

ARMOR

RED ARMY TANK COMMANDER

Crossing Three Rivers Using Improvised Means, a Soviet Tank Corps Thrusts Toward Recapture of Kiev

PAGE 13



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Tank Tracks



In 1944, B.H. Liddell Hart wrote in Thoughts on War, "The spirit of discipline, as distinct from its outward and visible guises, is the result of association with martial traditions and their living embodiment."

Our Armored Force's body of martial tradition began to take shape 70 years ago in the St. Mihiel and Meuse-Argonne campaigns, when the first American tankers traded their horses for primitive mechanical mounts on which they would spearhead a new development in ground warfare, leading inevitably to the creation of a new combat arm.

Subsequent generations took that budding legacy and built on it in Tunisia, Sicily, Bastogne, Pusan, Inchon, Operations Cedar Falls and Junction City, and at Ben Het. The heritage we have received is rich in stories of courage under fire, comradeship, and audacity.

Today, our regimental system, with its honorary colonels and sergeants major, retells those stories to yet another generation of tankers and cavalymen who aspire to move down the same proud road. This is the association with martial traditions and their living embodiment of which Liddell Hart wrote.

While we work to see that these martial traditions and accounts of Americans in battle are handed down to following generations and are thus not forgotten, perhaps it is appropriate that the American people have a visual reminder of the accomplishments of our Armored Forces.

Toward this purpose, the Armored Forces Monument Committee formed in 1986 to erect a monument in our nation's capital. Its congressional liaison team successfully met its challenge of securing Congressional approval, and on 6 November 1986, the president signed Public Law 99-620 authorizing the monument, which will be constructed on Memorial Drive

(Avenue of Heroes) near the entrance to Arlington Cemetery. Section 2 of Public Law 99-620 states, "The United States shall not pay any expense of establishment of the memorial."

Sponsoring organizations include the U.S. Armor and Artillery Associations; World Wars Tank Corps Association; Veterans of the Battle of the Bulge; 11th ACR Association; Tank Destroyer Association; 1st, 2d, 3d, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 16th Armored Division Associations; Council of Armored Divisions Association; and the National Association of Uniformed Services.

The memorial will feature a panoramic evolution of Armor and will honor all those "men of steel" who served in WWI, WWII, Korea and Vietnam in armored divisions or separate armored battalions; tank destroyer battalions; armored mechanized infantry, artillery, engineer battalions; cavalry regiments and squadrons; and Marine Corps armored units.

The cost of this memorial is relatively inexpensive — \$400,000. But time is running out. Funding must be completed by November 1989 if the monument is to be completed in time for the 50th anniversary of the Armored Force in 1990. The sponsoring organizations have done their part, but appeals to industries that built our tanks and APCs over the years have netted next to nothing. The Armored Forces Monument Committee needs help to avert falling short on this project. If you are interested in seeing a monument to our Armored Forces of the past, which would serve as an inspiration to armored soldiers of the present and future, perhaps you can help. Please contact

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November-December 1988, Vol XCVII No. 6

Features

- 8 Assault and Tactical Bridging for Armor Units**
by Brigadier General Philip L. Bolté (Ret.)
- 13 Red Army Tank Commander**
by Lieutenant Colonel Richard Armstrong
- 20 Cavalry Scouts at the Joint Readiness Training Center**
by Captain Alan R. Horn
- 22 The Royal Armoured Corps Tank Museum Has Expanded and Improved**
by Richard M. Ogorkiewicz
- 25 The Desert Training Center: Yesterday and Today**
by Francis G. Blake
- 30 Cavalry Missions and Structure**
by Colonel (P) Jarrett J. Robertson
- 34 Armor Training 1997**
by Major H. Critz Hardy
- 37 Soldier Training Publications: Supporting Training in the 1990s**
by Major Albert E. Bailey

Departments

- 2 Letters**
- 2 Contacts**
- 6 Commander's Hatch**
- 7 Recognition Quiz**
- 40 Professional Thoughts**
- 49 Recognition Quiz Answers**
- 50 Bustle Rack**
- 51 Armor Branch Notes**
- 52 Books**

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The Lessons of Vietnam

Dear Sir,

Major Michael R. Matheny ("Armor in Low Intensity Conflict," July-August 1988 ARMOR) is to be commended for addressing this sticky topic of Armor doctrine. His statement, "There is still little written doctrine on armor operations in Low Intensity Conflict," is not profound, but all too factual, and references the post-WWII fixation of our strategic and tactical planners with the great European land battle.

Two deadly "non-wars" since the Japanese surrender in Tokyo Bay clearly illustrate that ignorance, or more realistical-

ly, ignoring of history and hard lessons learned, have gotten our military establishment into situations for which they were not prepared. More important, these were situations for which the troops in the tanks were not prepared.

This is a fact, despite the vast resources and documentation of LIC around the world available for command and staff utilization at the time of troop commitment. And today, stacks of staff studies, combat journals and official lessons learned appear to be gathering dust.

I spent nearly two years researching Low Intensity Conflict in its 1960s guise - revolutionary war as defined by Mao Tse

Tung. It was clear at that time (1964), that LIC demands thorough analysis and doctrinal study on the part of every branch and element involved. This is particularly applicable to those arms in mutually supporting roles.

Vivid lessons in the application of Armor/Infantry teams to LICs were available to us prior to our commitment of armor and armored cavalry to the Vietnam conflict. French use of limited armor resources in Indochina should have provided glaring examples of how NOT to commit tank/infantry elements. Bernard B. Fall in his masterful work, Street Without Joy, described the destruction in detail of

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Groupement Mobile 100, a mixed motorized infantry, armor, and artillery group, on QL 19, east of Pleiku, in 1954.

I refer to this, not only because it is stark testimony to failed doctrine, but because I stood on that very spot in 1967, trying to explain to my tank crew the monument erected there.

When all is said and done, the sum total of the experience and doctrinal lessons learned of Korea, Indochina, Malaya, Vietnam, etc., should be compiled in geographic and situational scenarios, suitably condensed and structured into REQUIRED doctrinal studies at the company-grade officer level.

I and my fellow lieutenants proceeded through Armor Officer Basic Course 1-66 with barely a whisper of the armor role or experience to date in Southeast Asia, though I dare say that at least 75 percent of us wound up busting jungle in M48A3s, ACAVs, or Sheridans.

Even at this point in the "Vietnam Experience," there were a goodly number of officers and NCOs fresh from Vietnam combat who might have made significant contributions to the development and first-hand communication of interim doctrine to combat-bound officers and NCOs.

Major Matheny is absolutely correct in his allusion to the fact that Vietnam-era armor doctrine was, in essence, "play-as-you-go" system. The tankers of my unit, A Company, 1st Battalion, 69th Armor, and our sister companies, participated in "OJT Doctrinairing." The grievous lessons of the French disaster, and our own experience up to that point, should have been ingrained in our minds BEFORE we got to the bamboo-crunching stage.

Armor has, since its inception as a combat branch, suffered in its effective application due to a lack of study and understanding of its capabilities and use by infantry and other unit leaders. I refer specifically to the parceling of armor battalions and companies to support other commands, usually infantry. This is not the singular malaise of the U.S. Army, but it was particularly rampant in Vietnam.

Between August 1967 and March 1968, my platoon was OPCON to no fewer than seven major commands, most of which were infantry. The one exception, attachment to the 2nd Brigade of MG Jack Tolson's 1st Cavalry Division (Airmobile), allowed for the application of armored force in at least platoon strength. The mission of the 2nd Brigade, commanded by COL Fred E. Karhos, was to find, fix, and destroy main force Viet Cong and infiltrating NVA units dug into the fortified ham-

lets and hedgerows of the coastal plain in Binh Dinh Province. Too often, as Major Matheny states, air and artillery assets were brought into a target, while ground elements pulled back. Result? A lot of blown-up hooches, blood trails, and the bad guys melting into the jungles and tunnel complexes. Despite the addition of armor, the Cav's mission became even more complex without adequate training of infantry/air cavalry troops in tank/infantry operations in this particularly nasty type of combat environment.

Working with COL Karhos and his staff, we established an interim program of familiarization and training with Cav elements rotating through LZ Uplift. This rudimentary training was designed to show company- and platoon-size infantry/cav elements just how effective close infantry-armor team operations could be in the village sweep, cordon and search, and hedgerow/bunker-busting missions common to this area of operation.

