ARMOR

50th Anniversary U.S. Armored Force

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PB 17-90-1 **January-February 1990**

Tank Tracks

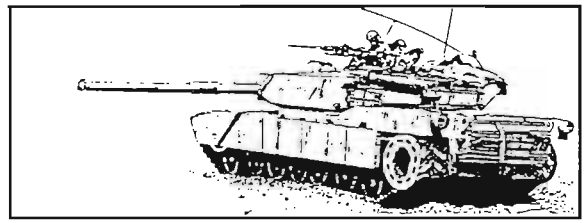
The most visible symbol of totalitarianism, the raison d'etre for large, standing Western armies, has sprouted fissures large enough to drive a tank through. The "Iron Curtain" has seemingly transformed itself from within to a curtain of loosely-woven lace. We have called for this for three generations, and, now that it has happened, we find ourselves contemplating our collective navel for answers about the future.

How ironic that as we ready ourselves to celebrate the 50th anniversary of the Armored Force's creation, we find ourselves concerned with justifying its very existence. Exist it will. But in what shape? What will our primary weapon systems be? What do we do with all the old new stuff we've received over the last decade? There are certainly tough decisions about force structure, stationing, and equipment procurement that lie ahead. So, we offer a few suggestions.

- The heavy force should volunteer for the drug war. Line the borders and known dealer corners in major cities with tanks.

- Donate tanks to towns and villages for placement in town squares and near flagpoles. That WWII stuff gets tiresome after a half-century.

- Put our tanks and Bradleys in storage and buy something like this –



though a tad less survivable, think how many you could get in a C-130. (Note the three-man crew.)

- Like the Soviets do, convert tanks for use in the agricultural sector. (The "farm implements" will come in handy here, as well.)

- Sell batches of vehicles and spare parts to the artistic community. They can weld them together in goofy ways to form modern sculpture to grace the lawns of large government and commercial office complexes.

- Sell tanks and CFVs to the people who bring us monster truck challenges. The motorcycle guys could jump rows of them, too, and a demolition derby might be interesting and make for good TV.

- The Patton Museum will take one of each of everything.

Though I have taken a tongue-in-cheek view, this is not the time to exaggerate the rumors of the death of the heavy force in prematurely-written obituaries, but a time to find new applications for shock effect, firepower, and mobility. The lighter organizations of our Army will tend to make up a larger proportion of the force and therefore a larger share of the burden in future conflicts. So, perhaps the time is ripe to push again the armored gun system, a lighter, more easily deployed system than the Abrams. Fix divisional cavalry. Light cavalry would fit the bill nicely.

Whatever the future path, we cannot rotate on our thumbs and give up the initiative. We must take the attitude of the old cavalry trooper, who, while gazing at a steaming pile of manure, remarked, "There must be a pony in there somewhere." Happy 1990!

– PJC

By Order of the Secretary of the Army:
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ARMOR

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January-February 1990, Vol XCIX No. 1

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LETTERS

Comments on Cavalry

Dear Sir:

The September-October 1989 issue of Armor included several thought-provoking articles and letters concerning the organization, training, and equipment of the Army's scouts/cavalry. MG Robert E. Wagner's "Division Cavalry: The Broken Sabre" very adeptly pointed out key flaws in the division cavalry squadron. Two letters concerning light scouts; however, missed the mark entirely.

MG Wagner's article raises serious questions concerning the current division cavalry organization. They are similar to the comments made in this very publication last year by Colonel (P) Jarrett Robertson. The Army has managed to take a combined arms organization, proven in combat, and disassemble it to the point it cannot perform the doctrinal missions outlined in FM 17-95, Cavalry Doctrine. I think several points made by MG Wagner require additional emphasis, given the current state of funds in the Army.

First, the air troops by almost everyone's definition are too small and lack staying power. Further, they lack a true, day/night capability and the targeting systems to exploit our precision guided munitions or TACFIRE system. Replacing MG Wagner's 3 x 6 OH-58 platoons with a 3 x 6 AH-58D system would put a formidable day/night recon platform, equipped for self-defense and fire support coordination, in the cavalry. Moreover, this would reduce the number of different airframes in the division and provide commonality wth the GS Target Acquisition Platoon already fielded. We could achieve this with rebuilt OH-58 airframes.

Secondly, the concept of teamwork cannot be overstressed. Presently, heavy divisions "rob Peter to pay Paul," i.e.: combat assets from the maneuver brigades are put together on an ad hoc basis to allow the cavalry to conduct its missions. Having been a part of an organization such as this for over 16 months now, the only way this organization works is when the division commander commits the entire division to it. This includes all training, gunnery, training guidance, etc. As MG Wagner stated, we must train as we will fight. Therefore, at a minimum, two four-

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tank platoons should be added to each ground troop. When funding becomes available, the third ground troop is a must. If combat forces need to be reallocated due to fiscal constraints or manpower, so be it. It was done for the needed light forces, it can be done for the division cavalry. Finally, should these changes take place, we must fix the cavalry logistical system. It must be augmented now to the point where fuel tankers, aid vehicles, cargo vehicles, and additional maintenance assets are required due to TO&E shortages. Given our modern equipment, logistics will be a war stopper!

As for SGT Johnston and the flaws he sees in the "Light Scout" concept, he has missed the mark. First, the scouts are not "light." The premise is that scout platoons at TF and brigade need a "stealthy" vehicle to perform certain recon functions, in addition to the M3. The OPFOR used to use motorcycles for this role, until safety considerations caused them to be removed. Further, according to data gained during the 24th ID test rotation, the combined M3/HMMWV organization worked quite well. Moreover, the comment, "What good is it to have excellent overwatch when everyone knows you're there?," really is not germane. That very same thing could be said about any offensive operation that uses overwatch. Further, the key is stealth and using the vertical plan, not dashing "extremely fast over unfamiliar terrain."

SSG Jett's comments, though not far off, still miss the target. First, I do not believe the Armor School is reinventing "light scouts." The concept was first used in WWII when jeeps armed with machine guns or recoilless rifles were used in cavalry recon and still later (1970s) as gun jeeps in cavalry platoons. Next, if the Stinger missile can be used by relatively uneducated guerrillas in Afghanistan, SSG Jett's 19Ds should be able to learn quickly enough. Moreover, there is never enough ADA, given the odds we may face in any future conflict. Finally, 19Ds are not primarily armor oriented. The MOS is scout, not armor or infantry scout. The primary focus again is on stealth, using the vertical plan, reporting, and being the eyes and ears of the commander. The unit may be different, a HMMWV may be used instead of an M3, or the mission may be the DMZ in Korea, but the principles remain the same. If we train a soldier correctly, we would not have to worry about his MOS – 11D or 19D. By the way, the SQT will be METL driven sometime in the near future.

DOUGLAS J. MORRISON
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Fort Riley, Kan.

Cav Needs "Hardening"

Dear Sir:

Every time a surrogate Soviet-equipped and organized reconnaissance unit develops good intelligence about my dispositions and then hangs around, if undetected, to kick my butt, I wonder at the organization of the divisional cavalry squadron because of its positioning and lack of tanks. MG Wagner has it right in your September-October issue as he discusses the organization of that all-important entity.

The current squadron's positioning in the combat aviation brigade is clearly wrong. I suspect that the aviation maintenance boogeyman drove this. The squadron is a key divisional force and therefore should be commanded and controlled by the division. This represents a logical train-to-fight scenario.

Fundamental to reconnaissance operations, which are the cornerstone of all cavalry operations, has always been the fact that the force conducting reconnaissance must be prepared to fight to get information. Hence the clear need for tanks and the "hard combat capability" MG Wagner refers to. To blow this off with an ad hoc solution hazards the yield normally associated with ad hoc solutions, and that is rarely positive. If we truly expect divisional cavalry to do reconnaissance, security, and economy of force, it must have the day-in and day-out structure to train to do this. It is interesting to note that every other major army in the world currently provides organic tanks with its reconnaissance units. Certainly, all of our potential foes do this and doctrinally stress the need to fight to gain information. Can we readily expect our divisional eyes and ears to do less?

A recent excellent and insightful study by the Armor School indicates that divisional cavalry squadrons can expect to receive combat missions which doctrinally require tanks about 70 percent of the time. The guard mission features prominently in the list of security and economy of force missions a squadron could expect to receive. A driving operational consideration here is that no other combat arms battalion regularly trains for this mission, which makes it all the more vital to the squadron's repertoire. It's really kind of basic: when scout fights tank, scout loses. When scout finds enemy tank and hands off to tanks which are a part of his platoon, scout does much better, and the three traditional cavalry missions are eminently more executable. The proposed squadron discussed by MG Wagner is a compilation of a number of operational imperatives which have the considerable advantage of having worked over time. If it's not precisely the answer to the divisional cavalry squadron structure, it's not far off, and I've not seen a better, more workable solution! Lots of really talented and seasoned cavalrymen have indicated for nearly a decade that the current divisional cavalry squadron structure was broken. They're right. It is. MG Wagner's article captures the essence of the problem and poses a super solution.

A. J. BERGERON
Colonel, Armor
Cdr, 3rd Bde, 9ID (MTZ)
Ft. Lewis, Wash.

Task Force Scouts – Another Opinion

Dear Sir:

I read with great interest the article "HMMWVs and Scouts: Do They Mix" by Major Scribner in the July-August 1989 issue of Armor. As a tank battalion commander, I feel he has many very valid observations. The most precious commodity in war is information, and the most dangerous soldier on the battlefield is a well-trained scout with a pair of binoculars and a radio.

After having the opportunity to observe with the OPFOR at the NTC (there's that place again), I am convinced that the TF scouts deserve special consideration in the TOE and training, regardless of where the TF will fight. Also, the lessons learned at Ft. Irwin prove the importance of the recon/counter-recon battle. The success of the OPFOR recon efforts at the NTC, using wheeled and dismounted recon elements, should make us look and question.

Many studies, and some tests as discussed by Major Scribner, have been done on the proper vehicles of the TF scouts. I will not restate the excellent comments of Major Scribner, but submit that we must also look beyond the NTC to other deployment areas of the world, namely Europe.

In my opinion, the scout platoon should be equipped with four HMMWVs and four Light Armored Vehicles/25mm (LAV25s) with a crew of five in each vehicle (40 soldiers). This would allow the scout platoon to man up to eight dismounted teams and eight mounted teams in the battalion sector (16 dedicated sets of eyes and ears). METT-T would dictate the actual manning and mix of teams for each mission (the combinations are almost endless).

Use of an off-the-shelf vehicle such as the LAV25 means lower cost and faster fielding. The LAV25 gives the scouts

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COMMANDER'S HATCH

MG Thomas C. Foley

Commanding General

U.S. Army Armor Center

Thunderbolts for the 1990s

Some say the cold war is over. If not, to use a football analogy, it looks like we are nearing the end of the 4th quarter. In any event, world events are spurring a fundamental review of America's defense strategy and priorities. Questions abound concerning the role and makeup of our forces.

It is, of course, a coincidence that all this is occurring as we move into the decade of the 1990s. The start of a new decade is always a fitting time to reflect on the past as we move to the future. We recall these past years as a time of major challenge and great accomplishment. This is especially true for Armor and Cavalry – in terms of our sound doctrinal concepts and training, capable warfighting organizations, modern equipment, and, above all, our quality soldiers of all ranks. The unraveling of the Communist vision has been the work of many forces over time. All of America's military forces joined in holding the line for 45 years, while these events evolved. Yet we must remember that the very forward edge of this has been a combined arms team effort, especially of our own Armor and Cavalry soldiers. That is no coincidence.

The year 1990 is a particularly important year for the total armor force. We will celebrate the 50th anniversary of the creation of America's Armored Force that fought in WWII. We will also honor the 40th anniversary of the establishment of the Armor Branch and the start of the Korean War. Many activities and events are planned.

To look back 50 years can be most instructive. We in Armor can be very proud of our role in shaping the outcome of WWII and the 45-year, post-war period. After all, we are the force that conceived and embodied the concept of combined arms. Our motto "Forge the Thunderbolt" has one very simple meaning – create a powerful force of all arms that can strike with the speed of lightning. So it was that, starting in 1940, 16 armored divisions were formed. Each was a thunderbolt, built on the notion of all arms and services working together as a team. Each was led by leaders imbued with the soundness of mission-type orders and thoroughly schooled in the application of the factors of METT-T.

All of us are familiar with the basic facts concerning the creation of the Armored Force and the great difficulties the visionaries who preceded us faced in convincing our nation of the need for such a force. We paid dearly for our shortsightedness. We paid again, ten years later in 1950, having disarmed and disbanded much of our Army. Thus it is also fitting, as we prepare to look back on the creation of Armor Branch, that we recall our Army's inability to stop the enemy tanks that spearheaded the attack on South Korea.

So, it is important, as we review our role and makeup and forge the thunderbolt for the 1990s, that we heed the lessons of the past. Our world is still a dangerous place. Many hostile nations possess strong armored forces that can threaten our security and national interests. And so we have a need for strong and ready, mobile, armored, combined arms forces. The tank remains their centerpiece.

We must not look just at our heavy forces, but at our light forces as well. The total armor force has a role in each part of our Army – be it forward deployed, contingency,

Continued on Page 51

DRIVER'S SEAT

Some Candidates Still Arrive Unprepared For New, Small-Group ANCOC

A Guest Column by
Master Sergeant Donald L. Rogers

As the small-group concept of teaching armor advanced noncommissioned officers continues to grow, I feel the need to address some problems still inherent within the program. First, since the inception of the course in August 1988, it has become apparent that the individual soldier does not adequately prepare himself to arrive and attack the course with the same vigor and enthusiasm that he would for other major events like his battalion ARTEP or Table VIII.

Many times, we've reminded the Armor community that a soldier selected to attend the course must start preparing himself immediately. This includes, but is not limited to, his weight control, proficiency up through the Skill Level Three tasks, and physical fitness.

The introduction of the new ANCOC course brought a completely different approach to the school environment. The small-group instruction technique quickly identified those armor soldiers who were not up to date in the field, and also pointed out many factors that contributed to substandard performances at the platoon level.

As an effective armor force leader, many of you have been selected to move into branch-related duties, such as the Master Gunner Program and drill sergeant assignments, as well as recruiting and advisor duty. Although these are *bona fide* and demanding jobs, they can tend to affect a soldier's proficiency if he does not take steps to stay abreast of current information while performing such duties.

The student will be surprised if he arrives expecting the "old hat" method of instruction, where an instructor preached for a length of time and expected the student to recite the material on a test. The small-group method, in its most perfect form, requires the student to actually teach himself the material through interaction with the rest of his group. The small-group instructor merely facilitates this process and ensures that all students meet the standards of the learning objectives. This is a very difficult task!

Each group of 16 students learns from a small-group instructor, who is the subject-matter expert on all phases of training. The subject-matter expert is an NCO selected for his extensive background and experience, both as a platoon sergeant and/or platoon leader in armor and Cavalry TO&E units. The small-group instructor leaves the student with the rewarding feeling that he — and he alone — has achieved the course standard and meets all the characteristics of a professional noncommissioned officer in today's Army.

The course is tactics-oriented, with numerous examinations. Students execute tactics in a small-group environment, using sand tables for platoons, SIMNET, and Field Tactical Exercises for platoons and companies. During-action reviews and after-action reviews evaluate students throughout the exercises.

In summarizing the Advanced Noncommissioned Officers Course, it is imperative that everyone who is involved with the operation — from notification to completion — understands that only the motivation and extreme dedication of each and every soldier attending the course will allow successful completion and graduation.

In this never-ending process, the force's goal is to ultimately develop the professional attitude of everyone involved, and this goal is what makes qualified platoon sergeants and the future senior NCO leaders of our Armor Force.

Master Sergeant Donald L. Rogers joined the Army in 1974. He served with the 11th Armored Cavalry Regiment for five years, as a drill sergeant for three years, and with the 1st Armored Division for three years. He is currently the supervisor of small group leaders in the ANCOC course. He and the instructors wrote the POI for the current course in late 1987.

Armored Vehicle Recognition Quiz

Compiled by Dodd L. Caudill, Threat Division, DCD

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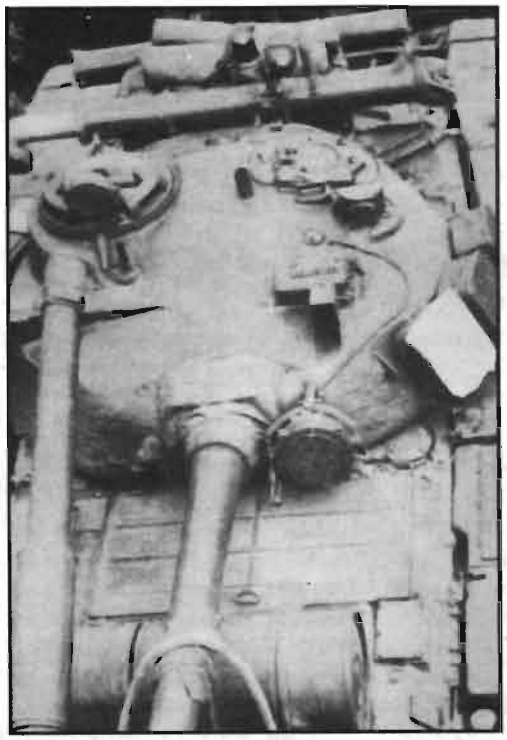

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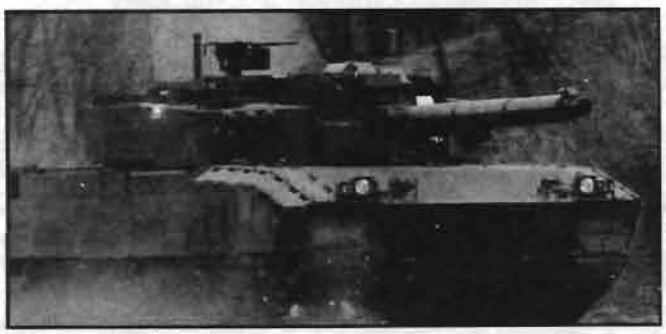

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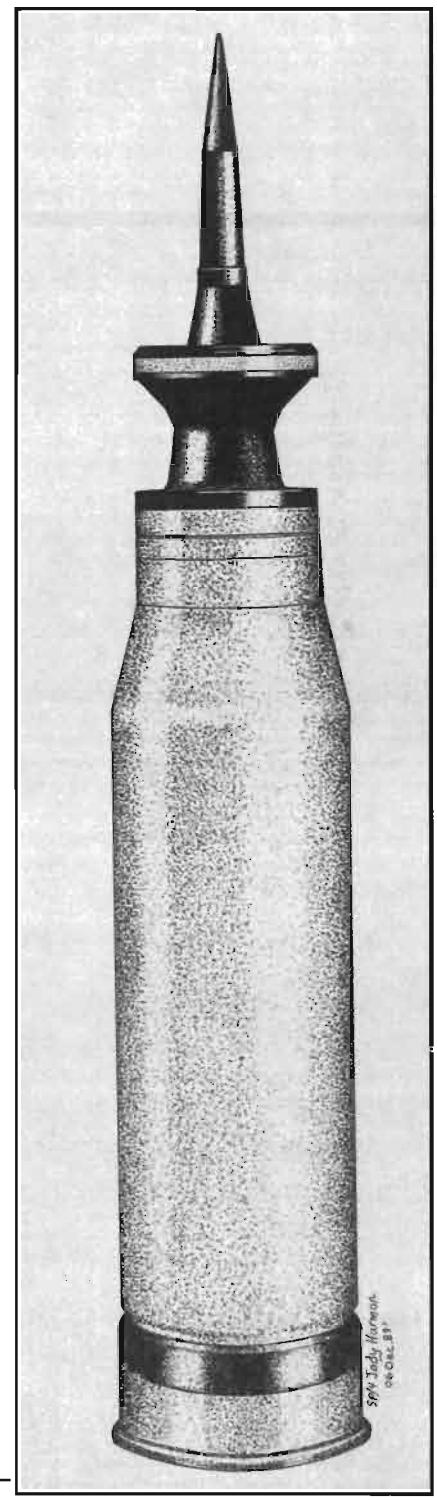
Answers on Page 47

120-mm Tank Main Gun Ammunition: An Accident Waiting to Happen?

by Captain Charles J. Koehler

The combustible canisters on 120-mm ammunition aren't durable enough in the field, posing a danger to crews and combat readiness



Is our 120-mm tank main gun ammunition an accident waiting to happen? I argue that it is.

I was an armor battalion support platoon leader in Kirchgoens, West Germany, for 22 months. During my tour, the battalion transitioned to the M1A1 Abrams tank with its 120-mm combustible sidewall canister ammunition.

In my experience of transporting, handling, uploading, and downloading both the service and training versions of the 120-mm combustible canister ammunition, I argue that this ammunition is not packaged for efficient transport and transfer, nor is the combustible canister durable enough to survive in a field environment. The ammunition is too susceptible to damage that will severely degrade its ballistic performance, and unnecessarily exposes our soldiers to fatal danger.

When packaged for bunker storage or transportation, the ammunition is individually packaged in a round airtight metal canister that opens at one end. There are 30 packaged metal containers, stacked six high and five wide, banded together on a metal platform. Eight of these pallets were designed to fit side-by-side on an M977 cargo HEMTT, with the openings facing outward. This configuration was specifically designed to significantly decrease the uploading time from truck to tank. In order to upload, two tanks would pull simultaneously alongside the HEMTT, the crews would then merely open the canister ends, and pull out the rounds. In theory, this is an ingenious idea that could significantly decrease the work and time required to upload a tank company. However, I experienced a discouraging problem.

The cargo bed of the M977 HEMTT is exactly 18 feet long and 92 inches wide. Straps fasten the cargo to metal eye hooks on the cargo bed. This reduces the usable width of the cargo bed from 92 inches to 87.5 inches. Each 30-round, 120-mm pallet is 38.75 inches wide, 46.5 inches high, and 44.5 inches long. When placed side by side with the openings facing outward, the total length of the two pallets is approximately 90 inches. The pallets cover up the eye hooks, and therefore cannot be properly secured to the truck during transport. The remaining space available on each side of the truck does not provide enough room for soldiers to properly and safely transfer the ammunition to the tank. This

"I believe that the vulnerability of the 120-mm combustible canister to absorb moisture when the protective shell is damaged severely degrades the ballistic performance of the round."

problem defeats the purpose of the quick downloading design of the 120-mm pallets. This means that the ammunition has to be downloaded, which is time consuming, or reconfigured with fewer pallets of main gun ammunition. However, this slight logistical problem is insignificant compared to the following.

As you know, tanks in Germany are uploaded with main gun ammunition in order to be prepared for war at any time. When my battalion received new M1A1s and 120-mm combustible canister ammunition, we followed suit and uploaded our new tanks.

We initially discovered defects in 30 percent of the rounds and had to turn them back to the ammunition supply point.

We also discovered that the combustible canister was not durable, and scratched very easily. Over time, with the normal uploading and downloading associated with services, borescope and pullover, annual ammunition inspections, and rotations to Grafenwoehr and Hohenfels, we noticed that the combustible canisters were getting scratched and worn. Particular areas of wear developed where the round rested in the ammunition rack. This occurred in approximately one third of the battalion's rounds, in less than a year.

The wear appeared to be due to the normal vibration of the moving tank. Initially, these scratches did not seem to be a problem. The real problem came when moisture from the inside of the ammunition storage areas attacked the scratched rounds. The rounds absorbed the moisture and were damaged. In one particular instance, one tank round in another battalion absorbed moisture to the extent that the combustible canister could easily be pressed in. The thousands of dollars worth of damage associated with the easily-damaged 120-mm combustible canister ammunition in Germany initiated the major decision to download many tank battalions.

I believe that the vulnerability of the 120-mm combustible canister to absorb moisture when the protective shell is damaged severely degrades the ballistic performance of the round. If the propellant absorbs moisture, I argue that the distance and penetrating ability of the 120-mm ammunition will be significantly altered. This effect would obviously degrade our tank-killing capability.

Logistically, the decision to download the main gun ammunition posed a serious problem. An armor battalion support platoon in Germany has 15 M977 cargo HEMTTS to transport ammunition and supplies. Because all of the main gun ammunition is now stored in bunkers, we can't transport a battalion's worth of war stock ammunition in one lift.

A support platoon now has to make several trips to the bunkers, which are very vulnerable to enemy attack, or must request additional transportation from division and corps, both of which have very limited assets. Using its own assets, the time it takes a battalion to be ready to fight will be lengthened substantially.

The vulnerability associated with the combustible canister is not solely a characteristic of the service version of the 120-mm ammunition. I have seen more pronounced effects when handling the 120-mm training round, due to the increased frequency of use during gunnery ranges at Grafenwoehr, Baumholder, and Bergen.

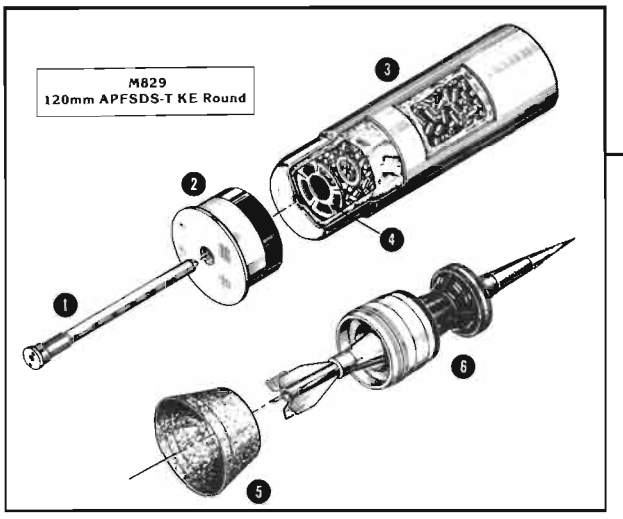
The 120-mm training round is palletized in wooden boxes and metal containers. Both types of palletized packaging pose the same HEMTT placement problems as the 120-mm service rounds. They would not fit properly on the HEMTT when placed side by side with the openings facing outward. This was not a problem, because gunnery ranges provide ammunition pads.

