous. From its very beginning, the United States Army officer corps has been filled with a rich tradition of self-education, primarily through reading and travel. Names like Winfield Scott, Dennis Hart Mahan, Sylvanus Thayer, Robert E. Lee, Emory Upton, and George S. Patton, Jr. spring quickly to mind as we review those self-made, self-educated giants of our past. Not long ago, Colonel Tom Griess, former Head of the Department of History at West Point, asked the question, "How does one educate oneself for the grave responsibilities of leadership on the battlefield?" The answer to Colonel Griess' rhetorical question was first offered by our Revolutionary War predecessors and his question continues to be answered today by officers young and old, junior and senior, at far-flung bases and postings around the world.

If Johann Ewald were to sort through our haversacks today, we would be well served if he were to find a copy of *The Challenge of Command* by Colonel Roger H. Nye, who culminated a splendid Army career with his duty as Professor in the Department of History at the U.S. Military Academy. Roger Nye has produced, in less than 200 pages, an incomparable blueprint for professional development — an articulate guide through the great works of the history of military command that will deepen and enrich our understanding of the profession of arms. From lieutenant through general, there is something here for everyone — an undiscovered biography, a contrasting view of a favorite battle captain, or a new work by a modern critic.

As with many other great military historians, Colonel Nye points out clearly that the study of *man* stands at the centerpiece of a serious study of military history. General Patton, in a letter to his son on the eve of D-Day 1944, pointed out that "To be a successful soldier, you must know history....What you must know is how *man* reacts." Earlier in our history, Admiral Farragut likewise had advised his son, "Remember also, that one of the requisite studies for an officer is *man*." Colonel Nye helps in furthering our understanding of the military man by viewing our profession through the eyes of the commander. He underscores the point that all of us should focus our professional reading on the study of command. He bases this assertion on the premise that we will all perform better in our assigned duties — as specialists, staff officers, instructors, or commanders — if the common study of command serves as the cohesive factor for our professional development. Colonel Nye sums it up well when he states that "...the proper study of military command is military commanders."

Chief of Staff of the Army General Douglas MacArthur, in his 1935 report to the Secretary of War, highlighted the essentiality of serious study of military history: "More than most professions, the military is forced to depend upon intelligent interpretation of the past for signposts charting the future." In addition to broadening our vision and arousing our curiosity, Colonel Nye in *The Challenge of Command* has generously provided us a sketch map as we continue our intelligent interpretation of the past.

COLONEL MIKE SHALER
National War College
Washington, D.C.

Armor Association Publishes First Volume in a New Series

LEADERSHIP: Volume I of the Cavalry and Armor Heritage Series, LTC Burton S. Boudinot (USA, Ret.) and LTC Royce Taylor (USA, Ret.), editors. The United States Armor Association, Fort Knox, KY. 256 pages. $25.00.

The first volume in a planned series of ten on all aspects of Cavalry and Armor, *Leadership* is an impressive collection of selected articles from *The Journal of the U.S. Cavalry Association, Cavalry Journal, Armored Cavalry Journal,* and *Armor.* The articles range from the first issue of the journal in 1888 to those appearing in *Armor* in 1985.

Edited and compiled by Burton S. Boudinot and Royce Taylor, both past editors of *Armor,* the volume illustrates for present and future leaders the ideas, concepts, and experiences of past leaders from all ranks. For these men, successful command was, and remains, the result of successful leadership. To be a successful leader required technical and tactical knowledge, but more importantly, practice.

Today, command of troops is the exception rather than the rule, but we are all leaders. As the writers of these stories discovered, when the clouds of war break into actual storm, good leaders — from platoon to army level — determine victory or defeat for the soldiers they lead and the nation they serve.

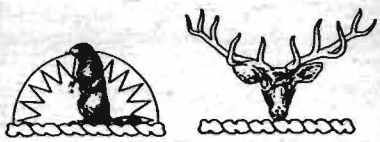
Richly bound, the volume is full of stimulating articles that will provide the modern leader with insight into leading and commanding. The book, and its follow-on volumes, are long overdue. They will make superb additions to any military professional's library.