True, these are basic tactics which should be known to every combat arms officer. But more important, they should have been part of an overall combat operations and training doctrine common to both armor and infantry, because variations on the basic theme were certainly applicable in all of the RVN tactical zones. Properly applied, these tactics fixed the enemy in his holes and allowed destruction of his forces in detail before he could slip away.

The European land battle always looms as a dire possibility and should receive a large share of doctrinal consideration. However, the hard lessons of history must not be ignored. LIC, in all of its forms, is here to stay. The Combat Arm of Decision must lead the way in developing and maintaining flexible doctrine which can be taught and understood at the lowest possible level - where crew and tank or APC meet the enemy.

J. F. Walker
USAR Armor (Ret.)
Roanoke, VA

Low Intensity Conflict Follow-Up

Dear Sir,

In his article, "Armor in Low Intensity Conflict: the U.S. Experience in Vietnam," (July-August 1988 ARMOR), Major Michael R. Matheny describes well how lessons bought in blood led us to better techniques and procedures. In citing Starry, Stanton, the 1967 MACOV study, and Bernard Rogers, Matheny directs other sol-

dlers and scholars to important primary sources.

Uninformed sceptics used to take cheap shots at armor, ground cavalry, and mechanized infantry by citing one photo of a mired track as proof that our heavy units did not belong in the Republic of Vietnam. They should be reminded now that:

- The Hanoi victory came two years after the departure of the last U.S. maneuver and artillery battalions.

- The NVA force that achieved it was some 15 divisions, most of them what we would now describe as motorized and mechanized.

- The first NVA soldiers to reach Saigon's presidential palace knocked down its gate with their tank before raising their flag on the balcony.

Robert P. Fairchild
LTC, Armor, NYARNG
HQDA, ODCSOPS

Vietnam Remembrances

Dear Sir,

As a member of the United States Armor Association since 1946, I have read with great interest well over 200 issues of our excellent magazine. However, no issue has really struck me as being as representative of what our association is all about than the May/June 1988 issue. In a word, camaraderie is the glue that binds all men that engage in the profession of arms. "The Bugle Call Has Faded," by Ted Browne, lieutenant colonel of infantry, underscores this basic principle. I am indeed humbled and proud to be remembered by a splendid trooper in his own right. Ted speaks to those of us who wore tankers' boots, yet in my view it encompasses the entire Armored Force - the very soldiers who are first to hear the sound of guns and to suffer the high casualty rates that result from close combat.

The greatness of our association emanates from the camaraderie of legions of men who have answered the "Bugle Call." It may have been coincidental that this issue of ARMOR Magazine had a blue cover. If so, let me say that this blue is for you, Ted Browne, and all other infantrymen I have served with, especially the gallant men of my battalion task force in Vietnam. It was an armored force built around the more than 1,000 men of the mechanized 1st Battalion, 5th Infantry (Bobcats), 25th Infantry Division, whose exploits won the Presidential Unit Citation

in heavy fighting in the latter part of 1968. So, as Ted has eloquently asked, "Join all to make this last." God bless you, Ted, and all others who continue to hold our colors high. I am proud to have been counted among your ranks.

Andrew H. Anderson
Major General, USA (Ret.)
Trappe, MD

Inheriting Combat Knowledge

Dear Sir,

I was glad to see MAJ Mike Matheny's article, "Armor in Low-Intensity Conflict," in the July-August issue of *Armor*. We need to capture the lessons of Vietnam while there are still a few veterans of that conflict on active duty.

The recently released brigadier general promotion list consisted of officers who served, in most cases, as company grade officers in Vietnam. It will not be very many more years until we have a division commanded by an officer with no combat experience. As the pool of active duty officers with Vietnam-era combat experience dries up, we must ensure that the next generation of Armor leaders inherits the knowledge gained with the blood and sweat of their predecessors.

While it is a popular cliché to say that the Army often prepares for the last war, or for the wrong war, it would be inexcusable for us not to prepare for a low-intensity conflict. The fundamentals learned in Vietnam would work just as well in Central America or elsewhere. No major revision of doctrine is required; no new tactics are called for; just some grassroots practice of lessons learned would prepare the Armor and Cavalry units of our Army to perform well in combat in a low-intensity environment, a far more likely contingency than an all-out war in Europe.

How many Armor lieutenants and captains know how to conduct a cloverleaf sweep? When is the last time an Armor task force commander practiced a hammer-and-anvil maneuver with dismounted infantry? Would it really be any different to clear a banana plantation than a rubber plantation; but who knows how it is done?

It is up to the Armor community to show some initiative in preparing for any potential combat environment before we are left behind in a future conflict in which we could have been the deciding force, if only someone had known.

James E. Good
Major, Armor
Riyadh, Saudi Arabia

(Major Good's letter was referred to the USAARMS Commanding General's office for comment. -Ed.)

Dear Major Good,

General Tait shares your concerns about not re-learning lessons of the past on the next battlefield. There is always room for improvement, but I think you will find the Armor School programs of instruction liberally laced with historical examples and lessons learned from a variety of nations and wars, Vietnam being one. In a recent summary we completed at Fort Knox, I found Vietnam lessons learned in six instructional blocks, varying from reorganization and consolidation at Dong Ha to combat service support operations in Cambodia. There are numerous professional books that recount the lessons of Vietnam combat, but three, I feel, will help us retain those lessons are: Armor in Vietnam, by Frederick Eugene Oldinsky; Mounted Combat in Vietnam, by General Donn A. Starry; and Airmobility 1961-1971, by Lieutenant General John J. Tolson. All three of these books are available at Fort Knox, and in most Branch School libraries.

You will also be glad to know that the "cloverleaf," now called the Fan Method, is still taught as a technique at Ranger School in zone reconnaissance, along with the Box Method and multiple techniques for reconnaissance of successive sectors. The mechanical ambush has also been retained, and is taught at the Ranger School. Those items are listed in the Ranger Handbook, SH 21-76, dated March 1987, on pages 5.5 and 14.10, respectively. FM 5-34, Engineer Field Data, dated September 1987, details several other field expedient firing devices for mechanical ambushes in Chapter 3. Armor Branch sends roughly 75 to 100 officers per year to Ranger School. Those young officers are in turn distributed throughout the Armored Force, spreading the techniques you mentioned, and many others.

Melvin J. Littig
LTC (P), IN
Chief, Professional Development Division

Convolutions of Lineage

Dear Sir,

What is shown to be the crest, motto, and lineage of the 104th Cavalry, on the back cover of the July-August 1988 *ARMOR*, is most definitely not that of the 104th. What is shown is in fact the lineage and heraldry of the 103d Cavalry, a junior regiment.

I realize that *ARMOR* merely published what it had every right to believe was an authentic statement. What has been hit upon, however, is a very, very sore point with many long-term members of the Armor Association.

From its inception following World War I, through the days of the horse cavalry and mechanization in World War II, to its reorganization as the 104th Armored Cavalry Regiment in the post-World War II era, the 104th was a revered Central Pennsylvania institution, with roots to the Sheridan Troop of Tyrone, PA., and the Governor's Troop of Harrisburg in the 19th Century, among other distinguished local units. Its demise, to permit concentration of the entire 28th Infantry Division in Pennsylvania, was ameliorated somewhat at the last moment, only because CWO4 Ralph H. Kline of Carlisle went to the State Adjutant General and asked that, as the senior cavalry unit in the state, the 104th designation be applied to the division cavalry squadron, up to then essentially a derivation of the 103d Cavalry. This, of course, was entirely in keeping with the letter and spirit of the Combat Arms Regimental System, in that the division squadron is only one element of the regiment, quite properly retaining its own lineage to the Philadelphia-area 103d Cavalry and other units, but under the colors and heraldry of the senior unit, the 104th.

Earlier, in the early 1960s, while serving as public affairs officer of Headquarters, Pennsylvania National Guard, I had staffed to Department of the Army approval the traditional regimental designation so that it should always be written: "104th Cavalry (The Governor's Troop)."

Now, not only that hard-won traditional designation, but also our distinctive "Over, Under, or Through" motto and crest, plus a century of history - including participation in the Spanish-American War - and even the primary geographic locale of the regiment, have simply disappeared, as though someone hit the wrong key on a computer.