The severe problems associated with the combustible canister occurred during normal handling of the round during uploading, loading, firing, and downloading. During the handling, I observed big scratches, gouges, and – in at least two instances – holes that penetrated through the case to the propellant. (The propellant did not leak out of the combustible canister due to the protective cloth packaging surrounding the propellant.)

The scratches and holes made the rounds very vulnerable to moisture, which is abundantly present in ammo storage compartments and

Components of the 120-mm M829 KE round:

1. Primer
2. Base Case and seal ("Stub Base")
3. Combustible case and propellant
4. Spring clip and retaining ring
5. Case adapter
6. Four-segment sabot and projectile



on tank ranges in Germany. The tankers told me that they noticed several rounds fall short of their targets. Whether moisture-affected propellant caused these short-line rounds is hard to prove without controlled data. However, I believe that moisture could have a pronounced effect on the ballistics of the round.

More important, there were at least three occasions when I had to retrieve and turn in broken 120-mm rounds. The metal stub base would separate from the combustible sidewall canister when loaded and extracted from the breech. Loaders would try to extract and rotate the round 180 degrees during a misfire. To their surprise, the metal stub base would separate and fall to the turret floor. Of course the exposed propellant would alarm the tank crew, especially when there were several hot metal stub bases already present from previous firings.

Luckily, nobody was injured in our battalion due to the easily damaged combustible canister.

I believe that the non-durable combustible canister is too dangerous inside the turret, especially if the tank and crew are in a wartime situation. If a hot object comes in contact with the exposed combustible canister, it will burn and kill members of the tank crew. This preventable situation happened at Grafenwoehr when a hot metal base plate came in contact with the combustible canister of another round. The round burned and killed two soldiers.

Granted, training can prevent this, but I believe that a more durable tank round, and better equipment inside the tank, would have saved their lives. For starters, the device that deflects the spent metal base plates into the catcher needs to be mechanically foolproof and easily maintained. The hot spent metal base plates must remain away from the combustible canister ammunition. Tank crews cannot afford any mechanical deficiencies with this device.

Secondly, although the technical challenges involved in suppressing propellant fires, for rounds containing their own oxygenating agent, are substantial, the fire extinguisher system inside the M1A1 tank must be capable of putting out the specific type of fire caused by a burning 120-mm tank round.

Finally, the 120-mm tank round itself needs to be redesigned. I propose that the combustible sidewall canister be made more durable to survive the normal handling environment in a wartime armor force.

The sidewalls need to protect the round against heavy scratches and moisture. The overall palletized packaging, although a monumental improvement over its earlier counterpart, also needs to be shortened by 1.5 inches. This would expedite the uploading process from HEMTT to tank.

Presently, through my experiences as an armor battalion support platoon leader, I believe that our 120-mm combustible canister ammunition is too susceptible to damage and unnecessarily exposes our soldiers to fatal danger. If fatal accidents to our soldiers and damage to the ammunition occur during a peaceful training environment, I can just imagine the effects of inferior ammunition in a wartime situation. The armor force must remember that our multimillion-dollar M1A1 main battle tank is only as good as the ammunition it fires.

Captain Charles J. Koehler was commissioned in Armor from the U.S. Military Academy in 1985. After attending AOBC, he served as a tank platoon leader and support platoon leader with 2/5 Cav, 1st Cav Div. at Ft. Hood, Tex., a COHORT unit with which he transferred to FRG when it redesignated to 4-32 Armor, 3d AD. A recent graduate of AOAC, he is currently assigned to the Directorate of Combat Developments, U.S. Army Armor School.

Directorate of Combat Developments comments on "120-mm Tank Main Gun Ammunition: An Accident Waiting to Happen?"

This responds to problems with 120-mm ammunition CPT Koehler cited in the previous article, and updates the Armor community regarding ongoing corrective actions to resolve some of the problems. CPT Koehler raises some interesting and important issues regarding the safety of 120-mm tank main gun ammunition. His initiative in raising these issues for discussion is commendable. Some of these issues certainly require further investigation and corrective action.

I must take exception to CPT Koehler's first point, "that [120-mm] ammunition is not packaged for efficient transport and transfer." All U.S.-produced 120-mm service ammunition and all new training ammunition is packaged in metal canisters. Thirty of these canisters are stacked and bound to form an all metal pallet 44 1/2 inches long, by 39 1/2 inches wide, by 51 1/2 inches high. The *raison d'etre* for this alternative to the age-old wooden box, fiber-tube packaging is improved transportability and handling throughout the ammunition distribution systems, especially in delivering a readily accessible, clean round of ammunition to the using tank crews.

To make its point, the article zeroes in on surface transport of the ammo pallet by the M977 cargo HEMTT and subsequent ammo transfer from this truck to a tank. During pallet design particular emphasis was placed on safe, efficient transport by the HEMTT. However, transportation and transfer of palletized ammunition is a vast area, encompassing many modes of transportation and transfer by a variety of materiel handling equipment. Packaged 120-mm ammunition must also be transported in rotary and fixed-wing aircraft, ships, railcars, and wheeled and tracked vehicles. It must be easily and efficiently packed into ISO, CONEX, and MILVAN containers. Lifting eyes on the pallet top allow attachment of a variety of slings for handling and transfer by crane. The pallet bottom is designed for four-way forklift access. In the event that a unit must manually transfer packaged ammunition, the pallet is designed for quick disassembly to handle the metal canisters individually.

While in the canister, the 120-mm round is protected from the environment, to include NBC contamination. Thorough testing has demonstrated that palletized ammunition is adequately protected from the rough handling when it is transported cross-country or dropped from the bed of a truck.

When the 30-round metal pallet was developed, the alternative was the World War II-vintage 20-round wooden box, fiber-tube packaging. The development of the 30-round metal pallet, similar in length and width dimensions to its wooden box counterpart, enabled 240 rounds to be loaded on a HEMTT, as opposed to 160 rounds in the boxed configuration. This has enabled nearly a 50 percent reduction in transportation and storage costs for the 120-mm Ammunition Program. Five additional HEMTTs would have been required to transport the basic load for the M1A1 battalion in the old 20-round containers.

Many readers are quite familiar with the old procedures for unloading boxed ammo from its transporter, unpacking the round, and uploading the tank. Under the best conditions, three men (one on the ground, one standing on the tank fender, one inside the tank) required about 35 minutes to upload a tank.

During the M1A1 Follow-on Evaluation at Fort Bliss, Texas, in October 1986, two tanks could pull up on each side of a HEMTT, dismount one crewman on the fender of the tank, and begin uploading. Upload times of 10-13 minutes were consistent.

CPT Koehler says the inability to use the HEMTT sideboard as a loading platform when transferring rounds to the tank is a problem. It was because of the demonstrated ease of using the tank fender as the loading platform, while bracing one foot against the edge of the truck bed, that an earlier effort to reinforce the HEMTT side boards was abandoned. The Armor School Directorate of Combat Developments will re-evaluate this situation to determine if reinforced side boards are necessary.

That CPT Koehler did not have access to the proper loading diagrams to load and secure eight ammo pallets on a HEMTT with the end openings facing outward is most discouraging. The approved U.S. Army Defense Ammunition Center and School load diagrams are on page 36 of AMC Drawing 1948-4901/3 CA17Q2, April 1987. Though previously distributed, Project-Manager-Ammunition Logistics will redsitribute to all tank battalions because of CPT Koehler's article. Ammunition Quality Assurance inspectors will emphasize availability of these drawings and will provide

them, on the spot, to unit personnel, as needed.

We have reports that loading the HEMTT in accordance with the cited drawing, and using the standard strap, webbing, universal tie-down (NSN 5340-00-980-9277) can be tedious. There are two courses of action. First – practice. Now that training ammunition is packaged similar to service ammo (most training ammo pallets will have a wooden pallet base) HEMTT operators can get practice when supporting tank gunnery programs. Increased availability of empty pallets can be used to develop home station training programs.

A second alternative is a staggered stacking arrangement. The first pallet would be loaded with its end facing forward, the second with its end facing out, and so on. The resulting reduction in the overall cargo width permits easier access to the tie-down points. Although the 1.5-inch reduction in canister length that CPT Koehler asks for seems little enough, that space is vital to provide adequate cushioning to protect the round in transport and cannot be given up.

Insofar as ammunition packaging for efficient transportation and transfer is concerned, I must conclude that the 120-mm ammunition effort has been an under-publicized, resounding success story. The combat developers at the Armor School and the TRADOC Munitions Systems Manager's Office, the materiel developers at Program Manager-Ammunition Logistics, and countless others have combined forces to produce a cost effective, efficient, user-friendly package for 120-mm tank main gun ammunition.

CPT Koehler also expresses some concerns about the durability and performance of 120-mm ammunition. A primary advantage of the 120-mm system is the increased performance and lethality over the 105-mm system. Use of the combustible cartridge case allows for some performance increase while maintaining the total tank weight budget. More important, it eliminates metal casings inside the tank, thus reducing the need to break NBC overpressure to discard casings.

However, the 120-mm cartridge case (canister) does require some additional care in handling. Tank crews must ensure proper maintenance and proper alignment of the loader's tray. Loaders must exercise care in removing ammunition from racks and in proper loading and unloading procedures. Damaged, unserviceable ammunition **must** be identified and turned in. CPT Koehler is correct in that the condition of service ammunition over time is a concern to everyone. Service ammunition is required to be able to withstand twenty years in controlled storage and three years in uncontrolled storage without degradation. This factor was considered during design and test of the ammunition. Plans are in place to require yearly inspection and testing of 120-mm service ammunition samples from stocks. The handling damage mentioned earlier does not degrade overall ballistic performance. This damage does, however, impact overall systems safety. Therefore, it is critically important to strictly adhere to ammunition serviceability criteria as established in TM 9-2350-264-10-1/2/3. DO NOT TRY TO USE AMMUNITION THAT APPEARS DAMAGED OR OTHERWISE UNSERVICEABLE. TURN IT IN!

Once ammunition is removed from its container and placed on a vehicle, exposure to moisture is of the utmost concern. Service ammunition is designed with long-term storage in mind. Therefore, proper protective finishes and moisture insensitive propellants are used. (For the KE training ammunition this is not the case. This propellant is moisture sensitive.)

CPT Koehler mentioned a primary area for moisture to accumulate: the ammo storage racks. We have found that some tanks do leak from the environmental cover. Before the ninth year of production, the environmental cover was installed using an intermittent weld with room-temperature vulcanizing (RTV) rubber to fill in the gaps. It was learned that over time the RTV would crack and fall off, which would allow water to enter the bustle area. To eliminate this problem, PM Abrams has taken a number of steps:

- Since March 1988 (tank serial number 9001), all environmental covers on production tanks have been installed with a continuous weld.
- Repair procedures and kits were sent to the field to correct all tanks without the continuous weld. A modification work order is currently being written with planned application dates for early 1991.

As a result of changing weather conditions, water condensation in the ammo bustle area is also a concern. When performing preventive maintenance on the tank, the ammo doors should be opened and the ammo compartments (both ready and semi-ready) wiped down. By opening the doors you allow the ammo compartments to air out. If the ammo compartment is not checked on a regular basis, you risk possible rust and corrosion damage to the on-board ammo. To reduce the amount of condensation, place bags of dessicant (NSN 6850-00-935-9794) in the ammo compartments. An article in the October 1988 PS

Magazine explains where the bags of dessicant should go.

CPT Koehler says that a faulty aft cap deflector contributed to the fatal ammunition accident at Grafenwoehr. A properly installed aft cap deflector will contain the aft caps in the catcher box. Test data indicates that within ten seconds after firing, the hot aft cap is cooled to below the ignition temperature of the combustible case or propellant. As an additional safety precaution, PM Abrams has instituted a program to reduce the ejected aft cap temperature to below the case/propellant ignition temperature. This improvement will be implemented in hardware fielded in late 1990.

Proper training, with chain of command emphasis on common sense and safety, is essential whenever handling any type of ammunition or explosives. Ammunition is inherently dangerous. It is intended to kill. Treated with proper care and respect, our 120-mm tank main gun ammunition will kill the enemy, and, in the long run, prove to be as safe as comparable types of ammunition.

Directorate of Combat Developments,
Ft. Knox, Kentucky

We encourage articles that provide essential feedback from the field and allow us to address and correct the real deficiencies and problems of the field. We welcome/solicit additional comments on this matter.

Address your comments to:

Director, Combat Developments
U.S. Army Armor School
ATTN: ATSB-CD
Ft. Knox, Kentucky 40121

Proposed 1990 Armor Conference Schedule

Tuesday, 8 May

Registration (all day)
Displays (pm)
Retreat Ceremony (1645-1730)
* CG's Garden Party (1800-2000)
* Buffet and Regimental Assemblies (2000-?)

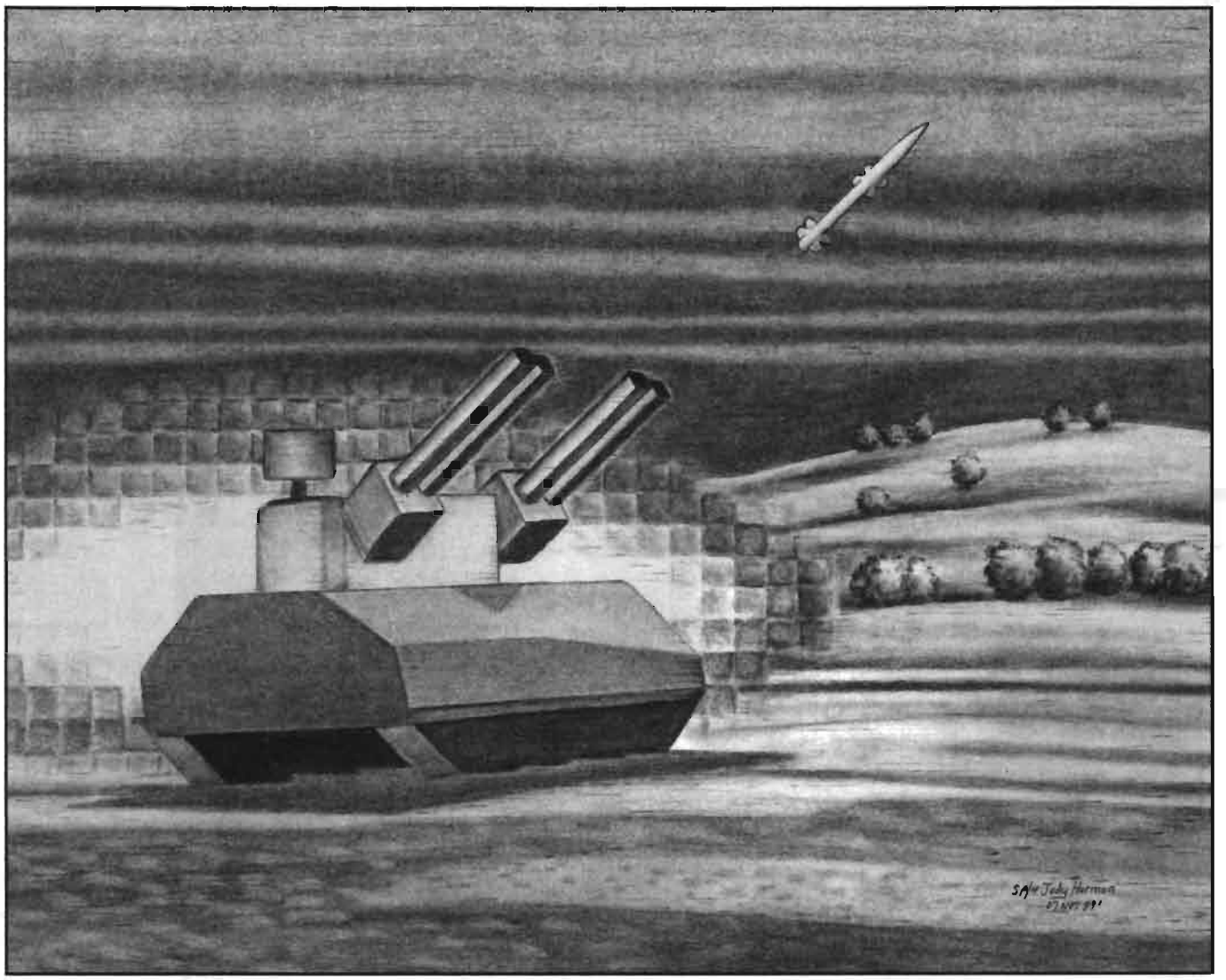
Wednesday, 9 May

Welcome (0800-0815)
Keynote Address
Report to the Force
Presentations
Armor Association General Membership Meeting
Presentations
Displays (all day)
* Armor Association Banquet
- Cocktails – Patton Museum (1800-1900)
- Banquet – NCO Club (1900-2200)

Thursday, 10 May

Presentations (0800-1130)
* Chief of Armor Luncheon
Presentations (1300-1500)
Displays (all day to 1600)

***Denote activities for which tickets must be purchased at registration.**



Fighting the Future:
A Revolution In Combat Developments

by Lieutenant General John H. Cushman (USA, Ret.),
Lieutenant General Frederic J. Brown (USA, Ret.),
and Major General Thomas C. Foley

Prologue

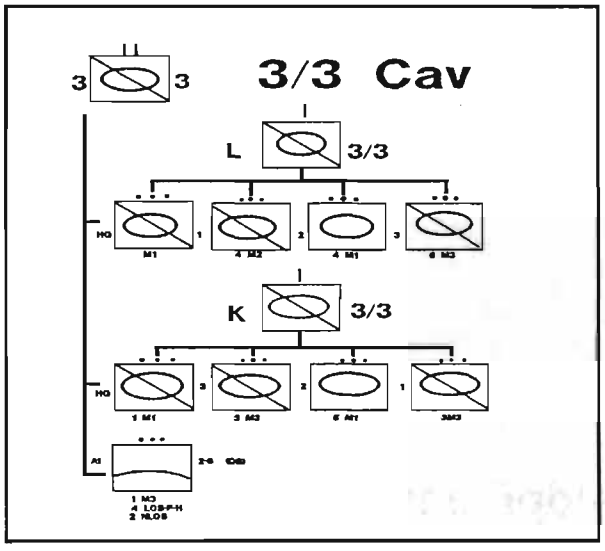
"There were moving targets, burning targets, shooting targets, artillery impacting the target area, helicopters, enemy aircraft, surface-to-air missiles, excited voices on the radio, and winners and losers." The words of Major Dan Sloan, an A-10 pilot of the 303rd Tactical Fighter Squadron, convey accurately the battlefield of the future. This future battlefield is, however, here today. The battlefield was created to develop and validate the doctrine, tactics, techniques, and procedures for the U.S. Army's future air defense systems slated to provide forward area air defense for the Abrams/Bradley heavy force.

The Revolution in Combined Arms Warfare

Few get to participate in a revolution in ways of fighting. But in September 1989, at Fort Knox, Kentucky, Captain Ricardo Cortes and his small contingent from the 3rd Armored Cavalry Regiment at Fort Bliss did just that. With an even

smaller contingent from the 6th Air Defense Brigade, led by Lieutenant Jim Lucas, also from Fort Bliss, they fought a combined arms battle of the future.

Working together in seven days of intensive all-arms combat, this team brought Army air defense artillery into the combined arms family in ways no one could have visualized without that vivid battle experience. And they dramatically demonstrated the value of combined arms warfighting prior to expenditures of large sums of increasingly scarce weapon acquisition dollars.



The Force

Captain Cortes commanded the bobtailed 3d Squadron shown above. It was realistically shorthanded, able to field a total of 35 combat vehicles, including its DS ADA units; after several days of fighting, two troops might well be all that was left of his squadron.

But Cortes' small team included a new and exciting element: a platoon of line-of-sight-forward (heavy) (LOS-F-H) and two non-line-of-sight (NLOS) air defense systems. This advanced air defense weaponry had yet to be tested in the DoD system's acquisition cycle, let alone in battle. In seven days of fighting, that platoon, reinforced with two NLOS Fire Units, was battle-tested. The cavalry soldiers who benefitted from these modernized ADA systems were convinced they were fighting with a winner.

The Battle Setting

The terrain was typical for armor – open fields and rolling hills, and wooded areas which limited mounted combat, yet offered cover and concealment to attacking helicopters before they unmasked to fire their antitank missiles. Stretched between two defending divisions of a corps, the 3d Armored Cavalry Regiment was in a standard economy of force situation, with all three squadrons on line. For the seven days of battle, the 3d Squadron's task was to fight off what remained of an enemy motorized rifle regiment.

This was a severe enough challenge to the cavalry troopers; the air situation made the task even more daunting. While friendly tactical air was committed elsewhere, the enemy's weakened regiment had air support available. As many as eight HAVOC/HIND attack helicopters and six Su-25 FROGFOOTs could penetrate Blue's fighter and Hawk defenses and engage the 3d Squadron at one time. So Cortes and his small band found a situation not faced in battle by American troops since 1943: an enemy with a telling ability to strike at will from the air.

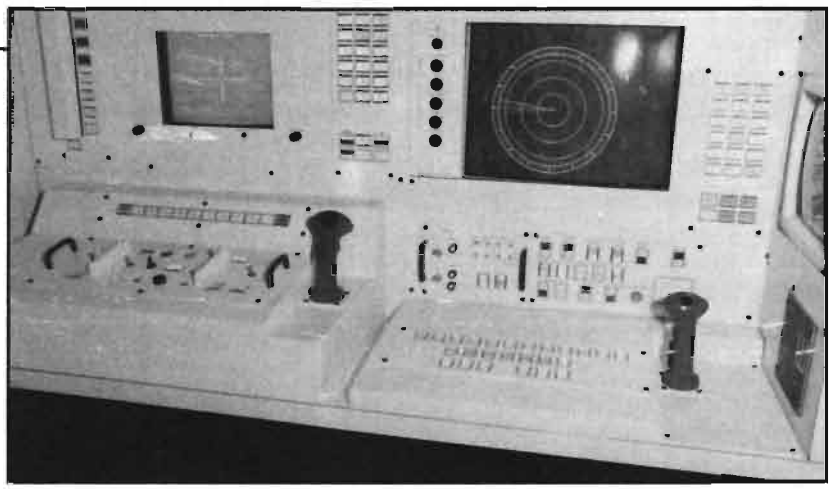
Battle Realism through SIMNET

Cortes' force and that of the enemy were not on real terrain; they were fighting in the world of SIMNET. As crew members, helicopter pilots, and fixed-wing aircraft pilots enter their simulators – each with its powerful on-board computers – they immediately find themselves performing battle tasks on an electonically created visual battlefield. By placing the opposing forces on a simulation of the real world terrain, and by portraying the full range of modern weaponry and their battle effects, the SIMNET world permitted battle action far closer to actual combat than a field exercise. The essence of the simulation is that the fighter is in a free play, kill-or-be-killed battle situation against a real, thinking, fighting-to-win enemy, at every echelon.

SIMNET for training (SIMNET-T) is now beyond research and development. Originally a Defense Advanced Research Projects Agency R&D investigation in pure computer science, it is being transferred to the Army for troop training at stateside and U.S. Army Europe stations. Its advantages are widely known in the Army, and are beginning to be known in the Air Force and Navy. At Fort Knox, it is the cornerstone of the Armor Center's Combined Arms Tactical Training Center. Further, the Army procurement process is underway to field this technology for units as the Close Combat Tactical Trainer (CCTT).

SIMNET for development (SIMNET-D) is today only at Forts Knox and Rucker. Like SIMNET-T, it permits the realistic exercise of tank and other fighting crews in battlefield teamwork, before they ever go to the field. While SIMNET-T simulates existing weapon systems, organizations, and C2 capabilities,

SIMNET-D allows rapid development of *future* weapons systems from the Required Operational Capability (ROC) through Pre-Planned Product Improvement. By constructing numbers of future systems as simulators it has proven possible to equip and organize whole units. By networking these future systems/units with the SIMNET-T current force, the combined arms warfighting effectiveness of future units or systems can be compared directly with the baseline force.



Control panel of the NLOS-F-H air defense simulator. The screen at right is the search radar; at left is the missile tracking guidance.

It was in this exacting environment that the commander of the Air Defense Artillery Center, assisted by the commanders of the Armor and Aviation Centers, decided to evaluate the capabilities of both the LOS-F-H and NLOS components of the Forward Area Air Defense System (FAADS). Only the FAADS C^3I, the STINGER-based LOS-Rear (the Avenger), the Bradley Air Defense sight reticle, and the M1A1 120-mm air defense round would be missing.

Because the SIMNET facilities are located at Forts Knox (ground) and Rucker (fixed and rotary wing) the commandants of these two schools were able to participate fully in the development of doctrine, tactics, and techniques needed by their forces to employ the modernized systems.

Assisted by representatives from the Air Force's Tactical Air Command and U.S. Air Forces Europe, they were also able to work with the ADA community in the evaluation of ADA weapon systems, force design, and emerging tactics/doctrine in the Armor Center's AirLand Battle-Future Laboratory. Thus, for this battle all parties were in a SIMNET-D situation. Although not yet fielded, the weaponry of Cortes' supporting air defense platoon, manned by the soldiers who might use it in battle, was teaming on the battlefield with the cavalry troopers to "fight the future." Most innovative was the fact that the commanders of the Armor and Aviation Centers, assisted by combat pilots from the Air Force's Tactical Air Command, were part of the FAADS evaluation and development team.