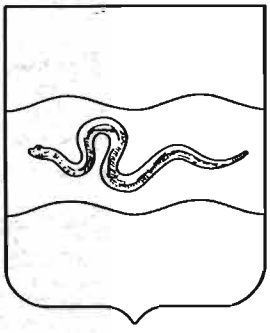
ARMOR Staff
Ft. Knox, KY

109th Armor Unit History

CONTINUED FROM BACK COVER

Headquarters Troop, 2d Squadron (Pocatello), entitled to:
French Croix de Guerre with Silver Star, World War II, Streamer embroidered PONT-BROCARD (183d Field Artillery Battalion cited; DA GO 43, 1950)
Cited in the Order of the Day of the Belgian Army for action in the ARDENNES (183d Field Artillery Battalion cited; DA GO 43, 1950)
Philippine Presidential Unit Citation, Streamer embroidered 17 OCTOBER 1944 to 4 JULY 1945 (116th Engineer Combat Battalion cited; DA GO 47, 1950)
Troop E (Blackfoot) and Troop G (Burley) each entitled to:
Philippine Presidential Unit Citation, Streamer embroidered 17 OCTOBER 1944 to 4 JULY 1945 (41st Infantry Division and 116th Engineer Combat Battalion cited; DA GO 47, 1950)





Symbolism

The shield is yellow for cavalry. The fess wavy and the gliding snake represent the Snake River, in the valley of which the regiment originally was located.

Distinctive Insignia

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

116th Armored Cavalry

Sine Mora (Without Delay)

Lineage and Honors

Constituted 4 March 1920 and allotted to the Idaho National Guard as the 1st Cavalry. Organized during March-November 1920 in the valley of the Snake River. Redesignated 12 October 1921 as the 116th Cavalry, an element of the 24th Cavalry Division (less the 2d Squadron, not allotted to Idaho until late in 1924).

116th Cavalry (less 3d Squadron) converted and redesignated 16 September 1940 as the 183d Field Artillery and relieved from assignment to the 24th Cavalry Division (3d Squadron reorganized as elements of the 148th Field Artillery — hereafter separate lineages). Inducted into Federal service 1 April 1941 at Boise.

Regiment broken up 8 February 1943 and its elements reorganized and redesignated as follows: Headquarters and Headquarters Battery as Headquarters and Headquarters Battery, 183d Field Artillery Group; 1st and 2d Battalions as the 183d and 951st Field Artillery Battalions, respectively.

After 8 February 1943, the above units underwent changes as follows:

Headquarters and Headquarters Battery, 183d Field Artillery Group, inactivated 21 October 1945 at Camp Myles Standish, Massachusetts; converted, reorganized, redesignated, and Federally recognized 8 and 10 January 1947 as elements of the 116th Mechanized Cavalry Reconnaissance Squadron (southwestern Idaho) and the 183d Infantry (southeastern Idaho).

183d Field Artillery Battalion inactivated 30 October 1945 at Camp Myles Standish, Massachusetts; converted, reorganized, redesignated, and Federally recognized 10 January 1947 as elements of the 183d Infantry (southeastern Idaho).

951st Field Artillery Battalion inactivated 13 October 1945 at Camp Myles Standish, Massachusetts; converted, reorganized, redesignated, and Federally recognized 8 January 1947 as the 116th Mechanized Cavalry Reconnaissance Squadron (southwestern Idaho).

183d Infantry (less 3d Battalion) and the 116th Mechanized Cavalry Reconnaissance Squadron consolidated, reorganized, and redesignated 12 September 1949 as the 116th Armored Cavalry (3d Battalion, 183d Infantry, concurrently reorganized and redesignated as the 116th Engineer Combat Battalion — hereafter separate lineage). (3d Squadron, 116th Armored Cavalry, allotted 15 December 1967 to the Nevada Army National Guard —separate lineage).

Home Area: Southern Idaho (less 3d Squadron in Nevada).

Campaign Participation Credit

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

Headquarters Troop, 2d Squadron (Pocatello), additionally entitled to:

World War II — AP
Papua
New Guinea (with arrowhead)
Luzon
Southern Philippines

Troop E (Blackfoot) additionally entitled to:

World War II — AP
New Guinea
Luzon
Southern Philippines (with arrowhead)

Troop G (Burley) additionally entitled to:

World War II - AP
Papua
New Guinea (with arrowhead)
Luzon
Southern Philippines (with arrowhead)

Decorations

Headquarters Troop, 1st Squadron (Caldwell), and Howitzer Battery, 1st Squadron (Nampa), each entitled to:

Cited in the Order of the Day of the Belgian Army for action at the MEUSE RIVER (951st Field Artillery Battalion cited; DA GO 43, 1950)

Troop A (Gooding) and Troop C (Weiser) each entitled to:

French Croix de Guerre with Silver Star, World War II, Streamer embroidered PONT-BROCARD (183d Field Artillery Battalion cited; DA GO 43, 1950)

Cited in the Order of the Day of the Belgian Army for action in the ARDENNES (183d Field Artillery Battalion cited: DA GO 43, 1950)

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