I have written to the commanding general of the 28th Infantry Division, requesting that he request official correction. We ask that you support that by publishing this letter and returning the lineage as published to wherever you got it, noting that it is being protested. We ask also that you publish a corrected lineage and heraldry when that is forthcoming.

William V. Kennedy
COL, AUS (Ret.)
Commander, Troop D, 104th CAV
(The Governor's Troop), 1959-61

Was Cav Team Really Cav?

Dear Sir:

The first thing that I would like to do is congratulate the 1st Squadron, 1st Cavalry (First Regiment of Dragoons) "Blackhawks" on their victory in the Boeselager competition. My hat is also off to the members of the 11th Armored Cavalry Regiment (Blackhorse) team on their fine showing. As a former member of the Blackhawks (April 76 - June 82) I was proud to see the team do so well, a fact that I kept the members of the infantry battalion that I am assigned to now, aware of.

What disturbs me is the method that was used to ensure the victory (during the week, I cheered the team on via the AFN reports). I was dismayed to learn that the patrol leader was an Engineer officer (16th Eng Bn)! Only four members of the team were from the 1st Sqdn, 1st Cav, two were from the 2d ACR (a fine unit in itself), and one each from 1-52 Inf, 2-59 ADA, and 3-35 Arty. This was a Corps team, not a 1st Sqdn, 1st Cav team as I was lead to believe. I was under the impression that this was a reconnaissance (read cavalry) competition, and as such should be made up of teams from the squadrons, NOT the Corps. As it was, these teams should have be designated as VII Corps and V Corps, not from cavalry squadrons.

When I departed Germany in 1982, there was a USAREUR-level cavalry competition to determine the teams that would go to the Boeselager competition and represent USAREUR. These teams were made up of members of the squadrons, 10 teams - 3 from each ACR and one each from the divisional squadrons, not a Corps all-star team. This was, I felt and still feel, in keeping with the spirit of the Boeselager competition and an opportunity for the squadrons to "strut their stuff." 1st Sqdn, 1st Cav always did well in the USAREUR Cav Cup, and did well in the international competition.

My questions are: Must we stack the deck to win? Where do we draw the line, do we send one USAREUR team next year to ensure another American win? What price victory, win at any cost, anyway, is this the message that we are sending our soldiers? Where are the ethics that we talk about, that we expect the young soldiers to use and live by? Are we being honest with ourselves? If this is the only way we feel confident of winning, should we be in International competition at all?

I may be speaking blasphemy, but I believe that USAREUR should return to

the spirit of the Boeselager competition and send true cavalry teams, from the cavalry squadrons; win, lose or draw. This does not mean that the soldier has to be a 19D, but that he be assigned to the squadron (honestly assigned to the squadrons). Return to the runoff competition to choose the teams to represent USAREUR at the international competition. When we go to Fiddlers Green, we as cavalrymen must be able to with our heads held high with pride.

Once again, my deepest congratulations to all the members of both the VII Corps and V Corps teams, a job well done.

David E. Rose
SFC, Cavalry
4th Bn 41st Inf
Garlstedt, FRG

(We asked Headquarters, 1st Sqdn, 1st Cavalry, to respond. -Ed.)

Dear Sir:

Thank you for the opportunity to respond to SFC Rose's articulate letter and sincere concern about the true nature of the Boeselager competition. I'd like to put the whole competition in perspective.

First, the winning team was at once the VII Corps team, the 1st Armored Division team, and the 1st Squadron, 1st Cavalry team. The corps and division were largely responsible for resourcing the team; the 1-1 Cav trained the team. The squadron has been generous in citing all of these commands, but what one reads in any given article may be as much a result of each reporter's style as anything else. The squadron is proud to acknowledge being the 1988 Boeselager team, but it has never excluded the corps or division from the accolades which follow victory.

In the final analysis, however, the winner was not a team from any of these units. Rather, it was a team of American soldiers who represented themselves and their nation in a competition which has reached almost Olympic proportions. To enter any competition, particularly one that is international in scope, without an intention of winning, is irresponsible and, some might say, "un-American."

There should be no concern over the ethics of assigning non-19Ds to the team. The selection process and 10-month training program clearly establish the fact that finding quality soldiers (the raw materiel, if you will) is but the first step in a tough, thorough train-up of cavalry standards. One status report, from July 1986, concluded that the competition "...requires

team members with significant athletic prowess, self-confidence, and fierce competitive spirit that will sustain them through several months of arduous training. Neither 1-1 Cav, nor any other single battalion has sufficient talent to support this competition." Hence the final selection of members from elsewhere in 1st Armored Division and in the 2nd Armored Cavalry Regiment.

As a final note, I would like to point out that while the 1-1 Cav/1st AD/VII Corps team won the overall and allied competition, the 1-1 Cav's partnership unit (the 4th Aufklaerungsbataillon) topped all of the 10 German teams and placed third overall. This dual standing reflects considerable partnership training and refutes the notion that the squadron entered the competition with a "win at all costs" mentality.

Major George Webb
Executive Officer
1-1 Cav
FRG

TN ARNG Gets M60A3s, ITVs

Dear Sir:

I noticed in the July-August issue of ARMOR that your magazine gave mention to ARNG fielding new equipment. Our brigade (30th Separate Armd. Bde, TN ARNG) recently completed fielding of M60A3 tanks at Camp Shelby, MS. We received 129 tanks from Anniston Depot, TARP, Germany, and FORSCOM units.

We also fielded 23 M901 ITVs in a direct National Guard Bureau purchase.

The Guard is receiving the same equipment that the active component has, and I thought you might want to make mention of this in a subsequent issue.

LEWIS F. ZERFOSS
MAJ, Armor, TN ARNG

Author Query

Dear Sir:

On the eve of WWII, when General John K. Herr was Chief of Cavalry, he is said to have written a letter to all officers in the branch asking them to express a preference between horse cavalry or the mechanized force.... I am looking for an example of this letter.

Dr. Lewis Sorley
9429 Garden Court
Potomac, MD 20854

COMMANDER'S HATCH

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

Safety – A Continuing Problem

In the September-October 1987 issue of *ARMOR*, I wrote about safety. I described three incidents that occurred at Fort Knox that were clear safety violations. I used Fort Knox as the example, but safety problems existed throughout the Armored Force then and they exist now.

For instance, in FY 88 we had 58 M1/M1A1 tank fires. They occurred for a myriad of reasons. However, there may be systemic problems; we may not be removing the power pack often enough and inspecting and cleaning the engine compartment, leaving oil-impregnated sludge on the hull floor. The nozzles on the hull fire extinguisher bottles get clogged and may not discharge when a fire is sensed, or when the system is manually activated. The correction may be a PIP to raise the nozzles off the hull compartment floor. We will also have to make sure the nozzles get checked during those maintenance services when the power pack is pulled. Perhaps we should pull packs once again during quarterly maintenance services. It is also essential to check hydraulic and fuel lines to make sure they aren't frayed, and that all connections are tight.

These are just a few possible causes of the engine fires. Our data are incomplete. When we have all the information, we will analyze it,

and send the causes and trends to you through your chain of command.

Recently, two soldiers lost their lives during a live-fire exercise when the crew attempted to shave seconds off its firing times by not following established safety procedures. An M1A1 tank crew was firing Table X. In order to speed up the firing sequence, the loader carried a round in his lap and reloaded as soon as the gun fired and went back into battery. The aft cap catcher was not installed on the turret floor and this meant that the aft cap from the fired round, with a primer that had an initial temperature in excess of 700°F, rolled free on the turret floor. This was a safety violation.

The loader dropped a round on the turret floor, the aft cap primer evidently hit it and ignited the combustible cartridge case. The tank commander and gunner were unable to get out of the tank and lost their lives. This was a terrible accident and did not have to happen; the tank commander knew better. The shaving of a couple of target engagement seconds wasn't worth the cost. We have tested the firing tables at Fort Knox and have found that a crew can receive maximum scores when it follows correct procedures; there is no compelling need to cut corners. Tanks are now considered non-operable for firing

when the aft cap catcher is not installed.

The "long pole in the tent," when qualifying, is not loader speed. It is the ability of the gunner to identify targets and to lay the gun on the target acquired by the tank commander. Our tankers are pros, the best in the world. They know what to do, and leaders at all levels must make sure they do it. Commanders are still unit safety officers. As I wrote over a year ago, the unit commander has superb assistance in preventing accidents. He has well-qualified tank commanders and squad leaders who are the safety officers for their equipment. They are responsible for everything on their vehicle, including crew safety. If leaders at any level do not want to assume the responsibility for safety, we don't need them. We lose too many soldiers, in peace and in war, due to carelessness.