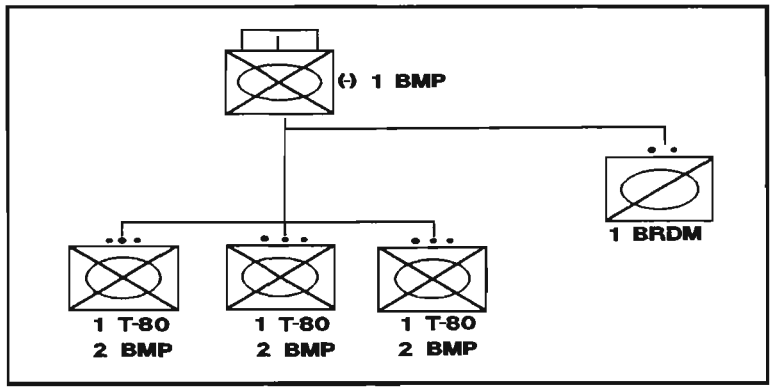
The SIMNET LOS-F-H and AH-64 simulators are shown above to illustrate the combat environment. Through combat vehicle vision ports and aircraft windscreens, the simulator's computer imagery projects the actual battle scene – the terrain with its hills and draws, its streams, roads, and vegetation, with friendly and enemy crew-serviced fighting vehicles in action, and with the sights and sounds of battle. Using lifelike controls in their crew compartments and cockpits, crew members and aviators "move" or "fly." They communicate. In teamwork, controlled by commanders and staffs using exact replicas of battalion level C^2 and logistical facilities, they maneuver and engage the enemy. When they make mistakes, they suffer – and learn.

The computer-equipped simulators are linked in local area and long-haul nets. Each simulator knows everything there is to know about itself and receives relevant information from all the other simulators of interest. Because each simulator communicates with all others, the crews fight as they would in war. There are no fixed scenarios. Rather, the brilliant and the dumb, the chance and the planned, all co-exist in a free-play, force-on-force fair fight. By allowing the creativity of the soldier to be applied to the fight, the limits of each new component early become evident. When this happens, doctrine, tactics, organization and training effectiveness are reliably based on the actual dynamics extent on the battlefield, uncontaminated by artificial limitations attendant to peacetime field exercises.

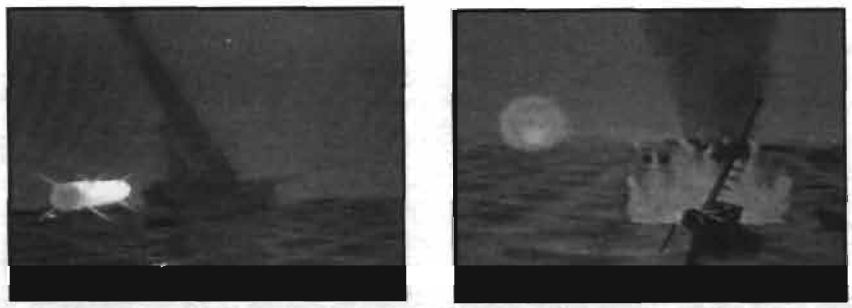
Used in wider application in development, and in training above the platoon level, SIMNET can provide a Semi-Automated Forces (SAFOR) capability to routinely generate the required force levels necessary to represent a valid threat.

This means that the crews or pilots of all systems are not present, nor are their immediate commanders (although they can be), and that the behavior of those not present is represented by software. The battle entities (tanks, helicopters, etc.) "see" and "engage" as they would if manned. With semi-automation, a human operator can

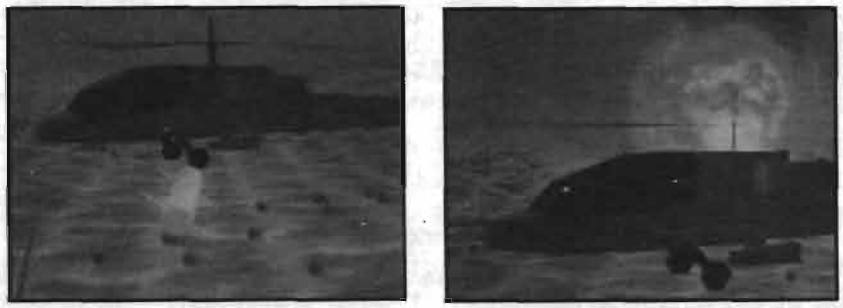
The OPFOR



SIMNET Views



Air defense missile homes in and kills Threat fighter-bomber.



This sequence shows a missile engaging an attack helicopter.

interrupt, modify, or override any automated behavior with a user-friendly (it talks Army) workstation.

Captain Cortes and his task force were in simulators at Fort Knox; his ground OPFOR, shown above , was also at Fort Knox.

Through a long haul network, Army and Air Force aviators from Fort Rucker flew OPFOR helicopters and fixed-wing air. All were fighting on the same battlefield.

LOF-F-H and NLOS

In the capable hands of Lieutenant Jim Lucas' platoon from A Battery, 2-6 ADA, these emerging air defense weapons were fought to win. As in real war, the troops learned and adjusted as they fought.

The new weaponry, being readied for the conduct of Force Development, Test and Evaluation (FDTE) at Fort Hunter-Liggett, have remarkable capabilities. On a Bradley chassis, with eight missiles ready to fire, each of the four LOS-F-H fire units can engage ground and air targets at ranges greater than 8,000 meters, well beyond the enemy attack helicopters' guided missile range. Consistent with their system requirements, the fire units could net their radars, which are capable of detecting aerial targets at 20 kilometers and more. Each fire unit is equipped with daytime television and FLIR (forward looking infrared) optical systems that allow visual target acquisition to ranges well beyond the 8,000 meter reach of the LOS-F-H missile. The Mach 3+ missile is guided by an invisible laser beam to intercept, where the fragmentation warhead destroys the target.

Trailing a fiber optic thread for image transmission and missile control, the NLOS missile is able to fly to the target area and look around. At ranges even greater than that of the LOS-F-H, the NLOS missile transmits detailed TV views of the battlefield to the fire unit. On command, the missile can then be directed to kill ground and air targets. It was this forward air defense weaponry, the production LOS-F-H and developmental NLOS systems, that created the revolution in combined arms warfare at Fort Knox in September 1989.

SIMNET-D's architecture reproduced the behavior of these radars and sighting devices, along with the missiles' flight characteristics and warhead effects. In summary, to depict the combined arms battlefield, the Armor, Air Defense Artillery, and Aviation Centers, the 3rd Cavalry, HQ TAC and SIMNET provided:

- The 50-x-50-kilometer digitized terrain used for the conduct of the fight.

- High-fidelity emulation of the LOS-F-H chassis, radar with netting capability, E-O suite, missile fly out and fuzing, and POSNAV equipment.

- A Manual SHORAD Control System (MSCS) and emulated corps and Air Force radars needed to implement the Early Warning Broadcast Net.

- Manned and SAFOR maneuver forces. (RED & BLUE)

- Threat aircraft, organization and pilots.

The US Army Air Defense Artillery Board from Fort Bliss performed data analysis, based on data collection and reduction by the SIMNET-D staff. Collective and systems' Measures of Effectiveness (MOE) were specified by the ADA Board, the Air Defense Artillery School's Directorate of Training Development, Combat Developments, and Tactics Department.

This combination of weaponry and its command and control with the traditional combined arms of the 3d Squadron and its supporting artillery – all of this orchestrated by Captain Cortes, the combined arms battle commander, and his people – proved a demanding proving ground for the emerging air defense systems.

Emerging Lessons

The seven days of battle were in truth thirteen battles in series, normally two per day. The experience was like that of "Duffers Drift" – except that Cortes and company were not dreaming. They were learning by fighting. And each day they got better at fighting. Lessons learned came in the three well known levels:

- Basic CMTC/NTC-type lessons that troops have to learn again and again;

- More advanced lessons that well-trained troops can absorb and thereby gain increased competence;

- Finally, lessons of truly advanced teamwork that when mastered mark only the best of fighting units.

Cortes's task force swiftly got through the first level of lessons. In an early AAR, the squadron S3, Lieutenant Dolan, described a couple of these:

"At squadron, we were seized at first with the problems of developing teamwork in terms of maneuver, and our own tank and TOW gunnery. So we did not place enough emphasis on planning for supporting fires, close air support, attack helicopters, or ADA.

"When the enemy came at us from an unexpected direction, we had not planned the use of these supporting capabilities. For example, on withdrawing from engagement areas, we were open to air attack from our flanks. Not having planned for an air defense, we were hit by enemy attack helicopters taking advantage of the covered and concealed routes into our flanks and rear. We had not coordinated with our ADA and were slow to react."

The Cortes force quickly graduated to the second level of lessons learned. Among these were the familiar ones of timing, of synchronization, of focusing combat power, of teamwork through mission orders and information exchange. For example, in his AAR Lieutenant Dolan stressed "the importance of spot reports to ADA from maneuver elements, and to maneuver elements from ADA."

The third level of lessons learned is where the possibilities of air defense weaponry in the combined arms fight begins to get exciting.

The cav's maneuver units (M1s/M3s) found that their fires could be cued by the ADA fire unit leaders, based on the latter's radar and electro-optical sightings and reports from MSCS. Cavalry leaders began seeking that information.

Responding to that need, the ADA platoon began to provide maneuver units the superb battle information that came from LOS-F-H radar and E-O sights and from the NLOS "eye in the sky." Spot reports from ADA drove the cav's recon view outward from its normal three or four kilometers to as much as seven or ten.

As important, the ADA squad leaders rapidly developed the skills attendant to calling for indirect fires to support the troop commander's scheme of maneuver.

Timely information from the ADA platoon's targeting assets helped the cavalry win the counter-reconnaissance battle; ADA equipped with the LOS-F-H and NLOS systems can alert the squadron CP of enemy air and ground actions, earlier and at greater ranges. When associated with LOS-F-H and NLOS, the cavalry now has far better eyes and ears.

Links between ADA and fire support C2 can assist the redlegs in target acquisition; indeed, NLOS can attack enemy artillery batteries as a form of "ADA counter-battery"!

As is normal in fighting, some preconceived notions faded; they

just didn't work. For example, the limited argon gas at platoon level, used for cooling the missile IR seeker, forced the fire unit leader to "prep" his missile just before firing, and to avoid "deprepping" as much as possible.

While LOS-F-H and NLOS are nice to have against ground targets, (in several instances, LOS-F-H fire units were forced to engage and destroy enemy tanks at ranges out to 6000 meters in self-defense), against air targets these weapons are vital. Protected by them, the maneuver force can get on with the job of fighting. Without that protection, maneuver units must always be thinking of hiding from the air.

As a result, maneuver commanders and staff who had never before paid much attention to their STINGER/Vulcan/Chaparral-equipped ADA support learned to protect and support their LOS/NLOS equipped ADA as a first priority when forced to operate against manned, modern attack helicopters and close support aircraft.

NLOS is critical in making enemy helicopters vulnerable when masking; it also releases artillery VT and mortar time-fuzed rounds for the attacking Abrams/Bradley force. But NLOS must attack the HAVOC quickly, guiding its deadly missile onto the target with disturbing regularity.

All these lessons were learned rapidly and vividly – and inexpensively, compared to an exercise or the real thing. The participating units "fired" about $81.5 million in ammunition during the seven days of war.

Meanwhile, the OPFOR was learning its own lessons, many of them applicable to Blue. As OPFOR applied these lessons in the next day's fight, the Blue side was itself forced to react, and vice versa. As the battles progressed from day to day, and indeed during one day's fighting, the two sides notched each other up on an increasing scale of proficiency.

Some OPFOR/BLUFOR reciprocal "level 3" lessons, described by Lieutenant Lucas:

"Once we got into the fight the enemy pilots were forced to stay low, about 50 feet AGL or below. They used every bit of mask they could find. These acts of self-preservation really reduced the enemy air's ability to find 3d Cavalry elements, even when they were moving!

"The enemy Su-25 and HAVOC drivers learned to work together...fixed wing came in with the lead aircraft low, fast and 5 kilometers in front of the follow-on fight. Then, when we radiated, we became the targets. But I ordered my fire units to go passive. SGT Burns assumed the role of master; his radar radiated long enough to get a track and to pass it to another fire unit. Once the others were cued, they engaged."

OPFOR aviators added their own comments. For example:

"Attack helicopters must work with tactical air, or FAADS kills both every time...."

"The radar warning receiver becomes all important. The rapidity with which the LOS-F-H systems can illuminate you with one system and kill you with a missile at 7 kilometers from another system, from an entirely unexpected direction, is so intimidating that we actually had one pilot so conditioned to take violent evasive action that, when illuminated by LOS-F-H radar, he flew into ground."

"Once ADA is out, enemy pilots were firm in their belief that it becomes very easy to destroy moving armored vehicles with the guided munitions available to modern attack air systems."

"We started out adhering to doctrine, training, and tactics. As LOS-F-H and NLOS got it together, we enemy pilots tried everything we could think of. But, because of the combinations of line-of-sight and non-line-of-sight and passive target engagement we were never able to suppress ADA and get free access to the maneuver, C^2, logistics, and fire support of the 3d Squadron..."

"We quickly learned the dead zone limitation of LOS-F-H, and used every wrinkle in the ground to get inside its dead zone, and then to launch determined attacks on the ADA fire units. Those guys need a cannon to cover the dead zone...without one they learned very quickly to coordinate their movements with the Bradley crews and through the Early Warning Broadcast Net (EWBN). They also learned to use the situational awareness available on LOS-F-H radar operator scopes to cue Bradley gunners to our approach."

The culmination was Captain Cortes' final day. As he shifted his force from defense to attack, he exploited his supporting ADA platoon like a seasoned pro. In other words, he learned to fight the future in the present at Fort Knox. His ADA platoon responded, all lessons learned.

Conclusions

The battles and the combat evaluation of those battles described above really happened. They were not war but they were very much like war. The 3/3 Cavalry and 2-6 ADA thus became the only units to fight the AirLand Battle under heavy, sustained air attack in more

than 45 years. Other people can have their opinions about that kind of war, but these people actually did it.

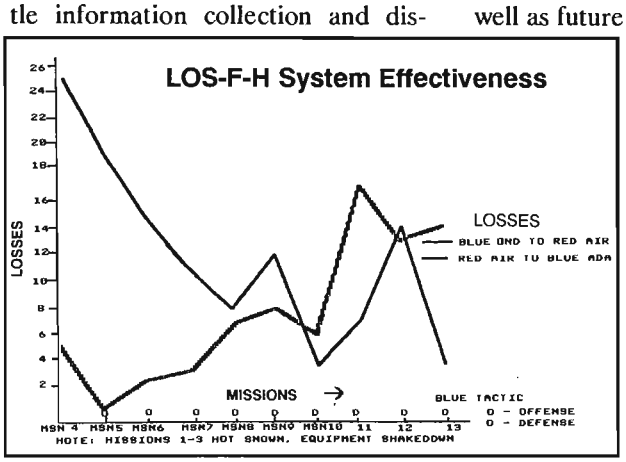
The basic lesson learned was this: Properly employed, with trained crews, in close coordination with the maneuver and fire support, LOS-F-H and NLOS are extraordinarily effective. They are essential components of the combined arms team. Once the cavalry and ADA leaders learned how to fight with these weapons, they forced enemy air to fatal compromises. Fighting for their own survival, enemy air became much less effective. Look at the data below. During early missions, before they learned to work together and to employ the ADA systems effectively, the Red air took out 26 or more tanks, fighting vehicles, and/or LOS-F-H fire units. That's 75 percent of CPT Cortes' force! When LOS-F-H and NLOS were on the battlefield, closely tied to the 3rd Cavalry's scheme of maneuver, tank and fighting vehicle losses declined to 5 by mission 13! In other words, effective air defense decreased the cavalry losses due to air from 75 percent to 14 percent. (See graph below.) This allowed the ground attack to continue. The air defense artillery contribution was the difference between victory and defeat.

These weapons proved to be more than the traditional air defense, however. Their capabilities for battle information collection and dissemination multiply the effectiveness of the other members of the combined arms team. How do we know this? Because SIMNET exercised these forces, and can exercise forces like them, in a realistic battlefield, with realistic combat outcomes, and realistic synergy of all fighting and sustaining means in a soldier-dominated environment.

The weapons systems and the terrain were simulated, but the soldiers were not. Their operational tempo, their decisions, their tactics, techniques, and procedures were their own. They simply employed the advanced vehicles and munitions which SIMNET simulated as they would in war.

The experience of Captain Cortes and his soldiers thus offers another profound "lesson learned." Their performance in seven days of battle showed that, with SIMNET, we can fight the future and learn. Developing systems can be tried and evaluated in a combined arms context under trained leaders and with trained soldiers, against a thinking, creative, enemy who is fighting to win — with immense implications for United States forces' doctrine and tactics, force design, training and leader development, and weapons acquisition.

As an Army, we must think through how to best employ this revolutionary new capability to enhance current mission readiness, as well as future systems development.



As the simulation progressed and the cavalry became accustomed to using the air defense system, their losses dropped and Threat air losses increased markedly.

Lieutenant General Frederic J. Brown, USA retired, commanded a tank company in USAREUR, a cavalry squadron in Vietnam, an armored brigade in CONUS, and was chief of Armor and Cavalry for 3-1/2 years. He is currently a consultant for the Institute for Defense Analyses.

Lieutenant General John H. Cushman, USA retired, has commanded the 101st Airborne Division and has been the Commander, Combined Arms Center, and Commandant of the U.S. Army Command and General Staff College. He retired in 1978 after two years in command of I Corps (ROK/US) Group, the field army formation defending the western sector of Korea's DMZ. Since 1978, LTG Cushman has been an author and consultant in the fields of warfare simulation and the operations and command and control of theater forces.

Major General Thomas C. Foley is commander of the U.S. Army Armor Center and Fort Knox. Commissioned in Armor from the University of Massachusetts in 1957, he holds a Bachelor of Business Administration and two master of science degrees. Key assignments have included DCSOPS, USAREUR; G 3, VII Corps; and ADC, 8th Infantry Division. MG Foley commanded 1-33 Armor and 3d Brigade, 3d ID (Mech). He served on the J1 staff, USMAC-V; and as senior advisor, Squadron Advisory Team 22, USMAC-V in Vietnam.

Non-dedicated Stinger Gunners Wouldn't Be As Effective, Air Defense Chief Argues

Dear Sir,

Having just completed reading the July-August 1989 issue of ARMOR, I wish to congratulate you on an outstanding publication. I read with particular interest MAJ Barry Scribner's article "HMMWVs and Scouts: Do They Mix?," and the article, "Air Defense in the Covering Force Area," by CPT Steven W. Karaffa and 1LT Timothy J. Perez. As Chief of Air Defense Artillery, I applaud the concern and effort to improve air defense of the maneuver forces. However, I cannot support the belief that air defense of the maneuver forces could be improved by simply providing Stinger missiles to scouts or ground surveillance radar crewmen.

Experience and empirical data indicate the proposed solutions would not achieve the desired results. Numerous studies have shown that effective Man-Portable Air Defense System (MANPADS) gunnery is only achieved through the use of trained, dedicated gunners. Four key issues highlight the shortcomings of the proposed solutions:

Training – Studies of dedicated versus non-dedicated MANPADS gunners have shown that MANPADS gunnery is a skill requiring intensive training, especially in the highly perishable skills of aircraft recognition and range estimation. Non-dedicated gunners trained only in the mechanical techniques of firing the system have a high probability of engaging friendly aircraft, firing at targets out of range, or not launching at all.

Employment – The effective employment of Stinger requires deliberate deployment to support the commander's intent. The suggested solutions propose employing Stinger as an after-effect of deploying the scouts or the ground surveillance radar. This will likely result in poor ADA battle positions and destruction of the protected force prior to missile launch.

Command and Control – Early warning and cueing is critical to successful MANPADS engagement. Due to limited engagement windows, MANPADS gunners are highly dependent on cueing and IFF to ensure successful engagements. Without cueing and IFF, the non-dedicated gunner is limited to a self-defense role, engaging only after being fired upon. Because of short reaction times, the probability of kill is lowered. In most cases this results in missed targets, a gunner failing to fire, or even worse, fratricide.

In fact, the fratricide problem resulting from non-dedicated Stinger teams may cause a "WEAPONS HOLD" to be imposed, thereby negating much of SHORAD's value on the battlefield.

Combat Experience – The Mujahideen's use of Stinger in Afghanistan proved the value of dedicated Stinger gunners. The Mujahideen obtained a 79 percent kill rate by using dedicated gunners deployed to best support the commander's intent. Gunners were selected based on intelligence, literacy and initiative. Emphasis was on tracking techniques, range estimation, and correct firing aspects. Since all aircraft were hostile, the Mujahideen's command and control problems were greatly reduced, and fratricide was not a problem.

Throughout history, successful mission accomplishment has been achieved through the use of trained soldiers, skilled in their craft, led by competent leaders, deployed at the right time and in the right place. Any compromise of this proven recipe for success must be deemed unacceptable. The proliferation of air defense artillery weapons in the hands of untrained gunners is likewise unacceptable....

DONALD M. LIONETTI
Major General, U.S. Army
Chief of Air Defense Artillery
Fort Bliss, Tex.

Required Armor/Cavalry Manuals

Each Armor/Cavalry leader must have the following Armor School/Infantry School proponent manuals. This list is current as of 1 November 1989.

All

FM 17-12-7, Tank Combat Training Devices, Sep 88

Battalion/Brigade Commander

FM 7-90, Tactical Employment of Mortars, Jun 85
FM 17-12-1, Tank Combat Tables – M1, Nov 86 w/change 1
FM 17-12-3, Tank Combat Tables – M60A3, Nov 86 w/change 1
FM 17-98, Scout Platoon, Oct 88
FM 23-1, Bradley Fighting Vehicle Gunnery, Sep 87
FM 71-1, The Tank and Mechanized Infantry Company Team, Nov 88
FM 71-2, The Tank and Mechanized Infantry Battalion Task Force, Sep 88
FM 71-3, Armored and Mechanized Infantry Brigade, May 88
ARTEP 7-246-12-MTP, Mechanized Infantry Mortar Platoon Mission Training Plan, Sep 88
ARTEP 17-57-10-MTP, Scout Platoon Mission Training Plan, Dec 88
ARTEP 17-236-10-MTP, Task Force Maintenance Platoon Mission Training Plan, Dec 87
ARTEP 17-236-11-MTP, Task Force Support Platoon Mission Training Plan, Nov 87
ARTEP 17-236-12-MTP, Task Force Medical Platoon Mission Training Plan, Dec 87
ARTEP 71-1-MTP, The Tank and Mechanized Infantry Company Team Mission Training Plan, Nov 88
ARTEP 71-2-MTP, The Tank and Mechanized Infantry Battalion Task Force Mission Training Plan, Oct 88
ARTEP 71-3-MTP, Mission Training Plan for the Heavy Brigade Command Group and Staff, Oct 88
*FC 71-4, Combined Arms Live Fire Exercise (CALFEX), Jul 85

Squadron/Regiment Commander

FM 1-114, Regimental Aviation Squadron, Aug 86
FM 17-12-1, Tank Combat Tables – M1, Nov 86 w/change 1
FM 17-12-3, Tank Combat Tables – M60A3, Nov 86 w/change 1
FM 17-95, Cavalry Operations (Approved Final Draft), Dec 89
FM 17-97, Armored Cavalry Troop, Sep 88
FM 17-98, Scout Platoon, Oct 88
FM 23-1, Bradley Fighting Vehicle Gunnery, Sep 87
FM 71-1, The Tank and Mechanized Infantry Company Team, Nov 88
FM 71-2, The Tank and Mechanized Infantry Battalion Task Force, Sep 88
*ARTEP 17-55J, Armored Cavalry Squadron-Armored Cavalry Regiment (Coordinating Draft), Nov 85
ARTEP 17-57-10-MTP, Scout Platoon Mission Training Plan, Dec 88
*FC 17-97-1-MTP, Armored Cavalry Troop Mission Training Plan, Sep 86
*FC(FKSM) 17-101, Light Cavalry Troop, Sep 85 (Jun 90)
*FC(FKSM) 17-101-1-MTP, Light Cavalry Troop Mission Training Plan, Sep 85 (Jun 90)
*FC(FKSM) 17-102, Reconnaissance Squadron (LID), Sep 85 (Jun 90)
*FC(FKSM) 17-102-1-MTP, Reconnaissance Squadron (LID) Sep 85 (Jun 90)

Company Commander

FM 7-7, The Mechanized Infantry Platoon and Squad (APC), Mar 85
FM 7-7J, The Mechanized Infantry Platoon and Squad (Bradley), Feb 86
FM 17-12-1, Tank Combat Tables – M1, Nov 86 w/change 1
FM 17-12-3, Tank Combat Tables – M60A3, Nov 86 w/change 1
FM 17-15, Tank Platoon, Oct 87
FC 71-1, The Tank and Mechanized Infantry Company Team, Nov 88
FM 71-2, The Tank and Mechanized Infantry Battalion Task Force, Sep 88
ARTEP 17-237-10-MTP, Tank Platoon Mission Training Plan, Oct 88
ARTEP 71-1-MTP, The Tank and Mechanized Infantry Company Team Mission Training Plan, Nov 88
ARTEP 71-2-MTP, The Tank and Mechanized Infantry Battalion Task Force Mission Training Plan, Oct 88
*FC 23-200-1, M1 Tank Combat Load Plan, May 85
*FC 23-200-3, M60A3 Tank Combat Load Plan, Nov 86
*ST 17-184-1A1, M1A1 Combat Load Plan, Nov 87
*FKSM 17-16, Company Team SOP, Mar 89

Troop Commander

FM 17-95, Cavalry Operations (Approved Final Draft), Dec 89
FM 17-97, Armored Cavalry Troop, Sep 88
FM 17-98, Scout Platoon, Oct 88
FM 23-1, Bradley Fighting Vehicle Gunnery, Sep 87
ARTEP 17-55J, Armored Cavalry Squadron-Armored Cavalry Regiment, Nov 85
ARTEP 17-57-10-MTP, Scout Platoon Mission Training Plan, Dec 88
*FC 17-97-1-MTP, Armored Cavalry Troop, Sep 86
*FC(FKSM) 17-101, Light Cavalry Troop, Sep 85 (Jun 90)
*FC(FKSM) 17-101-1-MTP, Light Cavalry Troop, Sep 85 (Jun 90)
*FC(FKSM) 17-102, Reconnaissance Squadron (LID), Sep 85 (Jun 90)
*FC(FKSM) 17-102-1-MTP, Reconnaissance Squadron (LID) Sep 85 (Jun 90)
*FC 23-200-1, M1 Tank Combat Load Plan, May 85
*FC 23-200-3, M60A3 Tank Combat Load Plan, Nov 86
*ST 17-184-1A1, M1A1 Combat Load Plan, Nov 87
*FKSM 17-98-3, Scout Platoon SOP, May 88

Tank Platoon Leader/ Platoon Sergeant

FM 17-12-1, Tank Combat Tables – M1, Nov 86 w/change 1
FM 17-12-3, Tank Combat Tables – M60A3, Nov 86 w/change 1
FM 17-15, Tank Platoon, Oct 87
FM 71-1, The Tank and Mechanized Infantry Company Team, Nov 88
ARTEP 17-237-10-MTP, Tank Platoon Mission Training Plan, Oct 88
ARTEP 71-1-MTP, The Tank and Mechanized Infantry Company Team Mission Training Plan, Nov 88
*FC 17-15-3, Tank Platoon SOP, May 85
*FC 23-200-1, M1 Tank Combat Load Plan, May 85
*FC 23-200-3, M60A3 Tank Combat Load Plan, Nov 86
*ST 17-184-1A1, M1A1 Combat Load Plan, Nov 87
*FKSM 17-16, Company Team SOP, Mar 89
*Tank Platoon Leader's Notebook, Oct 89 (Ft. Knox Pub.)

Scout Platoon Leader/ Platoon Sergeant

FM 17-95, Cavalry Operations (Approved Final Draft), Dec 89
FM 17-97, Armored Cavalry Troop, Sep 88
FM 17-98, Scout Platoon, Oct 88
FM 23-1, Bradley Fighting Vehicle Gunnery, Sep 87
ARTEP 17-57-10-MTP, Scout Platoon Mission Training Plan, Dec 88
*FC 17-97-1-MTP, Armored Cavalry Troop, Sep 86
*FC(FKSM) 17-101, Light Cavalry Troop, Sep 85 (Jun 90)
*FC(FKSM) 17-101-1-MTP, Light Cavalry Troop, Sep 85 (Jun 90)
*FKSM 17-98-3, Scout Platoon SOP, May 88
*Scout Platoon Leader's Notebook, Oct 89 (Ft. Knox Pub.)

Special

FM 17-12-5, Tank Combat Tables M551A1, May 89

Manuals denoted with an asterisk (*) are available in limited quantities from the Armor Center and can be ordered by calling the Army-Wide Training Support Branch, Non-Resident Training Division, at AUTOVON 464-AWTS (commmercial 502-624-AWTS) or by writing: Commander, U.S. Army Armor Center, ATTN: ATZK-DPT-NRT-AWTS, Fort Knox, KY 40121-5000.

120-mm Main Gun Zeroing: Some Ideas from CAT 1989

by Captain Michael W. Luttman

The biennial Canadian Army Trophy (CAT) competition provides each participating unit a unique opportunity to closely examine its tanks and learn many lessons through the trial and error process of fine-tuning the fire control systems. This year was the first time that the participating American teams used the M1A1 Abrams with its 120-mm main gun. Initially, the 2nd Armored Division (FWD) team used conventional zeroing procedures, as outlined in FM 17-12-1 (w/C2), which are essentially the same procedures used to zero the 105-mm gun of the M1 and M60-series tanks. But the opportunity provided by the CAT competition to fire nearly every month gave the team a chance to experiment with other procedures, in hope of achieving the highest possible accuracy for its tanks. The method of firing zero at 500 meters, which the team used during two pre-competition events, was adopted from the Germans, who have been firing the 120-mm main gun in its Leopard II tanks for several years.

Acknowledgement: Technical data and analysis were provided by the 2nd Armored Division (Forward) Master Gunner, SFC Norman K. Hardin. My thanks to him and the master gunners of the 2AD (FWD) CAT Team from C Company, 3-66 Armor: SFC Louis Thomas and SSG Robert W. Callender.

Boresighting

We made no changes to the procedures for boresighting the vehicles. We used the current procedure from FM 17-12-1 without modification, and the boresight panel at 1200 meters.

Zero Procedure

Range – The most significant change to the current approved procedure is that we set up all panels for zeroing at 500 meters. The team tried this method because it is the range at which the German crews zero their Leo IIs. We used this range for both zeroing rounds and confirmation rounds. At this range, the acceptable dispersion of rounds is 32.5 cm from the mean point of impact (MPI).

Panels – (See Fig. 1) The first rounds are fired at standard NATO 63a panels (zero panels with 50 cm grid). These panels provide an easy method of measuring the shot groups. Ideally, each shot should be physically measured, but if this is not possible, then use the grid can be used to obtain fairly accurate estimations. Fire confirmation rounds at NATO 52 panels (Leo II confirmation panels). The circle in the center is 25 centimeters in diameter.

MRS Updates – The usefulness of MRS updates between zero rounds was a topic of discussion, and the opinions of master gunners and factory technical experts are varied, indeed. The team decided after much debate NOT to use MRS updates between rounds while zeroing. This method continues to work well, and the team has been getting consistently tight zeroes in the absence of system malfunctions.

The MRS updates ARE used when on the range and firing in competition, which can be as long as 1-2 hours after zeroing.

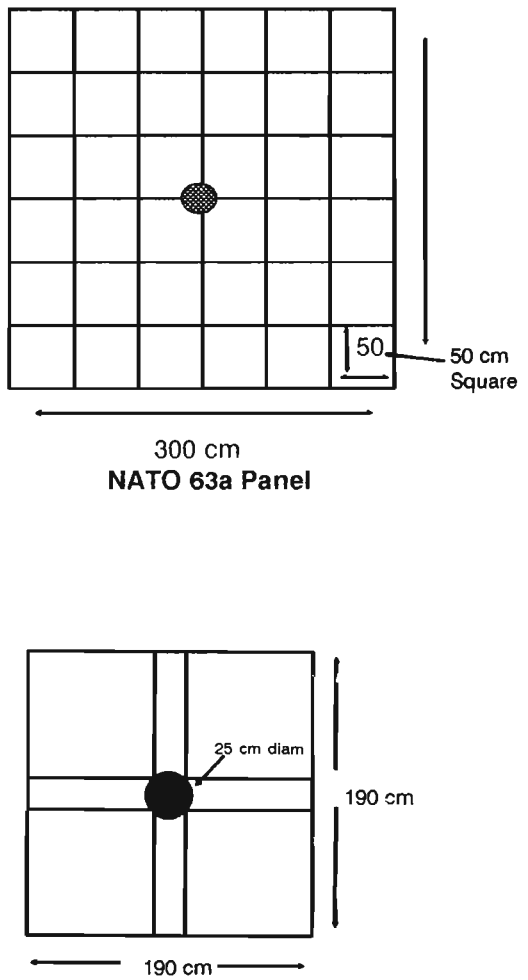
Rounds Fired – With few ammunition constraints on the CAT team, the preferred method included a 5-round zero and a 3-round confirmation, except for vehicles that exhibit apparent system malfunctions. When it is not possible, because of time or ammunition constraints, to fire eight rounds, the team used a 3-round zero and 2-round confirmation. If a system is obviously firing within tolerance, we have on occasion fired only three rounds for zero and one round to confirm, to conserve ammunition. Rounds that clearly strike out of tolerance and away from the shot group are not included in calculating zero, because these are not generally a fire-control system problem, but caused by ammunition dispersion. To include that data would not contribute to a proper zero.

Ammunition Type – We used this training method with success using standard training SABOT, product-improved SABOT (PIP), and HEAT.

Advantages of the 500m Zero

During CAT training, we found that using the German 500-meter zero method has both theoretical and practical advantages.

- Gunner-lay error is reduced. At 500 meters, the zero panel appears much larger and gives the gunner a more exact lay of the gun (using the "G" pattern) on the exact center of the panel. At 1200 meters, this becomes more difficult.
- Difference in wind effects is reduced. A problem with using the wind sensor at extended ranges is that the wind effect at 1200 meters from the tank can vary greatly from what the wind sensor indicates at the back of the turret. By moving the panels to 500 meters, that difference can be reduced, producing a more accurate sensing of wind effect.
- Fewer range restrictions. It is important to have accurate measurements of round strike to achieve the best computer correction factors (CCF). By having only to travel 500m downrange to obtain these measurements, the restrictions on personnel are reduced. There are normally great restrictions on downrange travel to 1200 meters (Both at MTA Grafenwoehr and at NATO TA Bergen). We have been able to go to 500 meters by merely



Note: NATO 52 panels were used for confirmation because panels with 32.5 cm circles were not available. The team used a plexiglass template with 32.5- cm circle cut out to check dispersion on both panels. They still attempted to get rounds within the 25 cm circle whenever possible for competition.

Figure 1.

coordinating with one or two adjacent ranges.

● Reduced effects of Reduced Visibility. As one would expect, in times of reduced visibility (haze, fog, rain, etc.) it is much easier to see the close-in targets.

This has allowed us to continue training in adverse conditions, where we otherwise may have had to cancel training.

Disadvantages

There are, of course, some corresponding disadvantages.

● Increased importance of accurate measurement. At 500 meters, the error of each round strike is increased by a factor of 2.4 over a similar error at 1200 meters. Any error in estimating the round strike by visual estimation is similarly increased. Therefore, to accurately measure each round is imperative to obtain an accurate CCF. Consequently, after the initial three to five rounds are fired, personnel should go downrange before computing the CCF and firing confirmation rounds.

● Accurate range becomes more important. Training area limitations may make it impossible to set each target at precisely 500 meters. When calculating the CCF, the exact range to the target for each vehicle (+/- 10m) must be included in the formula to avoid increasing calculation error. This is not as critical when firing at 1200 meters.

● Resistance to Change. Because this is a new procedure not normally used, crews will want to blame unusual results on the procedure, rather than to look at their vehicle or at themselves. The fire control system in the M1A1 tank is capable of zeroing at almost any range, because once the zero range is properly entered, the onboard computer will automatically adjust for all other ranges. Logically, if the procedures for boresighting and zeroing are followed, the actual range at which the zero rounds and confirmation rounds are fired should make no difference in the performance of the system while firing.

Calculation of Zero (FM 17-12-1, w/C2)

With this zero method, the formula for calculating the CCF and new zero is only slightly modified. For CAT, I developed a spreadsheet, which automatically takes into account the exact range and number of rounds fired. The use of a portable laptop computer makes all calculations easier, faster, and eliminates most human error. Use the calculation method for the proofing test as described in FM 17-12-1, Annex A, using .5 for the range, instead of 1.2. Figure 2 shows how these steps are put into spreadsheet format for use in a computer.

Final Notes

A consideration to help with confidence in this technique would be to fire one round or more at a single 1200- or 1600-meter target and checking the round strike. It will be within the range expected of a 1200-meter zero.

Despite the outcome of the CAT 89 competition, the units involved learned many important lessons about their equipment. This is a direct and tangible benefit of participating in this prestigious competition. For the U.S. units, it has been a great opportunity to closely examine and extensively test the fire control system of the M1A1 Abrams tank. There are many other lessons that can be applied Army-wide.

Response from the USAARMS Weapons Department

We appreciate the time and effort put into Captain Luttmann's article on 120-mm zeroing. However, the zeroing procedures for the M1A1 tank are found in TM 9-2350-264-10-2, not FM 17-12-1. The procedures in the FM are proofing procedures, not zeroing. While it is true that the tank can be zeroed at any range from 200-4,000 meters, 1200 meters has been chosen as a standard. This stan-dard helps to eliminate confusion by requiring every tank in the fleet to use the same range if/when zeroing.

We have recently completed live-fire testing to revalidate both the zero procedures found in the -10, and the proofing procedures found in the FM. As CPT Luttmann experienced, we found that the zero procedures require slight modification. We recommend that the MRS update between rounds be deleted, but the update between the initial group and confirmation be retained. This change will be reflected in Change 9 to the TM on or about January 1990.

George R. Wallace III
Colonel, Armor
Director, Weapons Department

Captain Michael W. Luttman was commissioned in 1980 from the USMA and is a graduate of the AOAC, the Combined Arms and Services Staff School, and the Airborne and Ranger Schools. He has served as a platoon leader with C Troop, 1-4 Cavalry, XO of HHC, 1st AD, and company commander with 3-66 Armor, 2d AD (Fwd). He is currently assistant S3 of 3-66 AR and was battalion project officer for CAT training.

The Mystery of "Tiger Jack"

by Brigadier General Albin F. Irzyk, USA, Retired

This is the extraordinary story of a remarkable general who figuratively commanded his division in combat, while sitting at a desk at Fort Knox, Kentucky, nearly 3,000 miles away from the action.

His division was the Fourth Armored Division.

He was Major General John Shirley Wood, nicknamed "Tiger Jack" and "P" Wood. He picked up the "P" at West Point, where he had spent endless hours tutoring fellow cadets. His habit of nervously pacing was reflected in his other nickname, one the Germans found accurate enough to use routinely.

Of his division: Gen. Patton declared, "The accomplishments of this division have never been equaled. And by that statement I do not mean in this war, I mean in the history of warfare. There has never been such a superb fighting organization as the 4th Armored Division."

Freed American PWs reported, "The 4th Armored Division is both feared and hated by German front line troops because of its high combat efficiency." GIs themselves said, "It is the best damned armored division in the European Theater of War."

Liddell Hart, eminent British historian, military writer, and critic, said Wood was, "The Rommel of the American armored forces...one of the most dynamic commanders of armor in World War II and the first in the Allied Armies to demonstrate in Europe the essence of the art and tempo of handling a mobile force."

Lieutenant General Willis D. Crittenberger said, "He far exceeded in his leadership capabilities any man I have ever known."

And General Jacob L. Devers simply stated, "They would follow him to hell today."

Yet, this man, commander of that division, who had achieved outstanding and unprecedented success in the employment of armor, who was at the height of his success, at the very apex of his fame in Europe, was relieved of his command and sent home, after little more than four months in combat.

"Impossible," you say, "This could not happen!" Why, this would be heresy – almost like trading off a star NFL quarterback at the height of an undefeated season.

After all, division commanders are relieved because their troops will not move, will not fight, are not aggressive; their tactics are poor, and they suffer unnecessary and heavy losses, or they don't seize objectives or accomplish assigned missions. But highly successful division commanders relieved – never!

Never say never, for it happened to Major General John S. Wood.

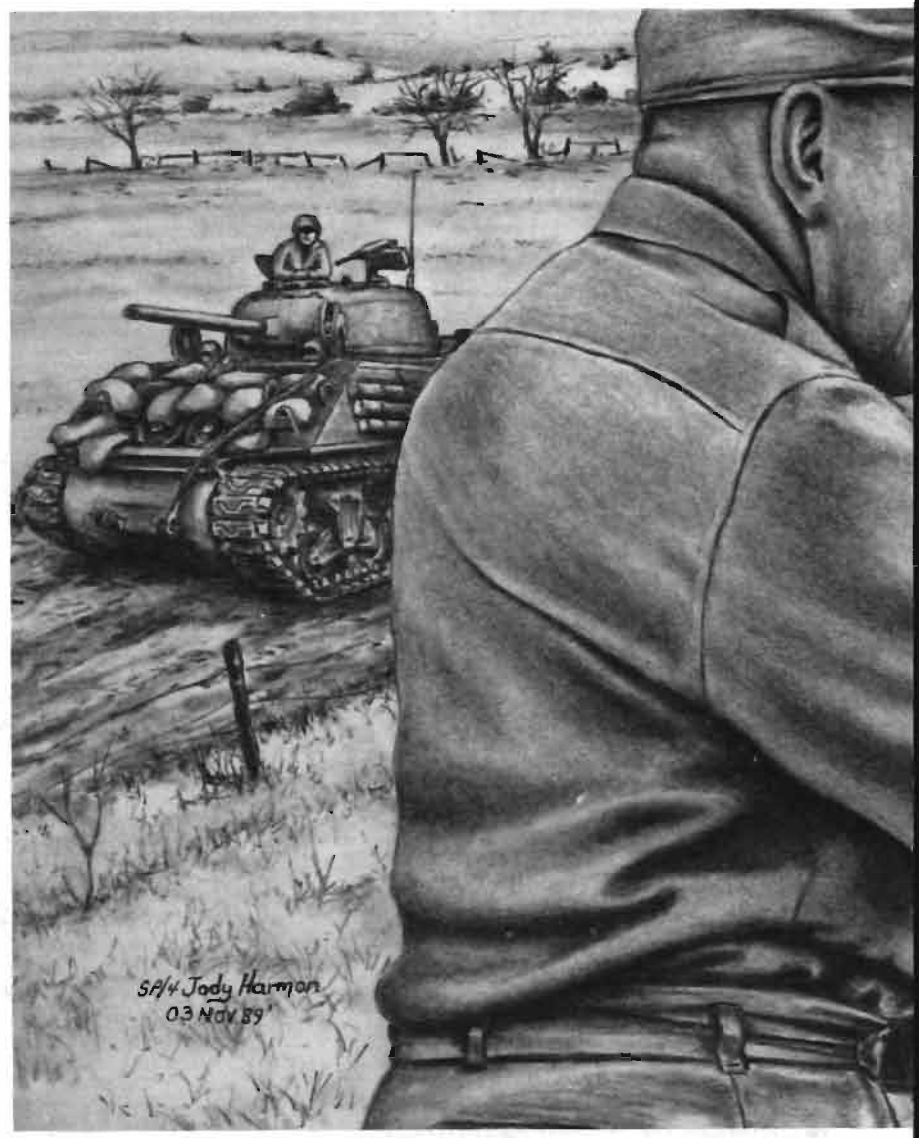
Air Force General O.P. Weyland had admiringly stated, "Whereas more cautious division commanders occasionally warranted some prodding, "P" just as often had to be restrained." Yet, this man was gone from the combat arena before word of his great accomplishments ever filtered back to the American public. Today, one will not find him listed among Eisenhower's lieutenants. Moreover, historians, military buffs, even the keenest students of World War II hardly know of him. Tragically, he was a great man, but virtually unknown.

I began my connection with the man and his division in August of 1942. As a cavalry officer in probably the last horse regiment, I had recently had to give up my mounts. The powers that be found me a new home and mounts of a different type at Pine Camp, New York.

Shortly after my arrival there, one of the first questions I asked was, "How is our division commander?" The answer, "He's kind of weak."

"Why do you say that?," I asked.

"Well," came the reply, "We recently had a division review and after it,



he made a speech and ended it by saying 'God bless you men'."

Weakness? That man was to utter those words in his remarks to his troops endless times, so fervently, so emotionally that he sometimes brought tears to the eyes of his listeners.

Initially, he was not liked or admired. There was plenty of bitching and griping at Pine Camp. The men referred to him as "Paper and Butts," because he insisted on immaculate unit areas.

His troops trained hard all day and had to attend schools at night. All were restricted to camp, except for Wednesday evenings and brief weekends. Such actions did not stimulate popularity.

When he had his commanders and staff together, he announced, "I don't expect much – all I expect is perfection." As his listeners recoiled, he continued, "Of course we'll not achieve perfection, but that's what we'll always be striving for."

He was recognized early as warm and caring. He stopped wherever he observed groups of his troops. He talked to them and showed concern. "When have you last written home?"

If the answer was not satisfactory, he would tell them, "Do something for me when you're in the barracks tonight. Please write home – tell them you're alright, tell them what you're doing."

In the early fall, we cut our ties to Pine Camp and headed for maneuvers in Tennessee. While there, General Wood was reprimanded, ridiculed, and rebuked by more senior officers during weekend maneuver critiques. They chastised him for being too bold, too unorthodox, for moving too fast, too far, covering too much ground, and forcing problems to end prematurely. They informed him that he just could not do it in combat with the enemy shooting, fighting, attacking, so why was he doing it in Tennessee? General Wood stood his ground, and quietly told them, "We can do it, and we will do it." (What a prophet he was.)

It was during these maneuver critiques that General Wood, on two separate occasions, challenged – actually called the hand of – Lieutenant General Ben Lear, 2nd Army and maneuver commander, who reputedly ruled by fear and commanded "by the book." Wood objected to certain criticism of his actions, and passionately and emotionally defended his troops, who had been the targets of critical remarks he considered totally unfair.

A witness later stated, "This was the greatest act of cold courage I have ever observed or have known of, and also the finest act of loyalty from the top down imaginable.... This man....had actually put his career in the United States Army on the line...." (A harbinger?)

Word of this exchange spread quickly throughout the division, and General Wood instantly became a great hero to his men, for they now knew he would always stand up for them, and between them and difficulty. It was during these maneuvers that a bonding took

4TH ARMORED SHERMANS DRIVE INTO GERMANY

"Once the division was finally turned around, we began what was to be an epochal sweep through France. General Patton plotted the strategy, and General Wood executed it."

place that has lasted to this day. General Wood and the 4th Armored Division became inextricably entwined, a marriage forever. The man and the division became one. It has been said that the great divisions of history have been known by the names of its commanders. One of the best examples is the 4th Armored Division, with which "P" Wood's name will be permanently and forever linked.

The Mojave Desert was the next stop for the division. Despite the intense heat of the desert, he required his men to wear their fatigues with sleeves rolled down and collars buttoned – certainly far from a popular requirement, but one he deemed necessary in the development of his division his way.

As we expected, his training was innovative and realistic. Two of his tank companies, buttoned up with live .30 caliber rounds in the coaxial machine guns, would start at opposite ends of a wadi and soon have a meeting engagement. In one of these problems I rode in one of the tanks, commanded one of the tank companies. I can assure you there was plenty of activity and excitement when we spotted an "enemy" tank moving from cover, fired live bursts at him, saw our rounds "splash" against his sides or turret, knowing instantly we had scored a "kill." How more realistic can you get, what better preparation for combat than that?

Then it was on to Camp Bowie, Texas, and more insights into this fellow, Wood. Not long after his division had settled in, a great hue and cry arose from the nearby civilian community. We were in the dry belt of Texas, and Wood had authorized the sale of beer in the Post Exchanges. Community leaders screamed in anguish, preachers pounded their fists in their pulpits, and letters of protest flooded Congressmen and other influential officials. Wood held fast, declared his soldiers would have beer if they wanted it, and beer remained at Camp Bowie as long as the 4th was there.

By this time, every man in the division was beginning to feel that General Wood was a personal friend. The men knew that their commander was genuinely, sincerely interested in them, that he identified with them, and had an emotional involvement in their lives. They knew he referred to them as "my people". Whenever he traveled by jeep in the presence of his troops, he stood in the jeep constantly saluting. The troopers marveled, "He saluted me before I saluted him." Soon the men were trying to salute their division commander as far as they could see him, to beat him to the draw.

He trusted his men. They treasured this trust. He obviously believed in the credo of Ralph Waldo Emerson, "Trust men and they will be true to you; treat them greatly and they will show greatness themselves."

Before the division embarked for England, Wood informed his troops, "This division will attack and attack, and if an order is given to fall back, that order will not come from me."

By this time, other divisions were acquiring nicknames. When pressed to come up with one for his, General Wood declared, "The 4th Armored Division will have no nickname – they shall be known by their deeds alone." Those words from that day forward became the division's motto. Although never with a formal nickname, the division in the months ahead was often known as the "Name Enough Division" and "Patton's Best," and was variously labeled, "Breakthrough," "Whirlwind," "Glorious," "Irrepressible," "Immortal."

The division did win its military immortality in the Normandy breakout, when it slashed rapidly and aggressively out of a depressingly stalemated situation to seize the tactically and strategically important city of Avranches, a decisive objective that gave access to Brittany on the south and west, and to Le Mans, Chartres, and Paris on the east.

For us, the action in Normandy was strongly reminiscent of Tennessee. We shouted excitedly at one another, "Just like maneuvers!" (except that our ammunition was live, the incoming fire was real, and the prisoners did not have "aggressor" armbands, but strange uniforms). Wood's troops were obviously seasoned from the outset.

General Woods quickly established his leadership literally, figuratively, and every other way. Near Coutances on the way to Avranches,

Wood marched into town under fire, captured a German soldier, found a path through a mined area, picked his way through on foot, and sent back a cryptic, classic message. It was scrawled in pencil on a message blank and ordered, "General Dager (his combat commander) send the Infantry through after me."

Later, he was to say, "If you can't see it happen, it is too late to hear about it back in a rear area and meet it with proper force."