Most accidents are preventable. Caring leaders make every effort to prevent accidents. Our soldiers deserve demanding and safe training. Let's ensure they have both. The cost of accidents in terms of lives, time lost, equipment destroyed, and dollars spent is enormous. A lean, mean, ready Army cannot afford accidents. Let's all do better.

Treat 'Em Rough!

RECOGNITION QUIZ

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

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

Answers on Page 49





Interior and ramp sections of Ribbon Bridge can be joined to provide rafts for heavy combat vehicles.

Assault and Tactical Bridging for Armor Units

by Brigadier General Philip L. Bolté (Ret.)

The role of assault and tactical bridging has been an important one throughout U.S. military history. That role is no less important today than it has been in the past. Because main battle tanks are not amphibious, bridging can have significant tactical impact on armor operations. Is assault and tactical bridging, though, getting the attention it deserves?

Waterways, both natural and man-made, are a major terrain feature in Europe and vary in size from minor streams and canals to rivers, such as the Rhine, Meuse, Moselle, and Danube. The planner who ignores European waterways imperils the success of his operation.

U.S. Army European operations during WWII are replete with examples of the criticality of waterway-crossing operations.

In its Moselle River crossing operation at Arnaville, 11-14 Sep-

tember 1944, the 5th Infantry Division and its supporting engineers had to bridge three waterways: the Moselle Canal, not only deep but also 80 feet wide; the Rupt de Mad, a small Moselle tributary; and the Moselle River itself, approximately 250 feet wide. Before the operation was over, engineers had erected two Bailey bridges, two treadway bridges, one double treadway bridge, and a heavy pontoon bridge over the three obstacles.

In attacking the Siegfried Line near Aachen in late September 1944, the 30th Infantry Division counted on getting tanks into the bridgehead early by using culverts designed for bridging the stream. In the area of the 117th Infantry, the banks of the stream became such a quagmire that the tank dozer charged with preparing the banks became mired in the mud. Tanks sent to assist also became bogged down, so that it became necessary

to give up and wait for construction of a treadway bridge. In the 119th Infantry Regiment sector, the culverts fell apart while the tanks dragged them to the crossing site. Even when the engineers constructed a treadway bridge, deep mud halted attempts to get tanks to the infantry.

During his 1960-61 assignment to the U.S. Military Liaison Mission in Potsdam, then-Lieutenant Colonel Clarke T. Baldwin observed Warsaw Pact maneuvers in East Germany in which tanks crossed rivers using snorkels. In his next assignment at Fort Knox, he stirred up the armor community's interest in developing such a capability for American tanks.

Study revealed that a stream uncrossable with normal tank fording capability occurs in Europe approximately every 10 kilometers. The end result was development and procurement of a deep water

fording kit for the M60-series tanks, allowing the tanks to ford to a depth of 13-1/2 feet. Although the Marine Corps has required development of a fording kit to allow landing of its M1A1 tanks during amphibious operations, the Army has shown no interest in this capability. In fact, the Army seems to have lost interest several years ago in the deep fording capability of its forces in Europe.

One can argue the practicalities of deep water fording in Europe. The many bridges available, the difficulty in determining the depth at which a tank will find firm footing, and the requirement to prepare ingress and egress sites are among the reasons advanced for considering the capability not worth the effort. Nevertheless, the frequent occurrence of unfordable waterways in Europe remains a fact of life, and the importance of assault and tactical bridging has become even more important.

There are other reasons for the importance to armor of assault and tactical bridging. Warsaw Pact forces have an impressive ability to

"The frequent occurrence of unfordable waterways in Europe remains a fact of life, and the importance of assault and tactical bridging has become even more important"

create obstacles. Antitank ditches in critical areas, particularly where movement is canalized by terrain features, can slow the movement of an armored force to a disastrous degree. Readily available bridging offers one means to allow armored forces to rapidly cross such ditches.

AirLand Battle doctrine emphasizes seizing and holding the initiative, and stresses maneuver and deep attack. The doctrine becomes meaningless without the battlefield mobility to implement it. With the Abrams tank and the Bradley fighting vehicle, the U.S. Army has the armored vehicles to capitalize on the tactical advantages of rapid battlefield movement, and to implement the doctrine of AirLand Battle. However, obstacles to such movement, in the form of waterways and manmade ditches, can severely restrict the movement of armored vehicles, particularly tanks, so that

the inherent advantages of such vehicles are lost.

Readily available, rapidly deployable bridging is a necessity. Even where bridges exist, their number is always limited, and they are subject to battle destruction. Assault and tactical bridging can provide the means to replace suddenly destroyed bridges, or provide a greater degree of flexibility in the selection of crossing sites.

Current U.S. assault and tactical bridging capabilities applicable to armored forces include the Armored Vehicle Launched Bridge (AVLB), the Ribbon Bridge, and the Medium Girder Bridge (MGB). The first is assault bridging, and the other two are tactical bridging.

The AVLB, mounted on an M60 tank chassis, provides heavy forces with a bridge that can be emplaced



The Medium Girder Bridge can be deployed to span a wide body of water.

rapidly under combat conditions. The 18-meter bridge can pass MLC (Maximum Load Capacity) 60 track loads across a 17-meter gap, and MLC 70 track loads across a 13-meter gap. It is found in armored cavalry regiments, heavy division engineer battalions, and separate bridge engineer companies.

The Ribbon Bridge, actually based on reverse-engineering of a Soviet design, was developed by the U.S. Army Mobility Research and Development Command in conjunction with Pacific Car and Foundry Company. ConDiesel Mobile Equipment Company produces the bridge. It provides tactical elements with a rapidly deployable MLC 60 wet gap crossing capability. It consists of a modular, continuous flotation bridge system made up of interior bays and ramp bays that are transported, launched, and retrieved by a wheeled transporter/launcher vehicle. The bridgebays are transported in a folded position. To launch the bays, the transporter backs partially into the water, the operator releases the bays, which automatically open to form a 6.9-meter section of bridge. Bridge erection boats join the sections. A complete bridge set of 10 interior bays, two ramp bays, and 12 transporters can be erected at a rate of about seven meters per minute to provide an MLC 60 bridge across a 77-meter water gap. Five bays can also form a Class 60 raft. The Ribbon Bridge is found in corps engineer float bridge companies.

The MGB, designed by the Military Vehicles and Engineering Establishment at Christchurch (now the Royal Armored Research and Development Establishment), and manufactured in England by Fairey Engineering, is a hand-erectable, prefabricated deck bridge that can be assembled into bridges of varying



Current Armored Vehicle Launched Bridge, mounted on M60 chassis, is too slow to keep up with M1 units and presents weight restrictions.

length. Because it can be erected quickly without heavy equipment, it can be used far forward under tactical conditions. With one bridge set containing 31 meters of bridging, the MGB provides the commander with a dry-gap capability in excess of the 18-meter capability of the AVLB. With the use of two sets and a reinforcing kit, a 47-meter span can be constructed. Nominally an MLC 60 bridge, the MGB can cross Class 70 loads with a reduced bridge life (7,000 instead of 10,000 crossings). The MGB is in corps engineer units.

These current systems provide armored units with considerable assault and tactical bridging support. However, required improvements are underway. In the case of the Ribbon Bridge, required improvements pertain largely to obtaining a basic MLC 70 capability and a longer ramp bay to accommodate

the 2-meter vertical abutment of the type found on many canals. The BMY Division of Harsco is under contract to develop the necessary improvements under the Improved Ribbon Bridge program.

The AVLB as mounted on an M60 chassis is incapable of matching the mobility of the Abrams tank. The bridge is only 19 meters long, and it is an MLC 60. The Army had to establish a formal requirement for a replacement.

The Heavy Assault Bridge (HAB) is now being developed under U.S. Army contract with the BMY Division of Harsco. Israel Military Industries (IMI), as a major subcontractor, is responsible for development of the bridge itself, while BMY is the launch mechanism developer and systems integrator. The HAB, with an MLC 70 load classification, will bridge wet or dry gaps of 30 meters.



The Improved Ribbon Bridge, seen in an artist's rendering, above, as it prepares to deploy from its transporter-launcher.



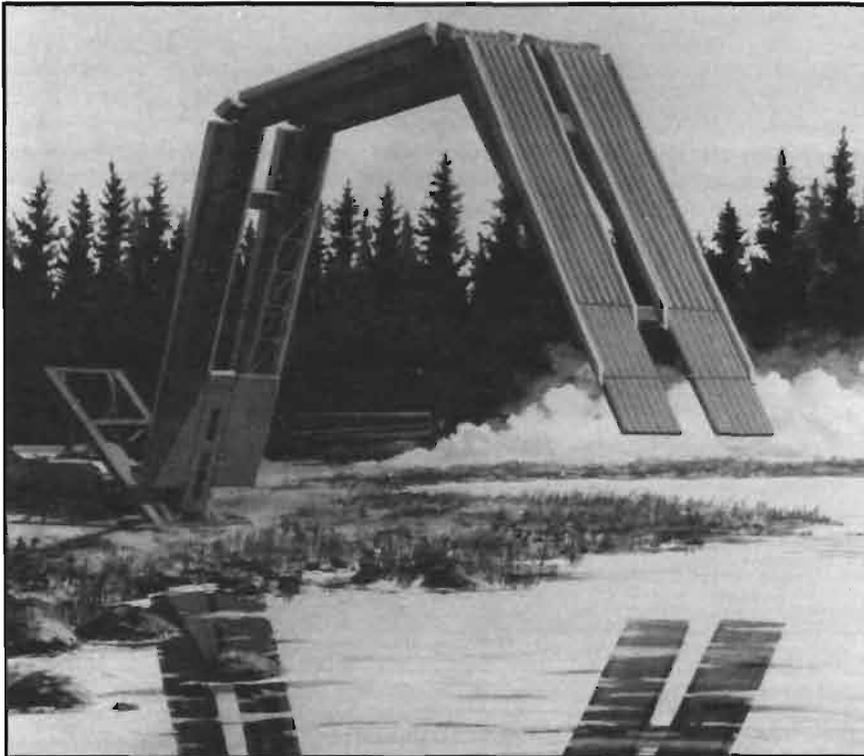
Above, the Towed Assault Bridge, which rides on a single axle, is shown being towed to a crossing site by a tank, but other vehicles can be used. Below, the bridge in use spanning an antitank ditch.



Various modifications have been proposed or are under consideration for the MGB. In addition, possible long-term replacements are in research and development, including an Israeli bridge known as the Rapid Deployment Bridge.

Concerned with shipping space — both air and sea — the U.S. Marine Corps has been pursuing a different course in heavy assault bridging. Experienced in the challenge of crossing antitank ditches, the Israeli Defense Forces initiated development, with IMI as the contractor, of a 12-meter Towed Assault Bridge (TAB). The USMC has tested the bridge but has established no procurement plans yet. The TAB is mounted on a single axle, and a tank or other vehicle tows it to the crossing site. At the site, the vehicle is reversed — or the bridge can be switched to the front — and the bridge is pushed across the gap. Folding "horns" guide the bridge onto the far bank. The crew disconnects the bridge from the towing tank without exposure. The TAB is a rapid means of providing an MLC 70 bridge across gaps up to 10 meters. The bridge easily separates into two sections to allow transport by C-130 aircraft. It is designed to continue functioning at the MLC 70 level after losing up to 50 per cent of its structural beams to mines, artillery, or direct fire. Deployment takes less than one minute.

The Marine Corps has also contracted through the Army with IMI (this time with BMY as a subcontractor) for prototypes of the 24-meter Trailer Launched Bridge (TLB-24). This bridge is towed into position and launched using hydraulic power furnished by two diesel engines mounted on the trailer. The bridge itself, with three folding sections, is in many ways



The Heavy Assault Bridge will provide armored units with a 70-ton crossing capability over gaps up to 30 meters wide.

similar to, although shorter than, the HAB bridge. It provides an MLC 70 crossing capability of gaps up to 22 meters. Deployment is accomplished in five minutes and recovery from either end in ten.

The HAB and the TLB-24 are both being designed so that they can transport and launch both types of bridge, as well as the AVLB bridge.

It appears as if development programs are proceeding to satisfy the requirements of both the Army and the Marine Corps. However, in the current and projected budget climate, procurement of these important combat support assets may lag. Even though the two services are moving into MLC 70 bridge requirements, the services may conclude to accept the less-than-optimal MLC 70 capabilities of the AVLB, the Ribbon Bridge, and the

MGB for now. A "Safety of Use" message on the AVLB has already placed "caution" crossing limitations, such as that the M1 tank cannot cross at speeds greater than 8 mph.

The Army will certainly face an affordability problem with the HAB because the mobility of the bridge depends on procurement of a tank chassis. Given the success to date of Marine Corps consideration of the TAB and the TLB-24, the Army might well give some thought to procurement of these less expensive alternatives to the HAB, at least to fulfill some of its requirement. Procurement savings would be more than matched by reduction in operational and personnel costs, because neither requires a dedicated vehicle or crew. Nevertheless, the Army may consider the TLB as unsatisfactory for such reasons as its asymmetrical roadway (half the M1 track overhangs the narrow roadway) or

doubts that a towed bridge could keep up with the supported unit. The Marine Corps will almost surely have to procure at least some TABs and/or TLB-24s. Its bridging capabilities are sadly lacking, and the few AVLBs are a somewhat slender reed on which to lean. Furthermore, the AVLB does nothing to solve the shipping space problem nor the challenge of air transportability. It is notable that newer designs and materials have greatly reduced the weight per foot of all of these new bridges.

One thing is certain: The ability to cross both wet and dry gaps is an important factor in the battlefield mobility of heavy forces. Effective assault and tactical bridging is a sure force multiplier. Bridging and battlefield mobility are too interrelated for the armor community to look on gap-crossing as solely an engineer problem. The successful application of AirLand Battle doctrine may well depend on an Army-wide, cost-effective approach to providing combat elements with the bridging they need.

Brigadier General Philip L. Bolté is a 1950 graduate of USMA. He served 30 years in the Army in a variety of armor and R&D assignments, including command from platoon to brigade, and combat tours in Korea and Vietnam. His R&D assignments included service as an assistant project manager of the Abrams tank and program manager of the Bradley fighting vehicle systems. He is currently a consultant and military writer.

Red Army Tank Commander

A legend in the Red Army, General Andrei Kravchenko led his tanks in an unprecedented river crossing under freezing conditions in one of the most remarkable battles on the Eastern Front. Improvisation was the key.



by Lieutenant Colonel Richard Armstrong

On 3 October 1943, the Red Army tank corps commander did not know how his day would end. He received an urgent call to the command post of the Voronezh front.

General-Major Andrei Grigorievich Kravchenko, who had been fighting in Red Army tank forces since the beginning of the war, had come up through the ranks in the typical fashion. He joined the Red Army in 1918, got the right schooling, and served as chief of staff for a motorized division, then a tank division in the Finnish War. Kravchenko commanded a separate tank brigade during the hard, desperate fighting against the German invasion in late 1941.

He commanded a brigade of the new T-34 tanks, and like many of these new brigades, his played a decisive role in battles to save Moscow and help stabilize the front against the advancing German forces. Although he earned a reputation as a quiet, almost reserved man, Kravchenko was recognized

early by the Soviet High Command as a fully capable and aggressive operational commander.¹ In those trying early times of 1941, if one could show command ability, one advanced rapidly in position and responsibilities. Kravchenko became a rising star. In June 1942, he received command of the II Tank Corps, and later, in October, was assigned to command the IV Tank Corps.

Assigned to the Southwest Front, his IV Tank Corps played a dramatic part in the fight to save Stalingrad from the encroaching German armies. On 19 November 1942, Kravchenko's tank corps, as part of the 21st Army, began the historic battle that culminated in the encirclement at Stalingrad of the Germans' ill-fated Sixth Army under Colonel-General Friedrich von Paulus. His tank corps slashed through the defenders' line and moved rapidly to exploit success in the rear area. Moving in a southern direction, Kravchenko's tankers sought to link up with the forces of

the Stalingrad front that were advancing north in an attempt to close the noose around the extended German units. Meeting at 1600 hours on 23 November, only five days after the offensive began, Kravchenko's tank corps met General V. T. Volskii's IV Mechanized Corps near the small settlement of Sovietskii, just east of Kalach. With filled glasses of captured champagne, each excited corps commander celebrated and toasted the other's forces and fighting prowess.