From Avranches, his division was ordered southwest to seize the Atlantic ports of Lorient, Vannes, and St. Nazaire. While his units were moving in that direction, he protested such employment to his senior commanders long, loud, and vehemently. He reminded them, in no uncertain terms, that the enemy was to the east, that the war was not going to be won by going west. But the plans had been conceived before the invasion and, because of strategic inflexibility, were being doggedly carried out. The high command did not like Wood's reminding them that they were winning the war the wrong way. By the time they reoriented their thinking, Wood had already reached the outskirts of the Atlantic ports and had lost much valuable time. In the process, he won few friends and undoubtedly picked up resentment, for it must have been galling for his superiors to know that he was right.

Once the division was finally turned around, we began what was to be an epochal sweep through France. General Patton plotted the strategy, and General Wood executed it. He was a bold and daring commander who was willing to take risks and was really the architect of the rampage through France. For weeks, as the 4th Armored Division went, so went Third Army. Wood's vision set the pattern for armor operations in Europe. Accomplishing the impossible prescribed by Patton became routine.

We moved too rapidly, were too widely scattered for the conventional gathering of commanders for the typically detailed, specific orders. Wood resorted to "mission type" orders. These consisted of a line of departure, a broad, directional arrow (axis of advance), a goose egg (objective), and the terse order to "get going at first light." That's all we had; that's all we needed. (See "Effective Op Orders," page 38.)

The hallmarks of his division were rapid flanking movements, deep penetration, constant momentum and violent execution of fire and maneuver. Like cavalry, Wood slashed and side-stepped with speed and surprise. He echeloned in depth and did not worry about his flanks.

After two and a half months of intense and constant action and, by now, deep in France, the division halted in the October mud and rain for its first "break." On the second day, word came that General Wood would visit our battalion early the next morning. We arose at dawn and assembled quickly. As the battalion S3, I spent many minutes getting the overshoes off and hidden and endeavoring to line up the men without getting their boots muddy. Shortly after I had made a final check of their appearance, and had them dressed in straight lines, we looked up and there suddenly was our commanding general. We watched fascinated as his large, bulky, tank-like form bounded lightly upon the temporary platform we had built for him. With legs spread, he glanced momentarily at his smartly assembled troops, and then called out, "Gather 'round, men." (Find that command in any drill manual.) In an instant, the carefully formed ranks were broken as the men rushed to get as close to their commander as they could. They jammed in a tight circle around him, eager to be near him, to hear his words. He related all that they had done. He told his men how very proud he was of them and how very humble he felt to be in the presence of those who had accomplished so much. His voice broke, and tears rolled. He was obviously very moved, and so were his troops. He concluded with, "God bless you, men."

About this time he began to receive recommendations for the Presidential Unit Citation for platoons, companies, and battalions, which had distinguished themselves during the weeks of combat. He refused to approve any, and declared that he would not single out any unit within his division. He said that if such an award were granted, he would wait until the entire division received it as a unit. Again, he showed great prescience and faith in his division because later, the 4th Armored Division became the only tank division and the second entire division to be so decorated by order of the President. There was an added and unexpected bonus. The French Government twice cited the whole division with the Fourragere.

October soon became early December, with the rain heavier and the mud deeper and stickier. The attacks continued down narrow roads in atrocious weather. The war became a slugfest. "Penny-packet" tactics had replaced massed armor employment. And then, without warning, the 4th Armored Division received an almost mortal blow. For the first time since entering combat it was stunned, reeling, demoral-

ized; it recoiled, was severely wounded. Word, like winds before a tornado, instantly reached every last man in the division that their beloved commanding general had been relieved of his command and sent home. All were shocked, disbelieving. This just could not happen, was not true, was not possible.

When the news had finally sunk in, and some semblance of composure returned, the first word universally uttered was the question, "Why?," the same question that persists to this day. Almost immediately, answers in the form of rumors and speculation swept the division like a prairie fire. The "real reason" soon reached us. General Wood, we were told, was relieved because he was tired and sick, and was being sent home for a rest.

BUNK! we all agreed. We knew that he was every bit as tired as we were, but not more so. If he was sick, so were we.

So speculation about "the true story" intensified and in some sources continues to this day. Wood, himself, speculating in later years rejected the medical verdict and declared, "I suppose I will never know the entire story...."

Within the division, we also universally rejected the medical version, and continued to speculate.

Was he relieved because:

- In his desire to press the attack, he had crossed the boundary between Third and Seventh Armies, and had, for a period, operated in the Seventh Army sector?
- He was openly critical of the misuse of armor and of his division, particularly?
- He pleaded with General Eddy, his corps commander, for a little rest for his exhausted men and vehicles, and for time to reorganize?
- There was a severe personality clash between Wood and Eddy, two very strong and dominant commanders, undoubtedly exacerbated by the three reasons above?

Comment upon each of these items of speculation is necessary to flesh out this most fascinating combat episode.

General Wood, in typical fashion, most certainly crossed the army boundary. He later wrote, "....such lines meant little to me, and I went where the going was good." However, in this case, he received permission to cross the boundary with XV Corps of Seventh Army to turn the enemy's positions facing the XII Corps. He not only helped his own situation, but did the XV Corps a great big favor by destroying the salient that a German counterattack by the Panzer Lehr Division had sliced into the XV Corps flank. So, this excursion surely did not cost him his command.

Most assuredly he complained of the misuse of his armor. Initially and briefly, the division had been held back pending an exploitation situation, but the corps infantry divisions were bogged down, and the armor was soon committed to "retrieve the setback."

Thereafter, because of rain, mud, and terrain, the division had to operate almost on a one-tank front. Some of the tanks were badly shot up by 88s, causing numerous casualties. Although the division ground ahead slowly, it took its lumps. The armored divisions were not concentrated. The only armor breakthrough at that time occurred at the Saverne Gap by the 2nd French Armored Division, and that success was not exploited. A corroborating voice came later from German General von Mellenthin: "....the armored divisions were committed too early and....[LTG] Eddy [commanding XII Corps] would have done better to wait until his infantry had eaten away more of our main defense zone."

All of this certainly aggravated General Wood, who saw his division being whittled away because of poor tactics. Certainly, Wood's criticism didn't set well with his superiors, some of whom undoubtedly still smarted from being embarrassed by Wood, who had been so very correct about Brittany.

General Wood deeply believed in the unceasing endeavor to spare the men he had the honor to lead unnecessary hardships and useless losses, and possessed the willingness and desire to share their hardships and face the same dangers. He tried to do the most with the least possible cost in the blood of his men. Stupidities and mistakes that caused needless casualties infuriated him. His division had pressed the attack, day after day, for many weeks, from first light until darkness, taking on fuel and ammunition during the night. The vehicles, which received maintenance every day during training, had not been touched for weeks.

The continuous fighting under almost impossible conditions for armor had seriously reduced its tank complement and caused heavy losses among experienced personnel, particularly officers. The men were exhausted. Both men and vehicles had been pushed virtually beyond endurance. Certainly, General Wood interceded for his men. He wanted a period of rest for his troops and vehicles and a chance to reorganize. Herein rests a tremendous irony. The "break"

which General Wood must have fought so hard for, at great personal sacrifice, was granted just five days after he was relieved of his command. His division, whose forward elements were in the Maginot Line, were relieved by the new and fresh 12th Armored Division.

And there is yet another great irony that apparently has eluded historians and gone unrecognized and unappreciated. If it had not been for the "break" that permitted the 4th Armored Division to rest, refit, and reorganize, it would have been impossible for it to make the historic forced march of 151 miles to the environs of Bastogne, and then, in five days of bitter fighting, succeed in breaking through to the 101st Airborne in that beleaguered city.

It was inevitable that Wood and Eddy would lock horns. Unquestionably, Eddy wanted to keep pushing (undoubtedly pressed by Patton) and could not help but be irritated and annoyed at Wood's pleas in behalf of his troops. He probably interpreted this as a sign of Wood's developing softness, because of the pressures of the campaign. To Eddy, Wood's insistence may also have spelled taut nerves.

It did not help that Wood was not an easy subordinate. He was a highly intelligent and perceptive man who did not "suffer fools gladly, no matter what their station." He had little toleration or respect for men of lesser minds, lesser competence. He had difficulty practicing allegiance to those above him whose capabilities he believed were inferior to his own. He was never a "yes" man, and sometimes expressed dissent so vigorously he may have appeared insubordinate. So, the sparks that flew must have caused an explosion, for when the dust settled, Wood was on his way home. Patton must have decided that one or the other had to go, and the decision was – Wood.

Wood said of his relief, "I will never know the entire story...." Over the years, those who have known and speculated about this World War II episode generally conclude that the full story of Wood's relief has never been told.

I, too, have speculated, pondered, and reflected on the reason for his relief. But suddenly for me there is no longer a mystery. I have deciphered the reason, and the solution is quite simple and basic. General Wood was relieved because he was just being General Wood.

Now, in an eerie resemblance of his actions during Tennessee maneuvers, he once again "stood up" to his superiors, was critical of their tactics, pleaded for a respite for his exhausted men and vehicles, and finally did in late 1944 what he came within a hair of doing in 1942 – he committed career suicide.

This need not have happened. General Wood could have been unfeeling, less humane about the condition of his men and vehicles; he could have diluted the fierce, almost obsessive loyalty to those he led. He could have ignored what he saw as the misuse of his forces and the improper tactics employed. His demeanor and remarks could have been more tactful, diplomatic, respectful.

Had he done all of this, he undoubtedly would have continued in command of his division and could possibly have finished the war as a corps commander with a third star (if he could have torn himself away from his division).

But if he had done all of that, he just would not have been "P" Wood.

Yet, because he was so good and so successful, there has to remain some suspicion about the motives of his superiors and the so-called "system." On the date of his relief, there must have been broad knowledge that merely five days later the division was to get its well-deserved "break." If Wood needed rest, as they claimed, why didn't "they" wait five days so that he could get his rest along with his troops?

Of an action only nine days before his relief, German General von Mellenthin related, "....Bayerlein might well have broken through to the Sarrebourg-Saverna road, but unfortunately was taken in the flank by the 4th Armored Division, which had forced its way across the Saar at Fenetrange."

At the end of November, three days before his relief, the 4th Armored was east of Sarre-Union and "pushing forward with violent fire." Could those have been the actions of a division led by a tired, sick commander?

In Europe, there was a paucity of good division commanders. Consequently, division commanders who were timid, mediocre, colorless, and, at best marginally successful, were retained. Realizing this, it certainly flies in the face of logic that Wood, a proven, successful division commander, would sit out the bulk of the war at Fort Knox.

MG Hugh J. Gaffey, Patton's Chief of Staff, succeeded MG Wood. Here was a safe, don't-rock-the-boat choice with whom Eddy, Patton, and others would be comfortable and certainly have no problem. Gaffey commanded for 3-1/2 months and was followed by

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MG William M. Hoge, who commanded for a brief period until the end of the war. They hardly counted. In the eyes of the men in the 4th, they were still led by Wood; the other two went along for the ride. There was no perceptible change in its method of operating or its indomitable spirit.

For the rest of the war, the division bore the distinctive mark of Wood's training, tactical ingenuity, and military genius. Not long after Gaffey assumed command, the division made its historic link-up with the 101st Airborne at Bastogne.

In the fall of 1945, at a gathering at Fort Knox at the quarters of Lieutenant Colonel (later Major General) Arthur L. West, 4th Armored veterans were rehashing the war and discussing the division's exploits. General Gaffey was present and himself admitted, "I had little influence on the division and its actions because you carried on under the influence and momentum of General Wood."

At another time, General Hoge, said, "Wood was much revered and loved by both officers and men of his division.... I still marvel at the depth of leadership when I took command."

The 4th Armored Division, until the end of combat, and for 40 years after as the 4th Armored Division Association, has been General Wood's division.

For many years, the New York chapter of the association celebrated Activation Day with a pilgrimage to West Point. The highlight of that weekend each year was the solemn, touching memorial service conducted at the gravesite of General Wood.

The division association has met in convention for 40 successive years. General Wood remains the favorite and most frequent topic of conversation.

His was leadership at its absolute best. Volumes that endeaver to answer the question, "What is leadership?" crowd library book shelves. One could obtain the answer by discarding many of the texts and theories and merely studying Wood. It is too bad that we cannot break down into component parts the Wood charisma and "magic."

He knew that the division he trained and led in combat was one of the most outstanding in World War II. He lived to realize that he was worshipped by his men, and recognized that their deep affection would last to the end of his days and long after he was gone.

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This story of General Wood has not been written by an impressionable, starry-eyed, hero-worshipping second lieutenant. Hardly. I have commanded a company, tank battalion in combat, an armored cavalry regiment in Germany, and for brief periods a division in Vietnam. I have served on joint and NATO staffs. During a full military career, I have watched from a very close vantage point many senior officers of all our services and of many allied nations. I have studied, taught, and endeavored to apply leadership. In my lifetime, I have looked up to few heroes.

It is now more than 40 years since WWII. Yet, in my eyes, MG John S. Wood remains a genuine, authentic hero. I have long admired him, always looked up to him. I consider him the finest soldier, the greatest leader I have ever known. I shall never forget him for what he was and what he stood for. For me, his greatness grows, as my years recede.

Brigadier General Albin F. Irzyk trained and fought with the 4th AD from its formation in 1942 through five campaigns in the European Theater and service in the postwar occupation. His 44 months of overseas service included assignments as a company commander, battalion commander, division G1, G3, and chief of staff. He commanded the 8th Tank Battalion during the relief of Bastogne. His long and illustrious military career later included service at numerous posts in CONUS, USAREUR, and the Pacific.

Battle Drills: Simplifying the Challenge

by Captain Jeffrey E. Phillips

In the pre-dawn gloom, Team Tank crosses the line of departure in column. Winding through low ground, weapons probing for a flash of gunfire or the glow of a thermal image, tanks lead Bradleys in silence. Reaching the point where the enemy threat exceeds the attractions of simple column movement, the team commander deploys his platoons:

"Yellow, this is Yellow Six, over."
"Red, over."
"Blue, over."
"Green, over."

"This is Yellow Six. Execute Vee, out."

Instantly, Red, the lead platoon, shifts in column a hundred meters left, then blossoms into a wedge. The trail Abrams darts out automatically to its wing position, using speed to cover the extra distance. Blue, the second platoon, simultaneously accelerates and shifts right, unfolding into a wedge running abreast of Red. Green's Bradleys, also in a wedge, move roughly centered and behind the tanks. Team Tank, on the two-word command of execution, "Execute Vee," has completely reconfigured. In doing so, it has maintained momentum and control. (See Figures 1-3)

An armored force must move resolutely and coherently. It must use its speed and mass to bring overwhelming fire to bear on the enemy. Battlefield realities, in combat or on exercise, tend to fragment mass, retard speed. Battle drills make it

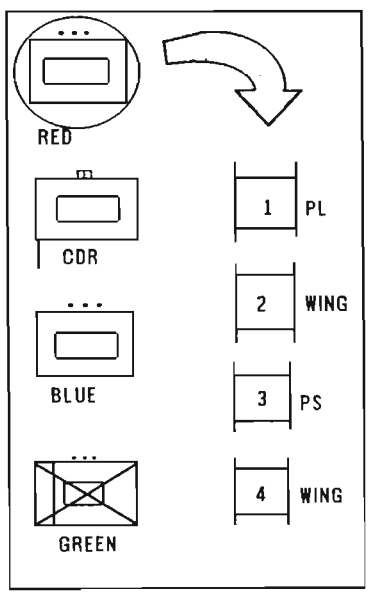


Figure 1: Team in column. Vee command given.

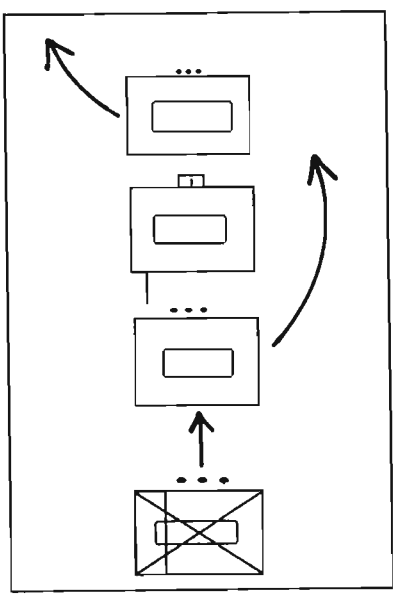


Figure 2: Team deploys with platoons in column.

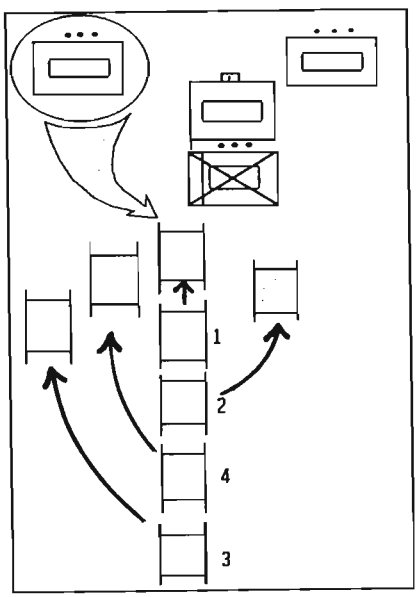


Figure 3: Platoons deploy.

Team Tank Deploys From Column to Vee

Figures 1-3 depict a simple method of deploying from column into vee. Platoons move in column into a team vee. Once in the company vee, they go to platoon wedges. One variation is for platoons to remain in column within the vee. That would be a different drill with a different command.

easier to keep the team together and moving.

American leaders are historically given great freedom to maneuver their forces. Given their training, equipment, and plain Yankee ingenuity, they should be capable of reacting correctly to situations. OPFOR doctrine, with its un-imaginative approach, tends to earn our condemnation. OPFOR leaders are not allowed the flexibility so important in an environment of constant change.

In our censure of OPFOR technique we have, however, discounted a tool that will assist us in executing our doctrine. Our platoons and companies cannot train frequently enough to master complex techniques, or gain the expertise needed to fully exploit the freedom they enjoy. Too frequently, companies get split up, mired down, or misdirected in their maneuver. Combat multipliers get neglected by commanders too busy just keeping formations together, their units a loose collection of independent teams. All this is evidence of techniques too complex for available training resources, including time. The problem is much greater for our reserve component. A tightening budget assures yet less time for practice. The key to success is simplicity.

The Soviets, with their high soldier turnover, face a similar challenge. Part of their solution is to use battle drills through battalion level. The NTC OPFOR uses drills. U.S. veterans of WWII armored combat express disbelief that the drills they lived by in Europe languish today.

Battle drills became a way of life in Bravo Company, 1st Battalion, 67th Armored Regiment, during a 1987 manuever and vulnerability test of the Bradley Fighting Vehicle at Fort Hood, Texas. Tasked to portray the tank company of a Soviet motorized rifle battalion, my Abrams crews practiced battle drills the NTC OPFOR and the Warsaw Pact currently use. Battle drills streamlined formation changes and dramatically eased command and control at each echelon. The simplicity of drills did tend to belie their effectiveness. Gun crews were initially dismayed at their reduced latitude.

OPFOR drills are straightforward and discount terrain, although not to the extent we commonly believe. While our crews were right to condemn terrain blindness, the crews' widely shared disapproval of set drills proved unwarranted and soon faded. Drills gave us the necessary structure to retain unit cohesiveness and exploit opportunities quickly. We could immediately respond to any situation. As we improved, we experimented with variations, increasing our flexibility. The improvement in our maneuver prompted the adoption of modified OPFOR drills into our tactical SOP. We moved fast and hit violently as a solid force. We overwatched with entire platoons, simplifying what could be a complex maneuver, while maintaining our momentum.

The same battle drills employed in the sweeping maneuver possible at Fort Hood served as well in the congested marsh and woodland of NORTHAG during REFORGER 87. This "hide and seek" environment is conducive to loss of initiative and momentum. The discipline, responsiveness, and cohesiveness we gained with drills kept us together and ready to respond. The platoons were used to keeping a close eye on each other and reacting quickly — two products of drill mastery. Benefits spilled over into defensive operations. Our displacements were snappy. The platoons sped from position to position with high regard for terrain, but unmistakably as teams. Control of a company displacement, normally a fairly busy time under the best of circumstances, got quite a bit easier. As was the case in the offense, subordinates had a much simpler time controlling their units in the absence of their leaders.

As defined by AR 350-41, "A drill is a collective task at squad or platoon level that has been identified as one of the most vital tasks performed by that unit for success in combat. Drills are totally or largely METT-T independent, require minimal leader actions to execute, and are standardized for execution throughout the Army. Drills are usually executed or initiated on a cue, such as a specified enemy action or simple leader order." I would expand the definition to include company use of drills. Our Tank Crew Gunnery Skills Test is a collection of drills. Battle drills give responses to tactical situations and facilitate tactics, any tactics. The Armor Officer Basic Course teaches battle drills outlined in FM 17-15. The problem is to accept a lessened degree of small unit freedom and force the rote performance of drills to a much greater degree.

In 1981, the Army Research Institute (ARI) published its report on tests measuring the impact of Warsaw Pact OPFOR maneuver on a friendly force's performance. The tests took place at what was to become the National Training Center with the 194th Armored Brigade fighting the fledgling OPFOR. Com-

ments from tankers of the 194th clearly endorse drills:

"There is a need to learn battle drill. Crews need to operate more by using SOPs...."

"We need to practice like a football team and stop thinking that we are so flexible that we can perform any task without practicing..."

"We need more emphasis on battle drill that includes less reliance on radio..."

"U.S. forces must be able to move fast with decisiveness by utilizing rapid dashes from position to position."[1]

Bravo company learned OPFOR drills, but units using standard U.S. drills would realize the same benefits. FC 17-15 teaches the basic drills for the wedge, vee, echelon, line, column, coil, and herringbone. It details the contact and action drills, which embody the basic drills. It adequately describes each drill's use and methods of control. Company drills are described in FC 17-16-1. I cite these publications specifically, because they are the ones now in use at the Armor School, and standardization is a keystone of simplicity. OPFOR doctrine emphasizes keeping a tightly formed unit moving without interruption. Overwatch is left up to following echelons, if used at all. OPFOR formations, however, are similar to formations in U.S. doctrine.

The OPFOR does not use vee or wedge formations below company level, but has two line formations, one with the platoon leader a tank length ahead and centered, the other with him a tank length behind and centered. Invariably, the minor variations in vehicle speeds result in these line formations resembling either a shallow wedge or vee. Like ours, OPFOR formations are variations on either the line or the column. An OPFOR company can move in a column, vee, wedge, echelon, or a line with platoons themselves formed in line, column, or echelon within the company. Each formation is a separate battle drill.

Red Thrust, the Army's trainer of OPFOR techniques, uses a superb method to teach OPFOR drills. It will work with any drills. It embodies the crawl, walk, run concept and results in skills gained quickly and relatively cheaply. Bravo Company's experience serves as an example: After a brief class on OPFOR doctrine and formations, hands-on work began. The OPFOR uses a triple number code and flag signal for each formation. Thus, an OPFOR commander sending his unit into a line formation would call "One, one, one" and raise a red flag.

The entire code system was introduced in the classroom and hammered home thereafter. The Red Thrust team first used 1/35 scale vehicle models, each with a distinctive number on it, to simulate a task organized tank company. Taking one battle drill at a time, they deployed the models as a demonstration, then had the students do so. Within an hour all drivers and vehicle commanders (loaders and gunners were not present due to space restrictions) could place the models in each of several formations. All the while, the team shot questions out at students, reinforcing the instruction.

When students could take the models out of a pile and configure them in formations, they began to deploy the models in and out of formations using the drill procedures. Here, the distinctive numbers were critical. The crews quickly mastered this last skill of Phase I. The importance of this phase cannot be overemphasized. The scale models and methodical approach laid solid groundwork for the next phase.

Phase II was literally the walk phase. Each commander/driver "crew," simulating an entire vehicle assembled on the PT field. Section leaders carried a flag set, as did the company commander. After a brief review and orientation, the trainer announced the code for company column. Shouting the column code and displaying the flag signal, the CO and his driver set off toward the far end of the field with the platoon leaders echoing his command and falling in, their crews taking up their positions.

Everyone felt a little foolish at first. With the column formed and moving, the trainer announced a different code, and we repeated the process. With each drill, the transition from models to walk-through brought minor and short-lived confusion. Embarrassment gave way to a feeling of progress as the crews quickly learned to recognize codes and flags and "do the drill." And the trainers kept up their quizzing.

We kept each Phase II session under two hours. As soon as possible, the commander issued his own instructions, and when he was comfortable, let platoons practice separately. Phase II training lasted about three days, culminating in walking attacks across open training area ground. We tried to use actual vehicle intervals. With the absence of radios, the flag signals came in handy. (In actual maneuver, we found flags difficult to manage and hard to see.) Phase II taught crews

what they should see and do in the drills. Use of real training areas doubled as terrain appreciation classes, all at low cost. Every line company does PT three or four times a week when in garrison. That's a golden opportunity for Phase II training. We formed the company into three platoon columns, with each platoon's men lined up by crews. Thus, the platoon leader was up front, followed by his crew and so on. From there, it was simple to execute drills as we ran. Granted, forming a company line can get tricky in the width of a street, but imagination makes all things possible... Phase II is a necessary link in battle drill training, not unlike the Unit Conduct of Fire Trainer in gunnery training. It will certainly complement SIMNET.