The swift, decisive action won Kravchenko's tank corps the coveted "Guards" designation. Now, the seasoned and well-known commander of the IV Guards Tank Corps had unexpectedly been summoned to appear before his notoriously stern front commander.

Immediately upon arrival at the front headquarters, General Kravchenko, a tall, well built, commander with broad shoulders, reported to the front commander, General Nikolai Vatutin. A short,

squat man, Vatutin was a no-nonsense, hard-driving fighter; these were the traits necessary to obtain and hold a front-level command. Kravchenko had been assigned to Vatutin's front since early 1943, and fought on the southern face of the Kursk salient as the Voronezh front's armored reserve.

At Vatutin's side sat his earthy, but astute, political officer, Nikita Khrushchev, a future premier of the Soviet Union. On this occasion, General Vatutin had good news to share with Kravchenko. Vatutin, who had an amazing ability to accurately describe the situation and foresee developing events, told Kravchenko how lead elements of the 38th Army fought to the banks of the Dnepr River and crossed north of Kiev. They forced the river with makeshift means. Using rafts from hastily felled trees, empty gas cans, and small fishing boats, they snatched a hold on the west bank of the wide river in the area of the small village of Lyutezh. Some 15 kilometers north of the prized city of Kiev, the Red Army now breached a potentially difficult German defensive line. It was not an ideal bridgehead, but nonetheless, it was large enough to move more Soviet infantry and tanks to the west bank.

"These units," said Nikita Khrushchev, sobering the momentary euphoria, "are bearing great losses and resisting continuous German counterattacks. It's unlikely that they will be successful in securing the captured bridgehead on the right bank if they are not supported by our tanks."²

"On the way to the Dnepr," continued the front commander, "is a serious obstacle, the Desna River.

To build a bridge across it to cover our weight requirements would take no less than eight to 10 days. That wait will preclude any timely support to the 38th Army's forward units, and it will be a difficult battle to support the bridgehead across the Dnepr."³

The Dnepr, the second largest Russian river, had concerned the Soviet General Staff planners since early 1943. Anticipating success in the Kursk battle during the summer, the Red Army leadership saw the Dnepr as the retreating Germans' next likely line of defensive positions, and a difficult one to breach. The river was wide, with a west bank 100 feet higher than the east. Dubbed the "eastern rampart," it offered a very defensible barrier to a continuation of the Red Army's western advance.

Hoping to preempt a strong defensive line, advancing Soviet units on the left wing of Vatutin's front raced the Germans to the river early in September. Advanced elements of the 3rd Guards Tank Army approached the Dnepr while German forces were still located on the eastern bank. The Soviets attempted to cross the river south of Kiev in the area of the Great Bukrin, a large bend in the Dnepr. In a poorly coordinated effort, the Soviet High Command attempted to assist the Voronezh front with a hastily-planned airborne operation using a full airborne corps.

But in dropping paratroopers into the Bukrin bend, everything went wrong. The airborne drop scattered jumpers on both sides of the river, some landing in the river itself. The assault was a complete disaster. The Germans slipped away to the

"In his usual quiet, muffled voice, Kravchenko directed his staff to organize an immediate reconnaissance of the Desna. A tank platoon leader was about to earn his extra pay and rations as a "Guards" lieutenant..."

west bank and rushed reinforcements to seal the area.

The Voronezh front's first chance to breach the river had failed, but given the 38th Army's small bridgehead, Vatutin's front had another chance to achieve success. Showing his typical relentless style, Vatutin refused to let this opportunity slip. German commanders had learned to always count on Vatutin to do the unexpected. Now, he raced against time. Vatutin would have preferred to use the more powerful 3rd Guards Tank Army, but it was too far south in the Bukrin bend, and was engaged with strong German forces containing its bridgehead. General Kravchenko's IV Guards Tank Corps could move faster, and appear unexpectedly in the new bridgehead — if Kravchenko could get his tanks across the Desna.

With his knack for inspiring confidence in his subordinates, Vatutin directed Kravchenko, "You must look for a possible ford to get over the Desna."⁴

Receiving his mission with full awareness of his commander's urgency, General Kravchenko immediately left for his tank corps' as-

sembly area, in the woods northwest of Brovary near the Desna River. There, his unit was refitting and re-equipping after recent combat, and it still suffered from some major personnel and equipment shortages. Of an authorized tank strength of 210, the unit had approximately 90 tanks in good repair. Interestingly, some 15 of these tanks were British Lend-Lease Churchills, a heavy, slow tank — difficult to manage compared to the faster T-34s.

In his usual quiet, muffled voice, Kravchenko directed his staff to organize an immediate reconnaissance of the Desna. A tank platoon leader was about to earn his extra pay and rations as a "Guards" lieutenant. He received the task to measure depths and find the most shallow point for a crossing. Tankers from the 20th Guards Tank Brigade, designated for the reconnaissance, searched with local fishermen to find a possible ford.

The tankers dived several times in the now-cold October river waters to determine the character of the river bottom. They looked for an area with a solid river bed and no large rocks, tree trunks, or other obstacles which might stop their tanks as they drove across the river bottom. It was a long, cold, arduous task.

At the same time, Kravchenko had his tank brigade commanders begin preparing their tanks for the crossing. He reported his actions to the front commander and received from the front staff the mission to attack in the direction of Lyutezh, to force the Desna and Dnepr rivers, and to render help to the forward units of

the 38th Army in widening and securing the Lyutezh bridgehead.

The search for a river crossing finally succeeded. The tankers found a potential ford in the vicinity of the village of Letki. There, the Desna was 280 meters wide and two meters deep. But two meters was twice the fording depth of the T-34 tanks. The river bed of packed sandy soil was also a potential problem. After a few tanks crossed, it could quickly become deeper. In addition, the march route to the fording site twisted like a snake through swampy terrain. It was not the best of crossing sites, but Kravchenko had to risk it.

The tank crews carried out necessary river crossing preparations, displaying great inventiveness. All cracks, openings, hatches, engine louvres, and the turret race were caulked with oakum soaked in grease or tar. Any other potential openings were sealed with tarpaulins, oiled and battened-down. Air could reach the engines through the turret hatch, but exhaust fumes had to be fed through exhaust pipes made from tarpaulin sleeves, which carried the gases to the water surface.

Tankers of the 22nd Guards Tank Brigade made special protective covers for their main guns, and in a few of the battalions, soldiers crafted air intakes from corrugated hoses.

Engineers from the 38th Army assisted the tank corps and prepared the banks for the descending approach into the river. In the swampy areas, sappers layed a corduroy road made from brush wood.