Phase III, actual maneuver, began slowly, like the preceding phases. At this point, all crews knew the drills. The company began with basics. Under the company commander's control, it formed into a column. It then moved back and forth across the training area until each crew was positioned correctly. The company then did simple line deployments and returned to column. It quickly became apparent that tanks moving to the wings would never make it if the inner vehicles did not slow about 30 percent. Gradually, we added more drills, always returning for review to the basics. (Phase III training could begin with platoons drilling separately under the guidance of the CO, XO, and first sergeant. As they learned the basics, they could be pulled together in company maneuver. This platoon training would take about one day to get the platoons to the point permitting company drill. They wouldn't be masters, but capable enough to permit the company to train as a whole.)

From the first moment of Phase III, we pushed weapon orientation. The driver and tank commander positioned their vehicle; the driver's goal was to do so alone, just as he sought sound terrain. We went slowly at first, 5 to 10 mph was sufficient. We gradually added more complex drills, then bypasses, left and right, and turns while in a line. As our skill improved, and it did quickly, we increased speed and threw in some combat scenarios. The scenarios gave the drills meaning – a connection to real life. We kept them simple, one platoon providing a base of fire, while the other two attacked around a flank. Simple and realistic. Crews must learn to move quickly. This is a lesson tougher to learn than the drills themselves. One of the hallmarks of an unskilled crew is that it fears speed and consistently moves with hesitation. Speed equals security. Figure 4 shows a sample training program.

Drill training does not require a lot of land, although the more, the better. A single platoon can train all drills in a box 1/2 km by 1 km. It might get repetitive quickly, but the idea is rote performance, and you use what you have. A company needs a 1-1/2 km by 3 km box. That will barely be wide enough for a full company line. Open terrain is best. As skill builds, congested broken terrain will be a natural challenge. You will find that your crews keep coherent formations moving through ground that would have caused trouble earlier. You can execute Phase III training in the "subcaliber" mode. The HMMWV and APC are natural low-cost substitutes for tanks and Bradleys. You will eventually want to work crews in their combat vehicles, but time spent in a HMMWV will decrease time required in an M1.

A word about brevity codes: We used the standard OPFOR codes and drills. Due to our extensive ex-

Sample Initial Battle Drill Training Program

Phase I (Half Day)
- Classroom (1 hour): Theory and description of drills
- Practice with models (2-3 hours): until each crew is capable of performing each drill

Phase II (Minimum 2-3 Days)
- Platoon Drills supervised by CO, XO, and first sergeant (w/AAR)
- Company drills as a whole (w/AAR)
- "PT" drill (optional)
- Advanced Phase II using scenarios when unit is capable (It is not necessary to wait for mastery)

Phase III (Minimum 3-4 Days, all activities w/AAR)
- Subcaliber with low cost vehicles (Not a 100% substitute)
- Platoon drills supervised by CO, XO, and first sergeant
- Company drills as a whole when platoons are capable
- Advanced Phase III using scenarios when unit is capable
- Return to basic drills and Phases I and II for review

Figure 4

posure to these techniques in the Bradley test, we kept them through a subsequent company ARTEP, rather than retrain hurriedly to Armor School standards. The results were impressive, and other companies have since adopted the drills in one form or another. Success was not a product of fancy codes or OPFOR drills; it came through the practiced ability of crews to execute drills that were standard for them. A platoon that surges into a U.S. wedge at the command, "Execute Wedge!" is as deadly as one that explodes into an OPFOR line at the command, "One, One, One!"

This gets right to the heart of the drill. As Gen Polk. (Ret.) maintained in his May-June 1988 *Armor* article, "The Criticality of Time in Combat,"[2] speed is essential. FM 71-2J, written with AirLand Battle in mind, stresses speed and concentration as two of five operational concepts for the attack. Just as well-honed gunnery drills will propel tank crews to lightning times and devastating accuracy, a mastery of battle drills will help them move quickly, decisively, and hit as a concentrated team. Command and control will be simplified and, contrary to conventional wisdom, the adaptability of drills will increase flexibility.

Team Tank, now moving in vee, makes contact on its right with Blue Platoon:

"Yellow Six, this is Blue One. Contact, TANKS, east, engaging, Out!"

"This is Yellow Six. Blue fix. Green report set on Blue's left. Red action right!"

Team Tank's commander has responded quickly and decisively to the enemy, fixing him with Blue (in contact), setting up additional overwatch with Green (whose Bradleys are not the best assault vehicles against the reported tanks), and attacking on his left flank into the enemy's right with Red. He is free to talk to his combat multipliers, report higher, and control his unit. To open his attack, Red's platoon leader has only to command, "Red, this is Red One. Execute wedge, Action right, Follow me!"

Team Tank's commander cannot allow the engagement to slow his momentum. On the enemy's destruction, he gets his team moving, but with an added note of caution:

"Green and Blue, execute line. Red, move to checkpoint one zero, orient east, report set."

The team moves out with Green and Blue in line. Red, already in line due to its attack, moves to checkpoint 10, a nearby overwatch position. As Red is bypassed and masked, the commander details Blue to the overwatch on the right: "Blue One, This is Yellow Six. Overwatch from checkpoint two zero, report set. Red and Green, execute line, orient east, Out."

With battle drills, the commander can quickly reconfigure to the original vee, or any other appropriate formation.

Like Team Tank, the unit that has a solid inventory of drills always has a base from which to respond. The unit that relies on a more complex or less disciplined system, regardless of the expertise of vehicle commanders, risks confusion and loses time reacting, if only in telling the driver where to go.

In combat, that is a waste we cannot tolerate. Our challenge is to hit the enemy hard and fast — and then hit him again. The concept is simple. The execution isn't. There lies the real challenge; battle drills simplify that challenge.

Notes

[1]William K. Warnick and Norman D. Smith, Battlefield Realism: The Impact of Opposing Force (OPFOR) on Friendly Force Task Performance With Implications for the National Training Center, (Alexandria, Va.: U.S. Army Research Institute for the Behavioral and Social Sciences and the Human Resources Research Organization, 1981), Volume 2, pp. 8, 10.

[2]General James H. Polk, Ret., "The Criticality of Time in Combat," Armor, May-June 1988, p. 10-13.

Captain Jeffrey E. Phillips was commissioned in Armor from the University of Massachusetts in 1979. He served in USAREUR as a tank and support platoon leader with 3-35 Armor and as an assistant division operations officer (1AD). After AOAC and JOMC, he joined 2AD as an assistant division plans officer. He served with 1-67 Armor as battalion maintenance officer, assistant battalion S3, and commander of B Company, winner of the 1987-88 2AD Draper Award. Prior to his current assignment as media relations officer/assistant public affairs officer, III Corps, Ft. Hood, he was assigned to the U.S. Military Observer Group, U.N. Truce Supervision Organization, headquartered in Jerusalem, Israel.

Effective Op Orders

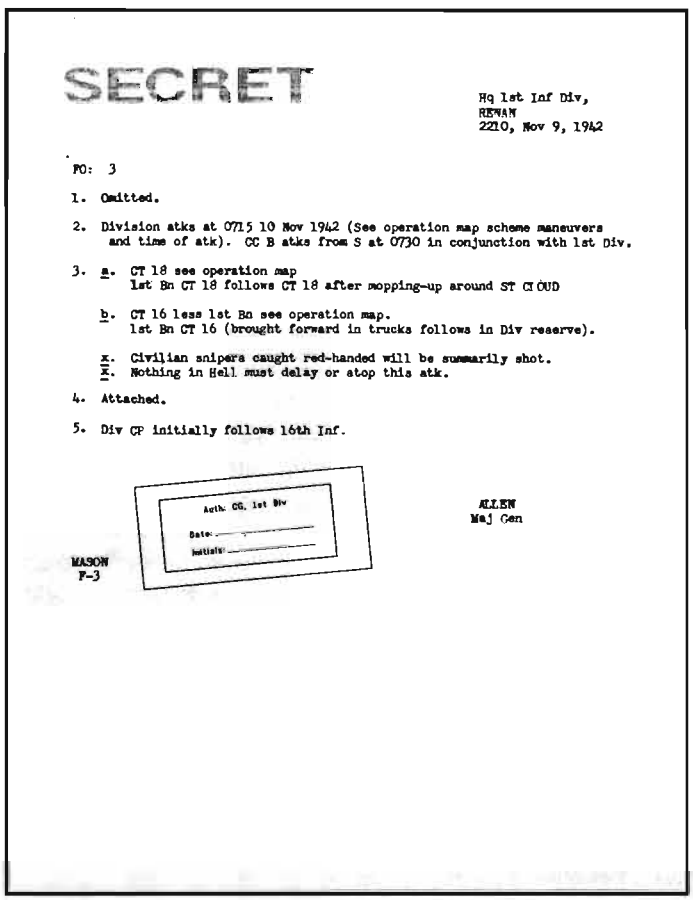
by Captain John L. Buckheit

The operations order (OPORD) is an important tool for the Army officer at any level. OPORDs direct our efforts in war as well as in peace. We learn to write the five-paragraph OPORD in Army schools at all levels. Then, we refine our skills during training exercises and much of our normal day-to-day business. But, are we learning to write and use the type of OPORDs needed to win on a modern battlefield?

OPORDs are a controversial subject. Almost all officers have written at least one, and each has his own particular style. Officers love to discuss the merits and flaws of different types of OPORDs. I have argued about OPORDs in both the basic and advanced courses, at the club, in officer professional development classes, and at ARTEP after-action reports. Through debate after debate, one criticism remains constant: the typical operations order at the battalion or company level is too long and unwieldy.

During World War I, American division-level attack orders were often 20-pages long. In the 1920s, battalion orders at the Infantry School were three or four pages in length. General Marshall criticized this as excessive. Studying German Army maneuvers during the 1930s, General Marshall learned that the Germans relied on brief orders, often only oral, up to the division level. During the Louisiana manuevers of 1940, he succeeded in cutting the division order down to a simple statement based on the five-paragraph field order. Battalion- and company-level orders were no longer than a page, and often oral. When the 1st Infantry Division attacked Oran, during the North African Campaign, the OPORD was only a page long, with accompanying graphics.

Through World War II, the Korean War, and the Vietnam War most units relied on oral OPORDs. Written orders were drawn up after the fact for historical purposes. The demands of combat did not allow sufficient time to draft and distribute lengthy orders. Commanders personally briefed subordinates on their intent whenever possible. At times, assistant S3s simply delivered graphics with the scheme of maneuver and a brief written order. This written order supplemented,



SECRET

Hq 1st Inf Div,
HEWAN
2210, Nov 9, 1942

FO: 3

1. Omitted.

2. Division atks at 0715 10 Nov 1942 (See operation map scheme maneuvers and time of atk). CC B atks from S at 0730 in conjunction with 1st Div.

3. a. CT 18 see operation map
1st Bn CT 18 follows CT 18 after mopping-up around ST CLOUD

b. CT 16 less 1st Bn see operation map.
1st Bn CT 16 (brought forward in trucks follows in Div reserve).

x. Civilian snipers caught red-handed will be summarily shot.
X. Nothing in Hell must delay or stop this atk.

4. Attached.

5. Div CP initially follows 16th Inf.

Auth: CG, 1st Div
Date:
Initials:

ALLEN
Maj Gen

MASON
F-3

Reproduction of the terse five-paragraph field order issued by MG Terry Allen to men of the 1st Infantry Division prior to the attack on Oran, North Africa, in 1942. The order is from the files of the First Division Museum - Cantigny, Wheaton, Ill.

"When we write OPORDs for a grade, we write as much as possible in order to demonstrate our competence. We learn this at service schools, and it follows us to service with units."

and did not repeat, the graphics. A well-trained unit with sound standard operating procedures could efficiently operate in this manner.

Unfortunately, we have lost some of these skills. All too often, modern battalions depend on lengthy written orders. Much of the information is redundant or restates the obvious. Staffs are taxed to produce these verbose documents, but subordinate commanders seldom read the entire order. Long orders briefings waste valuable time. Painfully detailed OPORDs cannot compensate for a poorly-trained unit. Dynamic plans become flat. Afterward, some commanders will need to personally review crucial points with key personnel. The system is inefficient and robs units of flexibility.

Why do units operate this way? Some officers respond that in wartime, they'd do it differently. That logic defeats the purpose of training. We need to review our training. Officers write OPORDs in three situations. Army schools, specifically the basic and advanced courses, instruct and grade us on writing orders. Then, we write orders for grade or critique during training exercises. Finally, we write orders to accomplish our day-to-day business in the field and garrison. Of the three, the third circumstance may be the best training. That is the *only instance* where we routinely write only what we need.

I am not criticizing the five-paragraph field order. The format is logical and designed to avoid accidentally omitting anything. Any reader knows where to look for whatever information he seeks. But too often, we abuse this format by providing excessive information. When we write OPORDs for a grade, we write as much as possible in order to demonstrate our competence. We learn this at service schools, and it follows us to service with units. Also, commanders give in to the temptation to micromanage through finely detailed OPORDs. Unfortunately, such orders will not suffice during the next conflict.

Throughout the Army, we need to stress the concise OPORDs that will be efficient tools in time of war. We will only be combat ready when such OPORDs become the norm.

The basic and advanced courses must teach officers to write this type of OPORD. Small-group instruction lends itself to writing a lot of OPORDs. Obviously, we must start by teaching long written orders. The Armor Officer Advanced Course does so. Also, it stresses mission-oriented orders with a solid commander's intent. Students write battalion OPORDs and brief company OPORDs for a grade.

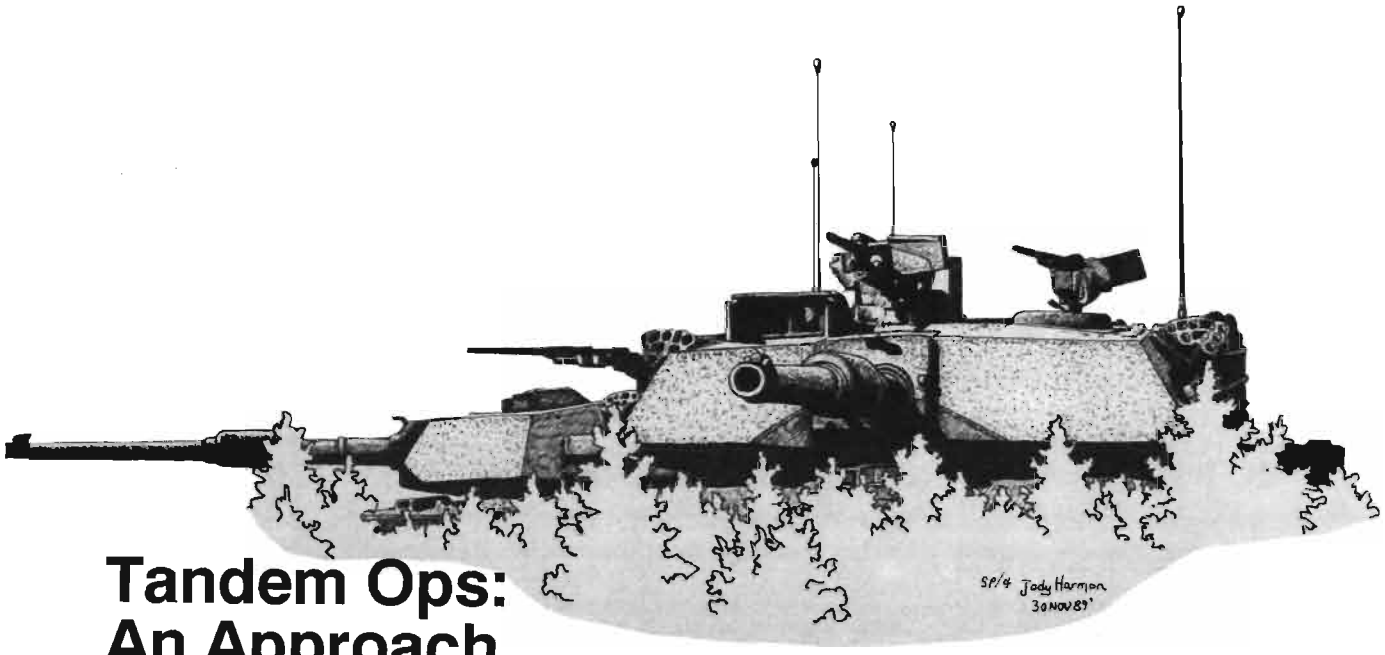
This is a solid base, but it is only a start. Instructors normally grade with a checklist. This tempts students to be as verbose as possible in order to cover everything. To combat this, students should have to write OPORDs under extreme time constraints, forcing them to prioritize information. Then, instructors could critique what was included and what was not.

Also, the instruction should stress OPORDs consisting solely of operations graphics with brief instructions. This would train students in the type of orders that have worked in wartime.

Commanders at all levels must implement sound standard operating procedures. This will allow for more streamlined OPORDs. The two must complement one another in an efficient system. Then, commanders must use brief OPORDs during field exercises, so that units can become accustomed to them. Also, they must encourage subordinates to use brief OPORDs. Obviously, micro-management does not create the necessary environment.

Finally, all officers should use the OPORD format whenever possible during day-to-day business. This constant practice will teach officers to become terse. Like any other skill, writing OPORDs requires constant practice. Once we start doing this, we will institutionalize a concept that has worked for our Army in three major conflicts.

Captain John L. Buckheit graduated from USMA in 1984 and received an Infantry commission. After attending the Infantry Officer Basic Course, he served with 1st Battalion, 16th Infantry, 1st ID (F) in the FRG. He was successively assigned as rifle platoon leader, company XO, battalion support platoon leader, and assistant S3. After attending the Armor Officer Advanced Course and the Cavalry Leaders' Course, he was selected for the Funded Legal Education Program. He is currently attending the Columbia University School of Law.



Tandem Ops: An Approach To Mounted Surveillance

by Captain Walter F. Ulmer III

It is 0200. As you begin to slip into a much needed slumber, your XO taps you on the shoulder. Battalion headquarters has radioed a mission change, and your company needs to be ready to move in 45 minutes. As you gather your senses and clothing, those routine tasks begin that will rally the company into a REDCON 1 status. Wisely, you had pulled the company into a tight nighttime assembly area, placed the unit on 50 percent security, and established mounted armored OPs at the most dangerous enemy avenues of approach. As the company hustles to get ready, the XO returns.

He has a frantic look about him. Apparently, the northern OP, a tank section from the third platoon, had placed its vehicles in hide positions about 200 meters apart.

As a result of running the vehicle's radios without starting the engine periodically, it will not start. Its wing tank has thrown a track enroute to slaving it. At the other OP, a section from the first platoon, things are not much better. The entire crew on one of the vehicles has fallen asleep. The wing tank commander, suspecting what had happened, sent his loader to wake the sleeping crew. Somewhere between the two vehicles the loader has become lost. Your XO completes his update by pointing out there is no way the company will be ready to move at the appointed time. You begin the walk to your vehicle to radio the battalion commander...

Few of us have been in units where all of the situations described above have occurred simultaneously. Most of us, however, have had similar mettle-testing sessions happen at one time or another. Obviously, much of what transpired can be attributed to leadership failures. At the same time, recurring errors in the establishment and recovery of mounted observation posts (or armored OPs), might lead one to believe that there exist systemic shortcomings in our current approach to this important combat function. Few field manuals address the specifics of conducting armored OPs, yet we find ourselves using them frequently as one important form of stationary surveillance.

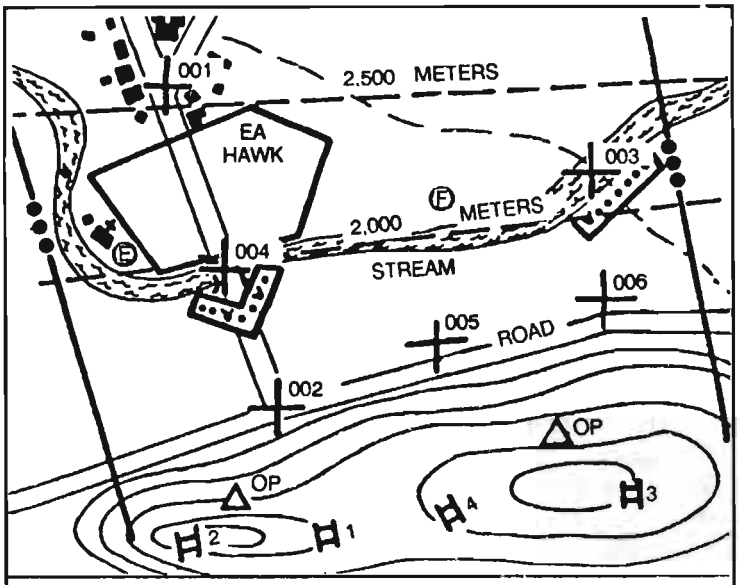
There are many advantages associated with conducting stationary armored OPs. Not only do they make best use of the vehicle's onboard sighting, weapons, and communication systems, they provide the crew enhanced protection from enemy direct and indirect fires. If the situation dictates, they can be augmented with dismounted OPs.

For the sake of this discussion, define an armored OP as a mounted, stationary OP, which has the primary mission of conducting surveillance on an enemy mounted or dismounted avenue of approach. While primary surveillance is conducted from the vehicle, this capability can be enhanced with dismounted OPs as required. Doctrinal missions traditionally associated with OPs remain the same, as does the sequence of tasks practiced during OP occupation, execution, and recovery.

There seems to be a dearth of information regarding the conduct of armored OPs. While many manuals cite the necessity for observation posts as part of a larger mission, few outline a specific methodology involving mounted OP execution. Most doctrinal literature addresses conventional dismounted OPs. ARTEP 17-57-10 MTP (December 1988) outlines FM 17-98 and FM 21-

75 standards for the priorities of tasks and conduct of dismounted scout OPs. FM 17-15, *The Tank Platoon*, (October 1987), provides a diagram (figure 4-9) of a tank platoon defensive position utilizing dismounted OPs. (See Figure 1, below.)

It depicts dismounted OPs positioned forward of the platoon's vehicles. It also shows the platoon's vehicles arrayed at some distance from one another, with hills between the section's vehicles.



TARGET O	TANK H
E	2, 1, 4
F	1, 4, 3
FPF	TRP 002 TO TRP 003
001	1, 2, 3, 4
002	3, 4
003	1, 2, 3, 4
004	1, 2, 3, 4
005	1, 2
006	1, 2

Figure 1.

A tank platoon defensive position, using dismounted OPs (from FM 17-15).

FM 17-98, *The Scout Platoon,* provides the most extensive narrative concerning OP occupation. It discusses dismounted OP operations and OP integration with crewmembers maintaining positions on board the vehicles. None of these publications discusses the conduct of mounted OPs in any detail. This article will describe one method of conducting armored observation posts, applicable to both scouts and tankers.

Setting Up the OP

The concept behind "tandem OPs" is simple: mutual support and teamwork between vehicles in a section will result in a better product. In terms of the establishment of OPs, it will provide redundancy and reduce the probability of errors commonly associated with observation posts.

Once the unit has chosen the appropriate site for the observation post, routine tasks associated with OP occupation begin. They are executed in that order which doctrine and unit SOPs dictate. However, vehicle positioning in tandem OPs is different. Instead of vehicles routinely placed 100-200 meters apart, the vehicles are directly adjacent to one another. One of the vehicles backs into a hide position, but no farther back than allows crewmembers to step from one vehicle to the other without having to get on the ground. This vehicle becomes the "passive" vehicle. Throughout the occupation of the OP, the passive vehicle shuts down completely, and its crew sleeps, performs maintenance, conducts personal hygiene, etc. The vehicle in the forward position, or "active" vehicle, is fully manned and

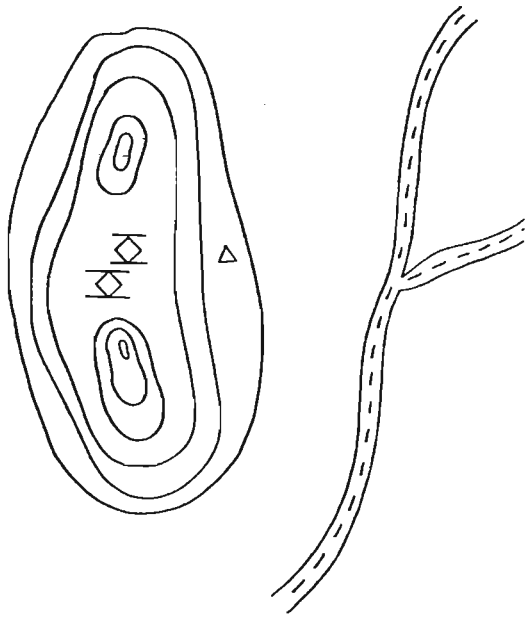


Figure 2.

A scout section occupies an OP using the tandem technique, with dismounted OP.

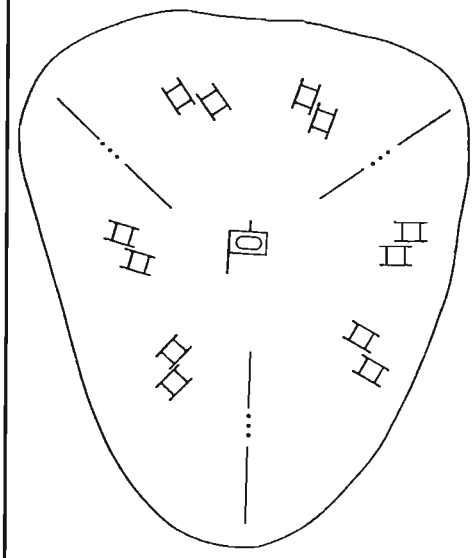


Figure 3.