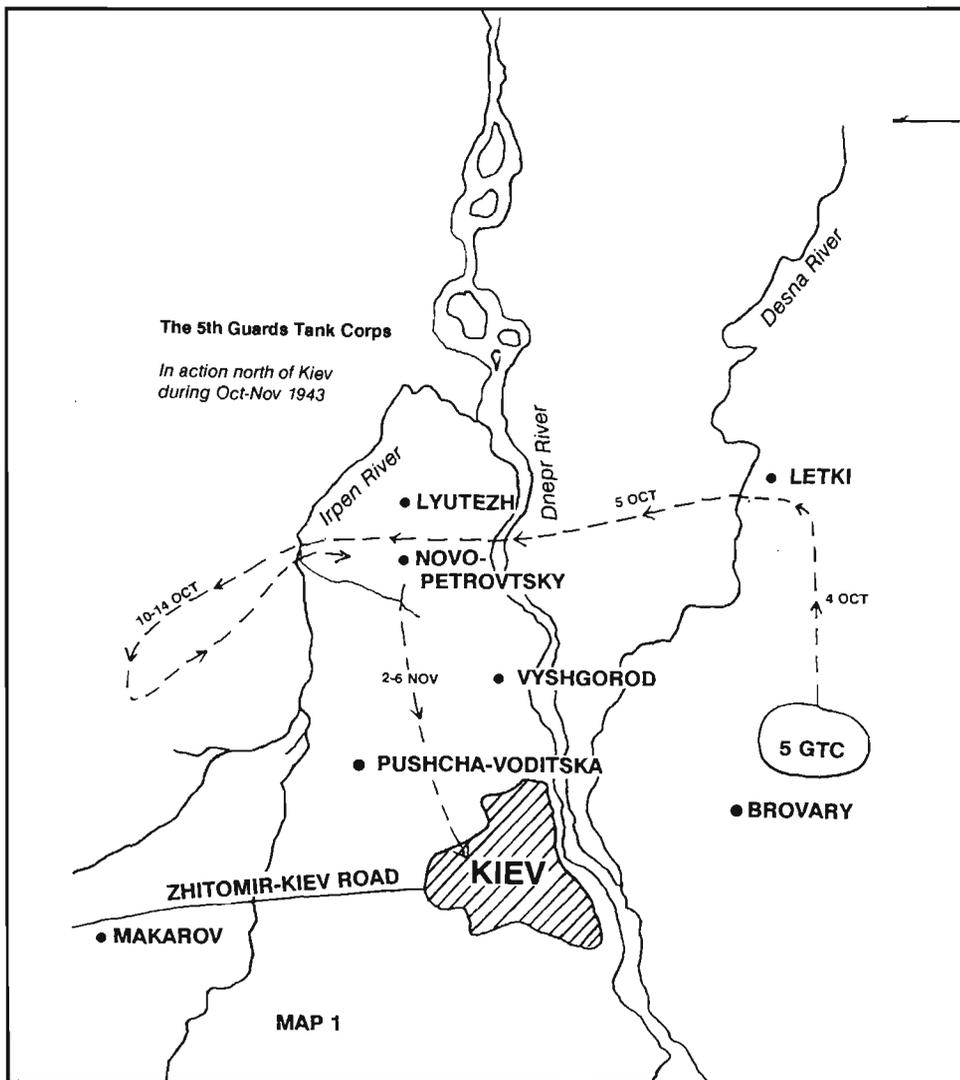
General Kravchenko listened attentively to his subordinates' progress reports. Later, he would attribute the success of the operation, in large measure, to hard, continuous work and precise coordination and planning by his corps chief of staff, and rigorous execution by the tank corps' engineers.

The tanks, personally led by their corps commander, began crossing the river on 4 October, less than 24 hours after receiving the mission. Across the top of the water, two rows of spar buoys marked the ford. The tanks moved along this designated path in first gear at no more than 7-8 miles per hour. The drivers drove blindly, carrying out changes in steering directions called from their tank commanders, who sat on the turret tops just out of the water. Exiting on the opposite bank, the tanks continued moving towards the Dnepr River.

In the middle of the Desna crossing operation, General N. E. Chibisov, commander of the 38th Army, arrived from his headquarters at Letki. While anxious for the tankers' arrival in his bridgehead, he was impressed by everyone's sacrifices.

"Andrei Grigorevich, what people your tankers are! For my many years of service," he observed, "I have never seen more courageous soldiers than I see at this time. The people are hours in the cold water without getting out. And such a risk the drivers take driving to the opposite bank!"⁵

Tankers had to spend time in the icy cold waters, fastening chains to tanks that bogged down in the river bottom. The sandy soil was begin-



the bridgehead, the Soviets would increase it rapidly — a small battalion would grow overnight to a division or more, making it impossible for the Germans to reduce the bridgehead. The Russians, on the other hand, knew that every day, even every hour, increased the Germans' potential to cordon off the fragile bridgehead with additional forces, mines, and systematic fires, as they had done at the Bukrin bend.

General Kravchenko began to think of the fight ahead. He contacted the commanders of the forward rifle divisions at Lyutezh. They reported that there were currently two German infantry and one tank division in the area. The Germans' defensive line consisted of three positions, each of which had trenches, prepared machine gun and mortar emplacements, and earth and timber

ning to give way with the passage of so many tanks. Three such tanks had to be towed to the opposite bank. The engine compartments had leaked and flooded. In many of the tanks that did make the crossing, the drivers did it blindly, sitting in a foot of frigid water.

Nonetheless, by 0800 hours, 5 October, 71 tanks had crossed the Desna. Although Soviet sources do not develop the point, the disparity in number of tanks making the crossing and the unit's on-hand strength indicates the Soviets did not drive the Churchill tanks underwater, like the T-34s. They left them behind in the rush for the bridgehead.

A pleased General Kravchenko, in a fur waistcoat over his field shirt, stood on the opposite bank with a broad smile. He presented awards for heroic personal efforts in the unique crossing. For the first time, a Red Army armor unit had crossed a river underwater — a first time for any army without specially designed underwater equipment. The Party and the Motherland were grateful, but none more than the waiting front commander.

After crossing the Desna, the IV Guards Tank Corps rushed onwards to the Dnepr River. Time was precious. The Germans had long since learned to react quickly and strongly to Red Army bridgeheads. No matter how small

field obstacles. Forward of their positions were antipersonnel and antitank mines. Crossing such a defense to expand the bridgehead would be no small task for Kravchenko's corps. But, first, the IV Tank Corps had to cross the Dnepr.

The Dnepr River at this point was 650 to 750 meters wide and between 2.5 and 9 meters deep. With the corps' advance to the river, reconnaissance was again dispatched and, with the help of local inhabitants, found two partially-damaged barges which the Germans had sunk when withdrawing. They raised and repaired these barges. Each barge could carry three tanks across the Dnepr. In addition to the repaired barges, the corps prepared two tank

ferries from pontoon bridging sections. Through the night of 5-6 October, these improvised methods resulted in approximately ten trips, and by dawn, Kravchenko had 60 of his tanks in the bridgehead.

German Field Marshal Erich von Manstein's Army Group South was an old opponent of Vatutin's Voronezh front. The Army Group's Fourth Panzer Army had General Hauffe's XII Corps in the area of the bridgehead. The sector was defended by the Hessian 88th and Brandenburg 208th Infantry Divisions along the steep river bank. In order to secure the crossing over the Dnepr, Kravchenko ordered preliminary artillery fire on German observation posts on the opposite bank. He also directed powerful suppressive artillery fires, supported by a large number of the famed Katyusha rocket launchers, to neutralize German machine gunners and artillery positions.

The first man to cross was the 20th Guards Tank Brigade commander, Colonel Shutov, a seasoned professional who had served in the Red Army since 1918. Before the war, he had been stationed in the ancient capital of Mother Russia, Kiev, and he knew the city well. His wife and two sons had remained in Kiev since the beginning of the war. He anxiously sought battle for the relief of his family and Kiev.

The arrival of Kravchenko's tank corps was the key to the Red Army defense in the bridgehead. The morale of the forward infantrymen in the rifle corps was bolstered and the reinforced German counterattacks were successfully repelled. Within 24 hours of the IV Guards Tank Corps' appearance, the

bridgehead began to expand. With the addition of the tankers, the depth of the Red Army's hold across the Dnepr expanded to a width of 8-10 kilometers and a depth of 5-6 kilometers from a previously shrinking area only 2-3 kilometers wide and 1-1.5 kilometers deep. Shutov's tank brigade had figured significantly in the fierce fighting, and Kravchenko's tankers widened and secured the bridgehead. General Hauffe's soldiers could not drive the Russians back into the river. They fought fiercely to contain the burgeoning bridgehead.

Even as the corps' rear element was waiting to cross the Dnepr, General Kravchenko received a new order from the tireless and aggressive front commander. The IV Guards Tank Corps was ordered to conduct a deep raid outside the bridgehead. Its objective was to cut off the highway between Zhitomir and Kiev, in the area of Makarov, and then halt the approach of German reserves from Zhitomir to Kiev.

Kravchenko's raid to Makarov began as aggressively as the crossing of the Desna toward the Dnepr. The corps tank brigades successfully passed their tanks through the kind of difficult and marshy terrain that normally inhibited the maneuver of armored formations. The tank units ground through the swamp-lined Irpen River to the southwest of the bridgehead and moved as rapidly as possible through a large tract of forest. After overcoming light resistance from a small group of German infantry, the tank corps, upon reaching good high ground, began to maneuver in the German rear area. With specially attached airborne infantry, which

rode on the tanks, Kravchenko's tankers rapidly advanced toward their assigned objectives. As usual, Kravchenko was well forward in his observation post. He always located himself at the most difficult situation, or most critical spot, sternly gazing on the action. His whole manner projected to his fighting tankers his strong-willed character. For four days, the tank corps fought toward Kiev and the highway to the west that was the Nazi lifeline.