A tank company using the tandem technique in an assembly area.

performs normal OP functions for the entire section (observation, radio watch, local security, etc.). The two crews can switch roles when required. If one vehicle is not fully mission capable, crews can rotate through the operational vehicle, which occupies the active position. It is important to note that the sequence of tasks associated with the occupation, execution, and recovery of the OP is not altered whatsoever. A tandem OP might look like the one in Figure 2, above.

Units occupying assembly areas can apply the tandem concept as well. (See Figure 3.) Again, drills prescribed for assembly areas will not be altered. In the event that the assembly area is threatened, vehicles can move out of the tandem configuration and assume designated fighting positions. (See Figure 4.)

Pros and Cons

There are certain advantages and disadvantages associated with tandem OPs. Advantages include:

● **Crew Efficiency.** One crew operating together at 100 percent alert (while the other crew sleeps, works, performs maintenance, etc.), results in an overall 50 percent alert posture without sacrificing crew integrity. One crew operating "full up" is more likely to function better

In the event that the assembly area is threatened, vehicles can move out of the tandem configuration and assume designated fighting positions.

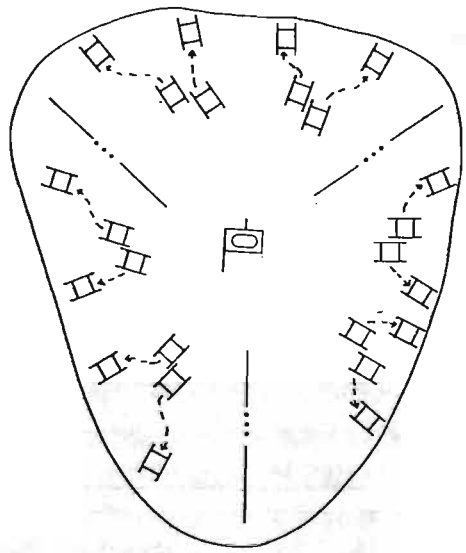


Figure 4.

Company plan for moving from tandem positions to fighting positions

"Crews short of personnel especially liked the idea, because it gave them the edge for sustained operations, while increasing the efficiency of their rest periods. Also popular was the concept of active and passive vehicles. Crews liked the idea of being 100 percent at work or 100 percent at rest."

than two crews operating independently at 50 percent. The ability to conduct sustained operations is enhanced, better overall surveillance results, and the quality of rest received by the passive crew increases.

● **Occupation.** Occupation of the OP or assembly area is quicker. Both crews "gang tackle" occupation drills for essentially one OP.

● **Personnel Utilization.** In an era when 3-man tank crews and 4-man Bradley crews abound, the concept of tandem OPs allows manning the active vehicle with a full crew at all times. This mutual support applies to maintenance and resupply functions as well. Shared duties enhance efficiency.

● **Asset Use Minimization.** The use of precious assets is minimized. The amount of wire run between OPs or positions in an assembly area is reduced, and hours logged on vehicles, radios, and ancillary equipment are minimized.

● **System redundancy.** More than one vehicle located directly at an OP site reduces the risk of that position becoming ineffective as a result of either vehicle breakdown or crew error.

● **Resupply efficiency.** Resupply operations are streamlined. Classes I, III, and V are supplied to two vehicles at a time, when using "tailgate" resupply techniques, (that which is routinely used when resupplying deliberate observation posts positioned for extended periods). During resupply, there is no lapse in OP operation: the passive crew can perform resupply functions for both vehicles, while the active crew continues to provide surveillance.

● **Responsiveness.** In the event of a short-fuzed change of mission, or during routine recalls of OPs, responsiveness increases, and havoc is reduced. The necessity for one vehicle to move to another's location to provide a slave or to wake up a sleeping crew is essentially eliminated, (unless both vehicles require assistance simultaneously, which is rare).

There are disadvantages as well:

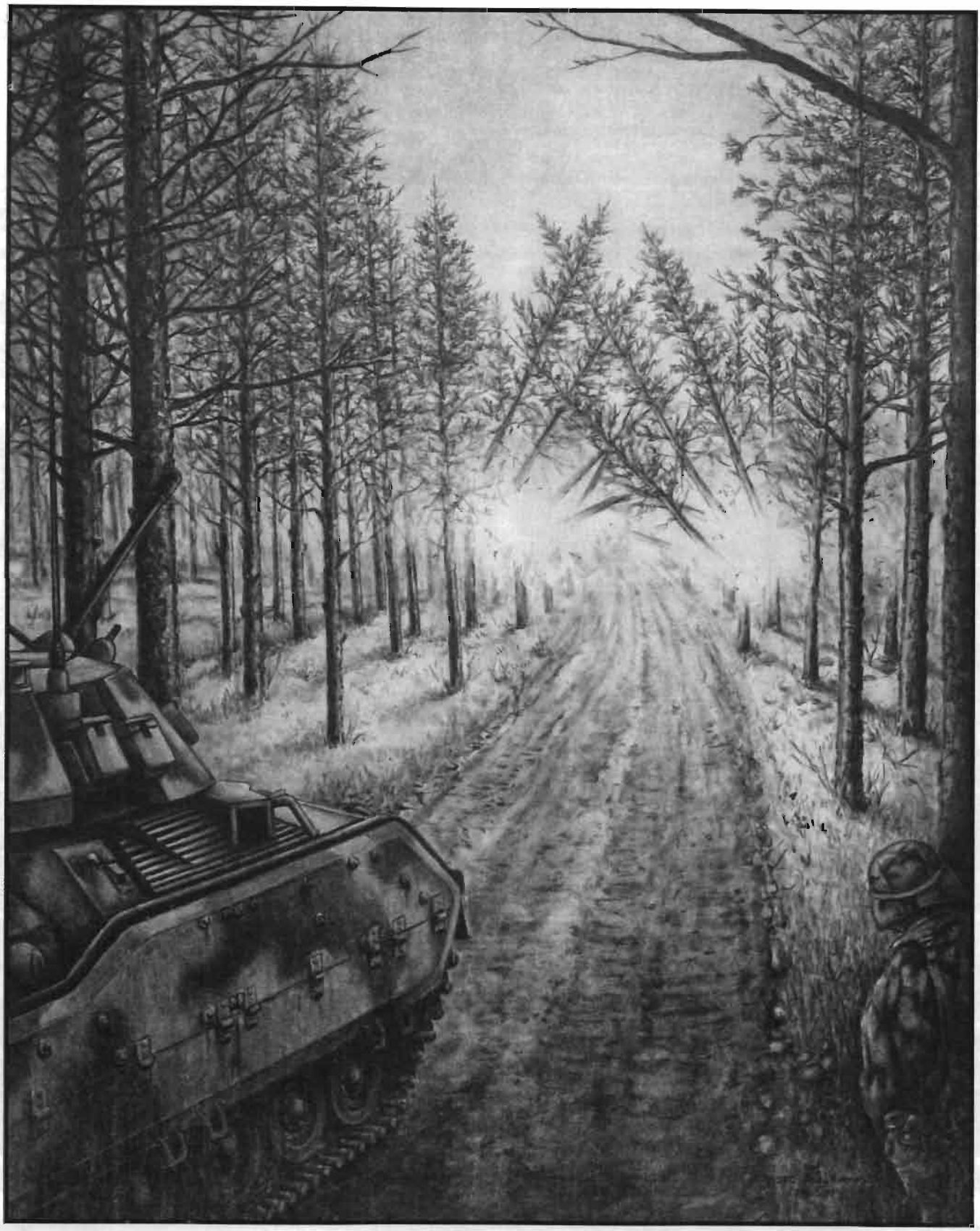
● **Vulnerability.** The proximity of vehicles in tandem OPs increases susceptibility to indirect fire.

● **Coverage.** By doubling the number of vehicles at each OP, a unit's surveillance capability is halved.

● **Concept Acceptability.** Many are initially uncomfortable with the idea of pairing vehicles in the tandem OP configuration. Initial training of crews must focus on the advantages, while realistically addressing the disadvantages. Crewmembers may take time to become accustomed to tactically positioning vehicles in a manner that resembles garrison motor pool parking. Soldier movement around vehicles must, as always, be monitored carefully to reduce potential increased safety risks associated with transitioning to a new way of business.

Response by soldiers who have used tandem OPs has been favorable. Crews short of personnel especially liked the idea, because it gave them the edge for sustained operations, while increasing the efficiency of their rest periods. Also popular was the concept of active and passive vehicles. Crews liked the idea of being 100 percent at work or 100 percent at rest. Those difficulties routinely associated with maintaining 50 percent security within a single crew were reduced significantly. With the reduction in this area, other failures associated with OP execution ebbed. Via tandem OPs, opportunities for sections to operate together increased, thereby increasing section cohesion. In an Army where we routinely train with undermanned crews, and where skeleton MTOEs fail to recognize the redundancy required in order to conduct sustained operations, tandem OPs might just provide an additional edge on the battlefield.

Captain Walter F. Ulmer III was commissioned in 1979 from the USMA and has attended AOBC, AOAC, CAS^3, Airborne, and Ranger Schools. He served as a tank platoon leader, cavalry troop XO, and S3 Air with the 3d ACR, Fort Bliss, Texas; and as squadron motor officer and cavalry troop commander in the 11th ACR, FRG. He was also S3 of the 4-67 Armor, 3d AD, in Germany. He is currently a personnel readiness officer at PERSCOM, Alexandria, Va.



The Scout-Emplaced Abatis

by First Lieutenant (P) Steven G. Unfreid and First Lieutenant (P) Michael Eller

"Red 1 – This is Black 6 – Frago Follows – Over."

"Black 6 – This is Red 1 – Roger – Over."

"Execute 'Woodcutter' Grid NB 679943 – NLT 0500 – to tie in with prechamber HED 1309 – Over."

"This is Red 1 – Wilco – Out."

1LT Wilson (RED 1) looks at his watch – 0240, should be enough time – then enters his platoon net and barks out mission orders to his L15 and L16 crews. His orders are brief – codeword, grid, time, and intent.

In 12 minutes the two tracks have pulled out of their positions on the troop's wide screen and have arrived two kilometers away at a narrow, winding, heavily-wooded pass on B468. 1LT Wilson readjusts his remaining four vehicles to cover the now-thinned screen.

The joint engineer/scout training conducted at home station and at Grafenwoehr begins to pay its dividends. The section starts battle drill "WOODCUTTER" – a demolitions-constructed abatis, which will reinforce the troop's GDP obstacle plan. Both L15 and L16 move into overwatching positions and begin separate, yet complementary tasks. The Bradley commander (BC) for L15 begins to calculate the required demo (to be drawn from his on-board basic load), recon the obstacle, and mark trees for demolition. The Bradley commander for L16 begins to test burn the OD green and yellow plastic-covered time fuse and cut line mains and branch lines.

Each crew member executes his assigned tasks in sequence. Little

Abatis Drill – Two-Scout Section
Vehicle I

	BC I	Gunner I	Driver I	Scout 1	Scout 2
Step 1	Receive mission Direct section into overwatch position	Man 25mm	Drive	Air Guard	Rear Security
Step 2	Place LP/OP Calculate demo Recon obstacle Mark trees for demolition	Man 25mm	PMCS	Assist BC I	Occupy LP/OP
Step 3	Supervise. Assist laying line mains	Man 25mm	Occupy driver's hatch	Lay line mains with BC I	LP/OP
Step 4	Inspect placement of charges.	Man 25 mm	Prepare to move	Bring in LP/OP mount vehicle	Return and mount vehicle
Step 5	Give order to detonate. Return to vehicle.	Man 25mm	Turn vehicle around	Account for sensitive items	Rear security
Step 6	Account for men/ equipment. Move. to safe distance Report.	Man 25mm	Drive	Air guard	Rear security

Figure 1

"Our experience shows that 14 inches is a good average tree size for planning. This will still make an effective obstacle. Time and materials estimates can be adjusted for different sizes of abatis."

time is wasted. Scout 1 from L15 lays line mains with his Bradley commander, scout 2 lays the land line to his LP/OP, the driver pulls PMCS, and the gunner mans his 25mm. At 0455 a bright flash lightens the still dark morning sky. A moment later, the shock wave of 90 lbs of exploding C-4 rocks L11.

"Black 6 — This is Red 1 — Over."

"Red 1 — This is Black 6 — Over."

"This Is Red 1 — 'Woodcutter' Executed Time 0455 — Over."

"This is Black 6 — Roger, Out."

This scenario, although fictitious, is a realistic one for cavalry scouts.

In this article, we give a battle drill for a demolition abatis. CPT Ed Cardon expressed the need for battle drills in the June 1988 issue of *Army Magazine:* "Units do well only those things that have been ingrained into their activities. There is little time to plan a play in the huddle or train soldiers in each subtask. Drills are ideal and essential in surmounting the nature of combat operations."

Once the need for battle drills is identified, the next step is to design and proof them.

The 58th Combat Engineer Company and L Troop 3/11th Armored Cavalry Regiment developed the following demolition-constructed abatis battle drill for a two-scout section. Each scout platoon has a demolition set by TOE. This drill can also be modified for use with chain saws. Chain saws are not TOE equipment, but are often available. Figures 1 and 2 show the duties of the first and second Bradley crews. Figure 3 provides a rollup of time and materials required to emplace an abatis, either with demolitions or chain saws. We have included comparison data for an engineer squad to emplace the same obstacles.

We used a standard 75-m abatis consisting of 15 trees of 14-inch diameter on each side of the road. Although FM 5-125, *Demolitions,* recommends trees of 24-inch diameter, trees in Germany are normally harvested before they reach that size. Our experience shows that 14 inches is a good average tree size for planning. This will still make an effective obstacle. Time and materials estimates can be adjusted for different sizes of abatis.

These estimates were made by emplacing an abatis using training aid demolitions, and by cutting logs to simulate live trees. Fuel use is an important consideration for chain saws (see Figure 3). We recommend carrying a five-gallon can of MOGAS/ oil mix on any vehicle carrying a chain saw.

There are never enough engineers; scouts frequently plan to emplace some of their own obstacles. By using drills such as this one for training, we can draw together the individual and collective tasks required to do the mission, and give our soldiers and leaders the confidence and skills to accomplish the mission in war.

Abatis Drill — Two-Scout Section
Vehicle II

	BC II	Gunner II	Driver II	Scout 1	Scout 2
Step 1	Direct vehicle into overwatch	Man 25mm	Drive	Air guard	Rear security
Step 2	Prepare demo. Test burn fuze Cut line mains, branch lines, time fuze.	Man 25mm	PMCS	Assist BC II	Assist BC II
Step 3	Fix charges to marked trees. Attach branch lines to main.	Man 25mm	Occupy driver's hatch	Assist BC II	Assist BC II
Step 4	Connect M60 fuze igniter and non-elec blasting cap to time fuze.	Man 25mm	Prepare to move	Assist BC II	Return and mount vehicle
Step 5	Attach cap to time det cord. O/O of section leader, light fuze. Return.	Man 25mm	Turn vehicle around	Account for sensitive items	Rear security
Step 6	Account for men/ equipment. Move to safe distance.	Man 25mm	Drive	Air guard	Rear security

Figure 2

Emplacement Times and Materials Required

	Engineer squad		Two scout section	
	Demolitions	Chain saws	Demolitions	Chain saws
Squad size	9	9	10	10
# of chainsaw (fuel)	N/A	1 (3 qt. MOGAS (1 qt. oil)	N/A	2 (3 qt. MOGAS) (1 qt. oil)
C-4	35 blocks (90 lbs)	N/A	35 blocks (90 lbs)	N/A
Det Cord	1 roll	N/A	1 roll	N/A
Non-elec blasting caps	4	N/A	4	N/A
Time fuze	1 roll	N/A	1 roll	N/A
Fuze igniters	4	N/A	4	N/A
Time to prepare	90 min	10 min	120 min	10 min
Time to execute	1 min	150 min	1 min	75 min
Total time	91 min	160 min	121 min	85 min

Figure 3

"Fuel use is an important consideration for chain saws...We recommend carrying a five-gallon can of MOGAS/oil mix on any vehicle carrying a chain saw....."

First Lieutenant (P) Steven G. Unfreid was commissioned in the Corps of Engineers from the University of Alaska in 1984. He has served as platoon leader and executive officer of the 58th Engineer Company, 11th ACR. A recent graduate of the Engineer Officer Advanced Course, he is currently attending Ranger School prior to assignment with the 6th Engineer Battalion, Ft. Wainwright, Alaska.

First Lieutenant (P) Michael L. Eller was commissioned in the Corps of Engineers from the University of Utah in 1985. He graduated with a B.S. in civil engineering in 1986. He has served as platoon leader and executive officer of the 58th Engineer Company, 11th ACR. He is currently the XO for the 11th ACR Boeselager team.

Recognition Quiz Answers

1. BTR-60PB. The BTR-60PB has wheels evenly spaced with foot steps between them on both sides. It has straight climbing rails on sides of hull.

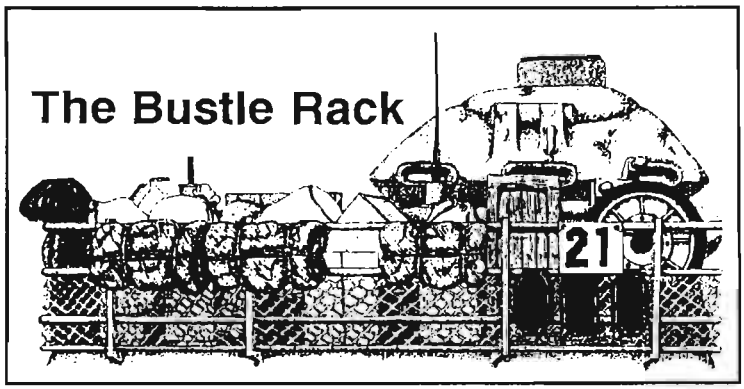
2. T-64. The T-64 and T-72 medium tanks are similar in appearance, but there are several design differences. Those features peculiar to the T-64 include six small, stamped road wheels; four track-return rollers; a 12-tooth drive sprocket; double-pin, rubber-bushed track; and linear-type shock absorbers. Other notable features include the gunner's IR searchlight mounted to the left of the main gun and a newly-designed 12.7-mm AA machine gun on the commander's cupola with fixed mount. A crewman can fire this machine gun buttoned up.

3. T-72. The T-72 has six, large, die-cast, rubber-coated road wheels and three track-return rollers. The tank has a larger engine compartment than the T-64, and its radiator grille is near the rear of the hull. The gunner's IR searchlight sits on the right of the main gun. The 12.7-mm NSV AA machine gun has a rotating mount and cannot be fired from within the tank.

4. Leclerc MBT (France). This new MBT joins the French force this year. The massive, boxy turret resembles the Leopard II and M1, but the 120-mm gun tube on the Leclerc is longer. With a weight of about 53 tons and a 1500-hp. diesel, the Leclerc will have a higher horsepower-to-weight ratio than the Leopard II or M1. Has NBC system, deep water fording snorkel, thermal imaging, laser rangefinder, and modern fire detection and suppression system.

5. Panhard VBL (France). This new reconnaissance vehicle joined the French force in 1987 for use as a scout vehicle and as an ATGM carrier for the MILAN missile. Powered by a commercial Peugeot diesel with 5-11-mm welded armor hull, sloped to provide greater ballistic protection.

6. AMX 10P (France). A standard French infantry combat vehicle in service since the 1970s, armed with a 20-mm dual-feed cannon. Carries eight infantrymen in bucket seats within aluminum hull. Large rear door drops down for entry and exit. Rear hull water jets propel the vehicle when swimming.



M1/M1A1 Tank Fire Reduction Program

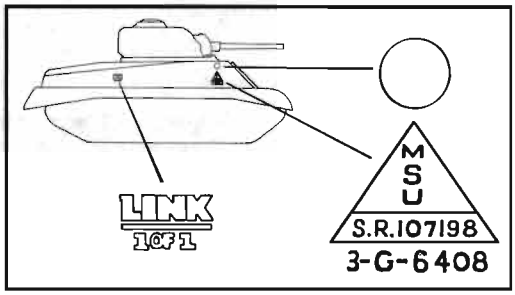
Since December 1988, the Tank-Automotive Command (TACOM) and the Armor and Ordnance Schools have endeavored to reduce/eliminate M1/M1A1 tank fires. TACOM developed fire prevention booklets and tapes that are being provided to all Abrams-equipped units. TACOM and General Dynamics Land Systems (GDLS) analyzed the reported fires and identified the problem areas. They provided this information to the Armor and Ordnance Schools, which reviewed and revised their POIs as needed to ensure these problem areas receive the proper emphasis. The Armor School developed and approved evacuation drills, then forwarded the final drills to TACOM for inclusion in the -10, and incorporated them in the appropriate blocks of instruction within the Armor School. TACOM and GDLS are considering/implementing various materiel changes via Emergency Change Proposal and Materiel Change Management processes to provide the necessary "hardware" fixes (i.e., low- and high-pressure hydraulic quick disconnects).

The Armor Center New Equipment Training (NET) Division developed a Fire Training POI provided to USAREUR as a exportable training package, consisting of lesson plans, fire prevention books, and evacuation procedures. FORSCOM divisions will receive the training from the NET Division by 11 January 1990. Units receiving or scheduled to receive Abrams transition training will receive the fire prevention training as part of NET.

POC for this action is LTC Self, AV 464-7227/8449.

Can You Help Identify These Markings?

The Patton Museum and the Tank Museum in England want to identify certain unusual markings seen on some Sherman tanks and other military vehicles in North Africa and Europe during World War II.



One marking has the word "LINK" either above or beside the digits "1 of 1." The other strange marking is a triangle enclosing the vertical letters "MSU" and a horizontal string of letters and numbers; a solid pink circle is just above the triangle's apex. The markings are on the upper hull of the tanks.

The Tank Museum has photographs of Sherman Firefly tanks with these markings in military vehicle parks in England, and on operational tanks in North Africa and northwestern Europe. The Patton Museum has a photograph of the "LINK" marking on the Staghound armored car built in the United States for British service.

Anyone who can identify these markings should contact David Holt, librarian at the Patton Museum, P.O. Box 208, Fort Knox, Ky. 40121-0208. The telephone number is 502-624-6350/3812.

Height Limit for New Accessions

Effective 6 November 1989, the maximum height for new 19E/K accessions will be limited to 6 feet, 1 inch. This affects all active and reserve enlisted accessions. The height limit does not apply to enlisted soldiers already in the force, nor does it apply to officer accessions.

We are sensitive to the fact that Armor battalions will have to go with a five-guard offense to remain competitive in post-level basketball competition.

West Point Seeking Social Sciences Instructors

The Department of Social Sciences at the United States Military Academy is looking for highly qualified company grade ROTC or OCS officers from Basic Yeargroups 1982 to 1989 who are interested now or may have a future interest in civilian graduate study, followed by a teaching assignment at West Point. The Department of Social Sciences educates cadets in the academic disciplines of Political Science (American and International), Economics, and Management.

The Department's selection process is exceptionally competitive and requires officers to express their interest early - it is never too early to begin the application process. Under consideration now are the applications of officers who might be available to start graduate study in the summer of 1991 or later. Officers available in the 1991 group must complete their applications, including reported GRE or GMAT Scores, not later than March 31, 1990. Selection criteria include: branch qualification before beginning graduate school, demonstration of strong long-term military potential, and undergraduate or graduate records that indicate the ability to gain admission and successfully complete graduate study at a top American university. For more information please

write: Department of Social Sciences, United States Military Academy, ATTN: CPT William K. Sutey, West Point, NY 10996.

70th Armor Seeks Memorabilia, Historic Items

The 4th Battalion, 70th Armor is looking for any 70th Armor memorabilia or items of historical significance to the unit. DA recently redesignated 2-81 Armor to 4-70 Armor in Erlangen, Germany. Send any items or further correspondence to: Commander, 4th Battalion, 70th Armor, ATTN: S1, APO New York 09066.

81st Armor Headquarters Seeks Memorabilia

The 1st Battalion, 81st Armor Regiment is looking for regimental memorabilia from the 81st Armor Regiment, in its capacity as regimental headquarters. Items of interest include: colors, guidons, yearbooks, photos, scrapbooks, etc. The memorabilia will be displayed in the battalion area with other regimental memorabilia. Units which fall under the 81st Armor through lineage include the 81st Tank Battalion; 707th Tank Battalion; 94th Medium Tank Battalion; Troop E, 85th Cavalry Reconnaissance Squadron; and the 505th Replacement Company. Mailing address is: Commander, 1-81 Armor, ATTN: ATZK-TC-TBA-I, Fort Knox, Ky. 40121-5261. POC: battalion adjutant or battalion XO. Autovon 464-5431 or commercial 502-624-5431.

Studying for your 1990 SQT

The Armor and Cavalry SQT for 1990 will be based on the new CMF 19 STP(s). These SQTs will also be battle-focused which means tasks selected for testing are combat critical. In preparing for your SQT, you should obtain the SQT Notice and study the listed tasks. The notice has a new format. It now lists the exact tasks tested on the SQT, and it lists the tasks in the exact order that they will be tested. It is especially important for the sergeants first class in MOS 19E and 19K, and the staff sergeants and sergeants first class in MOS 19D to study for their SQT following the tasks listed in the notice. Many new tasks in these SQTs have never been tested. These tests align with the new STPs, the new ANCOC, and the new platoon ARTEPs. The majority of these new tests are tactical and doctrinal in nature. Validation data indicate that these tests are more difficult than previous versions. We strongly encourage the staff sergeants and sergeants first class in CMF 19 to study hard for their SQT.

New CMF 19 Soldier's Training Publications

New Soldier's Training Publications (STP) for the Armor and Cavalry soldiers are presently in printing and distribution to the field. The title and print date of the STPS are listed as follows:

STP 17-19D1-SM	Soldier's Manual, MOS 19D, Cavalry Scout, Skill Level 1 (Aug 89)
STP 17-19D23-SM	Soldier's Manual, MOS 19D, Cavalry Scout, Skill Levels 2 and 3 (Aug 89)
STP 17-19D4-SM	Soldier's Manual, MOS 19D, Cavalry Scout, Skill Level 4 (Aug 89)
STP 17-19D14R8-SM-TG	Soldier's Manual, Skill Levels 1, 2, 3, 4, and Trainer's Guide, MOS 19DR8, M551A1 Sheridan Crewman (Aug 89)
STP 17-19D-TG	Trainer's Guide, MOS 19D, Cavalry Scout, Skill Levels 1 and 2 (Aug 89)
STP 17-19D-JB	Job Book, MOS 19D, Cavalry Scout, Skill Levels 1 and 2 (Aug 89)
STP 17-19E1-SM	Soldier's Manual, MOS 19E, M48/M60 Series Armor Crewman, Skill Level 1 (Aug 89)
STP 17-19E23-SM	Soldier's Manual, MOS 19E, M48/M60 Series Armor Crewman, Skill Levels 2 and 3 (Aug 89)
STP 17-19EK4-SM	Soldier's Manual, MOS 19E and 19K, Armor Platoon Sergeant, Skill Level 4 (Aug 89)
STP 17-19E-TG	Trainer's Guide, MOS 19E, M48/M60 Series Armor Crewman (Aug 89)
STP 17-19E-JB	Job Book, MOS 19E, M48/M60 Series Armor Crewman, Skill Levels 1 and 2 (Aug 89)
STP 17-19K1-SM	Soldier's Manual, MOS 19K, M1/M1A1 Abrams Armor Crewman, Skill Level 1 (Nov 89)
STP 17-19K23-SM	Soldier's Manual, MOS 19K, M1/M1A1 Abrams Armor Crewman, Skill Levels 2 and 3 (Nov 89)
STP 17-19K-TG	Trainer's Guide, MOS 19K, M1/M1A1 Abrams Armor Crewman (Nov 89)
STP 17-19K-JB	Job Book, MOS 19K, M1/M1A1 Abrams Armor Crewman, Skill Levels 1 and 2 (Nov 89)

The new STPs have some major design changes. The 19E and 19K Skill Level 4 tasks have been combined into one manual for Armor Platoon Sergeants. This manual covers only tactical and doctrinal tasks. The Trainer's Guide material has been placed into a separate manual. This will enable the Trainer's Guide to be more flexible and efficient. Another major change is the development of a separate manual for the M551A1 Sheridan crewman.

Effective 1 January 1990, Soldier's Training Publications (STPs) will no longer automatically be sent to your unit based on DA-established guidelines. To ensure your unit receives the proper type and quantity of STPs, you must submit a completed DA Form 12-99-R to the Army Publications Distribution Center – Baltimore. On DA Form 12-99-R, enter the appropriate form and block number for each type of STP you need. Find this information in DA Pam 25-30, dated 31 Dec 89.

Direct ant questions regarding this change to: CDR, USAPPC, ATTN: ASQZ-NV, 2461 Eisenhower Avenue, Alexandria, Va. 22331-0302, or phone AV 221-6248/6289 (commercial 202-3325-6248/6289).

BUSTLE RACK - *Continued*

Building Dedicated to MG Grow

The 2d Region, USA ROTC Cadet Command at Fort Knox conducted a memorialization ceremony on 27 October 1989 to dedicate Building 203 on Old Ironsides Avenue in honor of Major General Robert W. Grow. WWII commander of the 6th Armored Division.

Big Red One to Meet In Louisville Next August

The 72d annual reunion of the Society of the First Division will be in Louisville August 22-26.

Further information is available from Arthur L. Chaitt. Executive Director. 5 Montgomery Ave.. Philadelphia, Pa. 19118 (Phone: 215-836-4841).

Blackhorse Air Cav Vets To Meet in May

The 6th annual reunion of the Air Cavalry Troop (Vietnam) Chapter of the 11th Armored Cavalry Regiment - Blackhorse Association will be at Fort Knox May 9-12.

Further information is available from James Angelini, 2512 Lower Hunters Trace, Louisville, Ky. 40216-1352 (Phone: 502-449-1220).

Two Tank Books Stress the NCO Story

SSG John T. Broom, history instructor at the Command & Staff Department, U.S. Army Armor School, recommends two recent books worth reading as we close out the Year of the NCO.

Ralph Zumbro's Tank Sergeant is the story of one soldier's year in Vietnam with the 1-69 Armor.

Ken Tout's Tank focuses on a tank crew's struggle in the Normandy Campaign of 1944. SSG Broom rates it as "a very intense retelling of the effort of high-intensity conflict from the NCO's perspective."

LETTERS - *From Page 3*

required amphibious capability (not needed at Ft. Irwin, but very important in NORTHAG), rapid on-road speed (of special importance when moving laterally across the battlefield), adequate cross-country mobility, armor protection, and counterrecon firepower up through the BMP.

Each HMMWV would have a Dragon assigned and mount either the Mark 19, M60, or .50-caliber machine gun, all for self-protection only. I personally feel TOWs are out of place in the TF scout platoon. The time currently required to train and maintain this equipment, especially the ITV, could be better used in honing scout skills.

The TF commander would have a very flexible force to meet his recon, and if need be, counterrecon missions (HMMWV/LAV25 combinations to find and kill OPFOR recon elements).

Assuming that additional manning and equipment will not be available to meet the above optimum needs, reducing the scouts to three HMMWVs and three LAV25s with 30 soldiers would still give the TF scout platoon greatly enhanced capability over current TOE.

The TF scouts are special folks, and we must address the current TOE and training shortfalls. I applaud the initiative of some units to try different things and Major Scribner for sharing his observations.

MICHAEL H. TAYLOR
LTC, Armor, TXARNG
2-112 Armor, 49AD

A New "Old Idea"

Dear Sir:

In November 1988, Army General Stanislav Postnikov, former First Deputy Commander-in-Chief of the Soviet Ground Forces, assumed the post of Commander-in-Chief of the Western (TVD) Theater of Operations for all Soviet and Warsaw Pact Ground Forces, succeeding the retiring and somewhat controversial Marshal Nikolai V. Ogarkov. General Postnikov, a seasoned infantry officer, as well as having extensive experience commanding mechanized forces from platoon to group levels, and according to a recent biographic sketch in Jane's Soviet Intelligence Review Magazine (January 1989), as head of the Soviet General Staff Academy "has had a profound influence on Soviet thinking on strategy, operational doctrine, and strategic command and control throughout the 1970s and 1980s."

What is important, however, is that General Postnikov's writings have dealt with the application of lessons learned during the Great Patriotic War (WWII), and in particular the Kursk operation (Operation "Zitadelle").

Specifically, his writings indicate the level of emphasis that the Soviet Army is concentrating on the ability to "mount a powerful and effective offensive from a defensive posture," and its relations to operations on all main axes of operations and Soviet preparations for effective counterattacks, and all-arms coordination, something that has been a hallmark of Army combined arms doctrine.

Recently, writings on Soviet cutbacks in Eastern Europe, in light of Mr. Gorbachev's new policy of orienting the Soviet military toward a more defensive role, seems to indicate that General Postnikov's writings have reached their intended audience in the Kremlin.

With this in mind, Otto Preston Chaney's magnificent work on Marshal Zhukov, that he (Zhukov) recommended to Stalin that the Red Army not go over to the offensive since "it would be better if we wore the enemy down on our defenses, knocked out his tanks, and then, by introducing fresh reserves, by going over to the general offensive finally finishing off his main forces."

What this indicates is that during a mechanized follow-on attack or scenario that involves soldiers fighting a mechanized threat from any Soviet or Soviet-doctrine trained force, the GCE (Ground Combat Element) is prepared to beat back any counter-offensive the enemy launches, much in the same manner that Soviet forces were able to beat back the initial German gains in July 1943.

Last, this also indicates that soldiers of all levels, from NCOs to field grade, should be made aware of the fact that "once you lose the initiative, much like the Germans did after their initial successes at Kursk, you may never be able to regain it." The lessons of Kursk cannot be ignored, now that our doctrine is attempting to adjust to the Soviet Army's emphasis on defensive-oriented operations. Despite being outgunned, effective ground initiative can prevent us from losing the offensive capability that is professed in our all-arms team concept of our warfighting doctrine.

LEO J. DAUGHERTY III
History Department
The Ohio State University
Columbus, Ohio

Thermal Problem Overstated, In His Experience

Dear Sir,

I would like to respond to an article in the September-October issue of your magazine, titled "Tank Thermal Signatures: The Other Variable in the Gunnery Equation."

As an armor crewman and company executive officer, I truly appreciate the efforts of Mr. Rosa and Sergeant First Class Lindsley in heightening the awareness of the armor community in respect to the problems surrounding current thermal systems. However, I would like to comment on a few factors I feel are relevant to the discussion.

First of all, I believe the Army is "training the way we will fight," and conducting the training in proper sequence. Due to safety reasons, and the inability to provide real-war scenarios, Ft. Knox has developed both tank gunnery tables and tank tactical tables in order to train the way we will fight. Tank gunnery tables familiarize crewmen with the tank operating systems and proper use of these systems in normal and degraded modes. Tank tactical tables, which use the Multiple Integrated Laser Engagement System, integrate maneuver/ tactics with learned gunnery skills. As FM 17-12-3, pp. 1-3, paragraph 4 states, "Gunnery skills alone are not enough; we need to place equal emphasis on tactics." A graphic description on page 1-4 describes tank gunnery tables as providing manipulation and crew duties. They do not provide realistic targets or tough acquisition. Tank tactical tables provide realistic targets and tough acquisition problems. A proposal would be to integrate tank gunnery tables and tank tactical tables into a third live-fire table, thus providing optimum training for growing Soviet advances in target signature reduction.

In regard to Soviet-employed thermal countermeasures, I would very much like to view the USAREUR DCSINT video. I do not possess the classified information or years of experience of Mr. Rosa; however, during two National Training Center rotations and numerous field deployments, I have personally viewed HMMWVs, M60A3s, and Sheridans camouflaged to the hilt. On few occasions have I experienced problems in identifying these vehicles through the tank thermal sight.

I cannot imagine a camouflaged T-72 traveling 10-20 km/hr becoming so obscured or invisible that thermal sights would have difficulty identifying it. Although Change 2 to FM 17-12-3, dated September 1988, designates the thermal sight as the primary system. I do not feel we are training to exploit it, or rely on it to any excess. The tank tables consist of day and night scenarios which require the use of all fire control systems. In addition, we also train a swing task using the daylight channel with illumination to sharpen our gunnery skills.

In comparison to the TTS, TIS, or any NATO derivative of the latter, not to include the proposed upgrading of the M1A2's thermal system, I have neither read nor been privy to information which claims the Soviets possess better thermal systems. If the Soviets have developed obscurants, such as thermal-defeating smoke, who will it hinder more? In essence, if their equipment is actually of poorer quality, their ability to detect targets, maneuver, and command and control more than two vehicles will be seriously hampered. Again, I can only draw upon my personal experiences in which my battalion has been extremely successful during attacks and defenses cluttered with simulated battlefield obscuration.

Of course, there is no way to simulate the Soviets' ability to obscure and fight on a cluttered battlefield; however, who will this hinder more? In these times of budget cuts and troop reductions in the Soviet and U.S. Armies, don't our technical advancements play a greater role than the dwindling numbers of Soviet weapon systems?

I am not attempting to create a debate against Mr. Rosa's opinion. I do not have access to his information. I can only speak from personal experience. Yet, even a professional such as Mr. Rosa should consider all elements before making a statement such as, "We are conducting negative training. TT VIII is as clean as the driven snow, and TT XII is but a TT VIII with three friends." This statement contradicts the very foundation of our training. Ft. Knox developed tank gunnery tables for a specific purpose, and tank tactical tables for another purpose.

In conclusion, I would like to thank Mr. Rosa for stimulating the consciences of both the armor community and the combined arms team. I submit Ft. Knox develop a third transition table that combines live-fire gunnery with the stringent standards of the tactical tables. As a professional armor officer, I feel we must have access to the data provided in classified studies. This will enable us, the future combatants, to incorporate these findings into our training. If we, the users, do not know what is broke, we cannot fix it!

ROBERT P. WHITE
1LT, Armor
D CO, 1-33 Armor
Ft. Lewis, Wa. 98433

HATCH

continued from page 4

reinforcing, nation building, or in the unique force category. Our challenge is to articulate clearly Armor's role, particularly at the low-intensity side of the spectrum.

We must also seek innovative ways to make more effective use of the shrinking defense dollar — for our doctrine, force design, equipment, leader development and training of the total armor force. One such way may be through the use of the SIMNET technology, described elsewhere in these pages. So it is that we have established at the Armor Center a Combined Arms Tactical Training Center built around SIMNET. We do not intend to eliminate the requirement for actual field training, but we think that we can better prepare our student leaders to operate in the short field exercises we have in our programs of instruction. We have also established an AirLand Battle Future Laboratory, using SIMNET technology, to help us answer important questions concerning future doctrine, force design, and equipment needs of the decade of the 1990s.

This new decade promises to be very exciting. It will also be very challenging. While we may well be nearing the end of the 4th quarter, much can happen in the last two minutes. Our job is to remain ready and shape the outcome to our advantage. Thunderbolts, with Armor and Cavalry as their core, still will be needed to help secure our nation and protect her interests.

Forge the Thunderbolt!

BOOKS

A Flawed Book on Command

Lima-6: A Marine Company Commander in Vietnam, by Colonel R.D. Camp with Eric Hammel. Atheneum Publishers, New York, 1989. 285 pages. $19.95.

Unlike so many other recent books about combat in Vietnam, this one will not turn into a movie screenplay. Colonel Dick Camp, with popular author Eric Hammel, has written Lima-6 as a chronicle of his experiences as a Marine infantry company commander in Vietnam from June 1967 to January 1968. Colonel Camp, now retired, served for 26 years in the Marine Corps and lived through some of the fiercest fighting in Vietnam's I Corps. The co-author, Eric Hammel, is a popular, prolific writer of military history. Together, they have produced a book which has potential, but turns out to be disappointing.

The book is written almost as a diary of Colonel Camp's thoughts and actions, beginning with his assignment to Vietnam and his arrival at Danang, and ending with his departure from Khe Sanh during the historic siege. During his first six months in Vietnam, Colonel Camp was the company commander of Lima Company, 3d Battalion, 26th Marines. This period is the focus of the book.

Despite the slick, promotional buildup of the book's description on the book jacket, Lima-6 is not a classic. It is a chronological recollection of reminiscences, mostly dull, a few spectacular, and several particularly disappointing. The author's description of his arrival in Vietnam and his first introduction to his new company command offer a promising, good start. The initial thoughts and actions of the new company commander provide a poignant and distinctive lesson to all who have commanded or who aspire to command troops.

There are many descriptions of combat, for Lima Company saw a great deal of action. The scenes are vividly described as the author remembers each action, but each description always begins with the company commander shouting, at first contact, "What the hell is going on?" Combat is confusion and uncertainty, but this phrase is overworked to the point of doubt. That phrase is uttered so many times in the book that the reader will wonder if the author ever knew what was going on. On Christmas Eve, 1967, after six months as a company commander, the author finally admits that he did not.

Two other incidents will really cause the reader some doubt. During the battalion's particularly savage battle with North Vietnamese forces, the company commander of Lima Company, who was known by his radio call-sign, "Lima-6," had coordinated with an adjacent company for a planned withdrawal. Lima Company, it was agreed, would be the rear guard, covering the other company as it moved back. Inexplicably, as soon as Lima-6 returned to his company, it formed up and moved out, leaving the other company behind!

Later, when another infantry company was relieving Lima Company from its duty of guarding a Seabee camp, the camp took heavy enemy artillery fire, causing great damage and many casualties among the new relieving company. Lima Company "raced down the road" off the hill, without rendering any assistance to the new company's casualties, secure in the thought that "we were no longer responsible" for that camp.

Concluding the book are 65 pages of an especially vivid account of the early stages of the legendary siege of Khe Sanh. It is truly a mole's eye view of a spectacular episode in the war, told with great clarity. This is the best part of the book.

The purpose of the book is unclear. If it was written as a tribute to the Marines and Navy corpsmen of Lima Company, then it served its purpose well. Colonel Camp's adoration of his men clearly shows, and they deserve the recognition. Sadly, the book offers little else of value. Unfortunately, Lima-6 falls short in too many ways to earn a favorable recommendation.

W.D. BUSHNELL
Lieutenant Colonel, U.S. Marine Corps
Fort Knox, Ky.

Mud Soldiers by George C. Wilson. Charles Scribner's Sons, New York. 1989. $19.95.

Mud Soldiers is a nonfiction account of infantry soldiers in today's Army. This is a possible primer for new officers, a self-check for more experienced officers, and an enlightenment for the senior officers in the new American Army. In his work, Mr. George C. Wilson, author of Supercarrier, explores the question, "Will the soldiers of the new American Army fight as tenaciously as the soldiers who fought in Vietnam?" The author defends and praises the strength, initiative, dedication of the young infantrymen in today's Army. At the same time, as a result of faulty research methodology and poor editing of his work, he makes a gross overexaggerated accusation against the Army's ability to fulfill the young trainees' expectations of training.

The book follows trainees through OSUT at Fort Benning, Georgia, then into their first assignment in the 1st Infantry Division, Fort Riley, Kansas. To aid his research, Mr. Wilson lived with and experienced the training with the young soldiers. The soldiers opened their lives to him, told him everything. He took advantage of their openness and asked everything. He gained a tremendous insight into the soldiers' backgrounds, lifestyles, and reasons for joining the Army. He asked the trainees what they expected of the Army. He later asked the same young soldiers, experienced with time in a battalion, whether or not the Army had fulfilled these expectations. His overall conclusion was "no," the Army has failed.

In the process of following the young soldiers, Mr. Wilson comments on their trainers, their training, their leaders, and morale. In a chapter on drill sergeants, I think, for the most part, his comments support the "Iron Men of Basic – the Drills." He touches on their "successful techniques...to show the soldiers everyday that they cared about them...". He captures the dedication to duty displayed by the young drill sergeants – the hours, the hardships, the pain – some to the point of "being married to the Army," which caused wives to walk out on their drill sergeant husbands. I did not particularly care for the way he wrote endlessly on a bad decision made by an overworked young drill sergeant. The author could have used these pages to emphasize the tremendous workload – above and beyond requirements – we (the Army) place on the shoulders of our principal trainers, to reinforce how much the drills care about "their" trainees.

On the other side of the coin, the author strikes a strong chord when he discusses welcoming the soldiers to their first regular battalion. The company commander takes the lead in showing soldiers how the leadership of the Army cares for soldiers. Unfortunately, what happens in the chapter shows less concern for the soldiers during field training. Standing in a cold, driving rain for six hours reading from a field manual was a shining, albeit isolated, example of how NOT to conduct training. His analogy to support this faux pas is centered around teaching mathematics in the rain. I would agree this is NOT a good training technique, but the author never acknowledges that soldiers need training under varying conditions to

prepare for harder times under more demanding conditions, such as combat.

In follow-on interviews, the soldier-subjects of the book reflect on life and times at the National Training Center (NTC). Unfortunately, one would consider most of the comments negative. In questioning the soldiers, Mr. Wilson draws out the feeling that the NTC was really an officer training event, and the soldiers merely "training aids" in the field. The text is a series of comments or perceptions from the soldiers' perspective. This uneducated explanation of the best training event in today's Army fails to acknowledge that platoons of soldiers receive after-action reviews (AARs) for each mission. The outcome – win or lose – is not really the intent of the AAR; learning by discussing mistakes is the intended outcome. Soldiers can and do learn a great deal about their performance of individual tasks through the AAR process at the NTC. I think many soldiers are unaware of actually how much they learn and improve as individuals while training at the NTC.

Further exploring the premise that the Army does not train its soldiers well, Mr. Wilson reappears on the scene at Fort Riley after a year. The soldiers are asked to answer a very basic question, "Is training/life in the Army what you expected it to be?" (paraphrased). With few exceptions the answer was, "no." I had the feeling Mr. Wilson elected to print primarily the interviews that reflected dissatisfaction with the Army, thus supporting his initial premise. Some of the interviews were completely negative; others reflected the soldiers' desire for more challenge and less busy-work. What percentage of the interviews were positive in favor of the Army? Maybe, just maybe, more soldiers felt the Army was doing a good job in training them and meeting their expectations in training.

Toward the end of the book, the author writes of 11 soldiers who didn't make it. These soldiers left the service for a number of reasons, to include attempted suicide. The interesting information about these soldiers was their background prior to entering the Army. For the most part one would consider their backgrounds "traumatic," in the sense that they had lived a tough life – drugs, alcohol, despair, broken homes, etc. – before joining the Army. It should not be too surprising to most readers that even the Army was unable to hold their attention and help them meet social norms.

The author summarizes his work with the constructive act of making recommendations to the Army. In addition to the young soldiers, he interviewed their leaders, up through the commanding general, Training and Doctrine Command (TRADOC) to the chief of staff of the Army. His recommendations are food for thought. Some of them are expensive alternatives in learning/training. Others are good old common sense in training. Some of them are as nearsighted and naive as the people he interviewed. There is a good chance the Army will listen to and possibly investigate their merits, if any.

Read the book, but remember the Army is not one platoon, in one company, in one battalion, in the world. The statistical sample size of the book (one platoon) is insignificant to make such bold statements and recommendations. There are many strong commanders out there who do things differently, do things better, and who know the "Mud Soldiers" of America's modern Army "...will not fail us in war..." These same young leaders could successfully argue against the statement that "...we (the Army) are failing in peace in not recognizing and fulfilling their expectations."

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The Great Tank Scandal, by David Fletcher. Her Majesty's Stationery Office, London, 147 pp. (large format paperback) £12.95 (about $21).

Little seems to be written of Britain's tanks in the early days of World War II, and some would say this is just as well. This large-format new paperback, part of the excellent series coming out of HMSO from the Royal Tank Museum, where Fletcher is librarian, deals frankly with the disaster that was British tank production in the late 1930s. The title says is all.

The reader is struck by the sheer number of failed attempts the British made in attempting to catch up. Fletcher guides us patiently through the thicket of models and marks and modifications along this parade of failure, covering the dire days from 1939 to the ill-fated raid on Dieppe. A second volume is planned to cover the later years.

The photographic contribution to this book is superb, not only from the standpoint of clarity and printing quality, but also the extent to which unusual vehicles are shown. A written description of "Nellie," a truly bizarre concept for a tank that dug its own cover, cannot begin to get across the sheer lunacy of the idea, but a picture of this 131-ton (Yes...131 TON!) vehicle ploughing up a British park as Churchill looks on makes the point as words cannot. More telling is that the Nellie project lingered until 1943, part armored fighting vehicle, part mining machine that could move 8,000 tons of earth per hour!

It's important to study why things went so terribly wrong for the British, especially since they had invented the tank and first used it in combat. Fletcher's analysis helps us understand this, too – it is far more than a catalog of clinkers suitable for modelers, although they are sure to appreciate it.

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Treat 'Em Rough, The Birth of American Armor, 1917-20, by Dale E. Wilson. Presidio Press, Novato, Calif., 242 pages. Price not available.

Since World War II, German and Soviet armor have long held center stage in the history of mechanized warfare. Detailed studies, unit histories, and biographies of key figures have been churned out in amazing quantity. Unfortunately, the study of the early development of armor also has focused largely on British and German pioneers, such as J.F.C. Fuller and Guderian. A close look at the American contribution to mechanized warfare is long overdue.

Dale Wilson's account of the birth of American Armor is the first published comprehensive study of U.S. tanks in World War I. He begins with the organization of the U.S. Tank Corps and continues until the dust settles and the smoke clears from the battlefields of the Great War. The chapters are filled with the story of the men, machines, the tactics, and the battles of the first American tankers.

Few present-day tankers are familiar with the exploits of Patton's 304th Tank Brigade during the battles for St. Mihiel or the Meuse-Argonne. (See ARMOR, July-August 1988 issue.) Even fewer are aware of Eisenhower's role in pulling together the Tank Corps in the United States. Perhaps most obscure of all is the story of the brigade of American heavy tankers that served with the British Army. These tankers suffered appalling casualties in the final assault on the Hindenburg Line. Altogether, this is a compelling story of American soldiers coming to grips with the impact of technology on warfare. Wilson clearly records the innovation and the courage of these soldiers. This is not only the story of the birth of American armor, but the beginning of a new era of warfare, and the role America played in it.

Wilson has served the armor community well by documenting our beginnings. This book is very well researched and, without a doubt, the most complete study of the subject. Maps and contemporary photographs add additional flavor to the narrative. Treat 'Em Rough is a MUST on every armor officer's book shelf.

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1940-1990

50 Years On...

War was still about a year away for us, but the fighting in Europe and China gave peacetime training an urgency missing in the sleepy Thirties. True, some of the obsolescent tanks these men trained on would never see battle. Nor would the horsed cavalry charge. But there were better tanks and better tactics on the way.

In dusty camps in Kentucky, on maneuvers in Tennessee, preparation for war had begun. Fire...movement...shock...

Sixteen armored divisions would learn the trade before it was over...

A STUART MANEUVERS IN SMOKE

ON MANEUVERS IN AN ARKANSAS CORNFIELD

THE MAIN GUN HAD TO BE IMAGINED

STEEL STEEDS WERE ON THE WAY

THE M2 MEDIUM SUPPORTING THE INFANTRY

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