Then, just as the tank corps moved out for the raid, the situation in the Lyutezh bridgehead turned worse. The 38th Army was under strong German counterattacks from the areas of Vyshgorod and Pushcha-Voditsa on the southern perimeter. The German command understood the danger of Kravchenko's tank corps maneuvering against the critical line of communications in their rear area. Strong forces of infantry and tanks struck from Kiev to the north along the Dnepr River's west bank, attempting to cut off Kravchenko's tank corps and liquidate the menacing bridgehead.

It was a desperate effort to stem the Red Army advance and breach of the Germans' major defensive obstacle, the Dnepr River.

Kravchenko was ordered to return his corps to the bridgehead and strike in the direction of the counterattacking German forces. This recall troubled Kravchenko. These instructions were in error, he thought. The corps' attack to Makarov was progressing successfully and bearing results.

Believing the attack should continue, he called the front staff to question the order. He hoped to



"In the month's fighting, Kravchenko led his tank corps in crossing the Desna, Dnepr, and — three times — the Irpen rivers, and his unit was the first to pierce to the center of Kiev. Kravchenko's tireless, aggressive performance earned him his country's highest decoration, the star of the Hero of the Soviet Union."

change minds, but Vatutin himself reaffirmed his order to immediately return to the Lyutezh bridgehead. Kravchenko's tankers were still necessary to hold the Red Army's grab on the west bank.

"With an ache in our hearts," wrote Kravchenko after the war, "we abandoned our gains, rushed back towards the River Irpen."⁶ None in his command regretted the withdrawal more than Colonel Shutov.

With the tank corps' arrival back in the bridgehead, and in coordination with 38th Army rifle units, they repelled all the German counterattacking forces and again expanded the bridgehead. Meanwhile, Vatutin worked to rush other forces to fully exploit the Dnepr crossing.

German aircraft dropped leaflets throughout the bridgehead area. In an attempt to demoralize the tankers and dash the hopes of the infantrymen, the leaflets read, "General Kravchenko lost all his 240 tanks and now sits entrapped." Reading one of the leaflets brought to him, Kravchenko remarked, "If I had 240 tanks, I would drive those Fascists all the way to Berlin."⁷

With the arrival of additional forces — the 3rd Guards Tank Army — in the bridgehead, Vatutin, on 30 October, held a war council with his army and corps commanders. The conference was conducted in the cellar of a bombed-out school house in Novo-Petrovtsy in the Lyutezh

bridgehead, within the range of German artillery. Vatutin clearly and laconically stated the operational plan, and personally assigned the army, corps, and division missions. Generally, the plan was to capture Kiev from the north and, moving in a southwest direction, destroy elements of the Fourth Panzer Army and seize important population centers to the west of the Dnepr. "The Supreme Commander (Stalin) has ordered us to launch the offensive on 3 November," he said in conclusion. "The Ukrainian capital is to be liberated not later than 6 November."⁸

Kravchenko stood quietly in the back, against the wall. He made no comments. His tank corps, in coordinated tank and infantry tactics, would fight as a mobile group for the 38th Army. Attacking in the first echelon, his corps would again cross the Irpen River. He knew what was expected of him and he would get it done.

While in the assembly area, IV Guards Tank Corps became the target of marauding German Stuka aircraft. Kravchenko quickly decided deception would be necessary for his unit's third crossing of the Irpen. He had his engineers build false crossing sites over the river and fabricate mock tanks from plywood in the assembly areas. The dummy tanks drew the German bombing strikes.

At 0600, 3 November, the 1st Ukrainian Front (the Voronezh was

redesignated on 20 October), began a classic large-scale Red Army artillery preparation along the entire front south of Lyutezh. A powerful strike from a full Artillery Breakthrough Corps at the disposal of the 38th Army initiated the offensive in the direction of the main attack.

During the evening of 5 November, Kravchenko met with his staff in the outskirts of Kiev. Leaning over a map, Kravchenko indicated the march routes of the tank columns and the coordination requirements of the brigades. He marked on the map the portion of the city they would attack. He ordered the concentration of units and preparations for the advance to the final jumping-off positions. And then Kravchenko added a surprising requirement, "The tanks must drive in the night at high speeds with headlights on."⁹

His staff and commanders exchanged glances in disbelief. Noting the puzzled stares, Kravchenko confirmed his instructions. "Yes, all vehicles — tanks, self-propelled guns, transports — will move at a high speed with headlights on and sirens blaring."¹⁰

At 2000 hours, 5 November, General Vatutin gave the order to begin the final assault on Kiev. The tanks' rapid night advance, with headlights on and firing their main guns on the move, stunned the German defenders and created confusion and panic. Fearing encirclement, the Germans began to

withdraw from the city and, by 0400 hours, 6 November, the German resistance in Kiev ceased. Announcing the capture of the city, Vatutin phoned Stalin, who ordered salutes fired in Moscow and all Russia to celebrate the victory.

In the month's fighting, Kravchenko led his tank corps in crossing the Desna, Dnepr, and — three times — the Irpen rivers, and his unit was the first to pierce to the center of Kiev. Kravchenko's tireless, aggressive performance earned him his country's highest decoration, the star of the Hero of the Soviet Union. He became marked for advancement in command.

In January 1944, combining the IV Guards Tank Corps and V Mechanized Corps, the Red Army created its last tank army during the war, and Kravchenko became its commander. His organization, the new 6th Tank Army, was completed in time for participation in the Korsun-Shevchenko operation in January-February 1944. With his tank army, Kravchenko now attacked as the mobile group for the 1st Ukrainian Front, slicing through the German forward defense and encircling a salient of some 70,000 Germans. The operation was a catastrophic defeat for the Germans, forcing them to completely abandon the Dnepr River area.

In August 1944, Kravchenko led the 6th Tank Army in fighting in the Yassy-Kishnev operation. Executing a brilliant 11-day operation, Kravchenko conducted operations at night, crossed water obstacles, assisted in the destruction of an army group, and placed the German situation on the strategic flank in jeopardy. The army's actions in this operation won it the "Guards" designation. The 6th Guards Tank Army, under Kravchenko's leadership, con-

tinued to fight through the Balkans and Carpathian mountains to the end of the war in Europe, in May 1945.

After the war in Europe, Kravchenko and his tank army were transferred to the Far East military theater. In August 1945, his tank army attacked across the Greater Khingan mountains and desert of western Manchuria against the Japanese Kwantung army. In a lightning campaign, forward elements of his tank army ended the war on the shores of the Pacific Ocean. Kravchenko for the second time received his country's ultimate recognition.

Twice Hero of the Soviet Union, a title earned by only a select few, General Kravchenko became one of the major fighting heroes of the Great Patriotic War. Unfortunately, his accomplishments, like like those of many of the other Red Army tank commanders, have not been spotlighted in the West's postwar literature, leaving a vague, and often incorrect, notion of the fighting on the Eastern Front.

But as Kravchenko stood at the end of a long and hard-won triumph against the Germans and Japanese, he understood, and represented fully, the words of a traditional Russian warrior creed, "He who comes to us with a sword shall perish by the sword."

Notes

1. Author's interview with Malcolm Mackintosh, British Military Observer to the Red Army, who met and knew Kravchenko

2. A. Kravchenko, "Tankisty forsiryut reki (Tankers Force the Rivers)," *Voenno-istoricheskii zhurnal* (Military History Journal), No. 9-1963, p. 63.

3. Ibid.

4. Ibid.

5. Anna Stroeve, *Komandarm Kravchenko* (Army Commander Kravchenko), Polizdat Ukraine, 1984, pp. 63-64.

6. Ibid., p. 70.

7. Ibid., p. 70.

8. David Dragunsky, *A Soldier's Memoir*, Progress, Moscow, 1983, p. 111.

9. Stroeve, p. 68.

10. Ibid.

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Lieutenant Colonel Richard N. Armstrong was commissioned from West Virginia University in 1969. He has served in military intelligence in such posts as Department of the Army, 1st Cavalry Division, the USAREUR staff and in the European, Korean, and Vietnamese theaters. He is currently G2, 1st Cav Div.

Cavalry Scouts at the Joint Readiness Training Center

by Captain Alan R. Horn

The impact of the National Training Center (NTC) at Fort Irwin, California, on the U.S. Army is obvious. Tank and mechanized infantry units fight better because they now train to fight. With the expanding role and size of the light forces, the need for a "Light Training Center" became obvious. Accordingly, the Army created the Joint Readiness Training Center (JRTC) on 27 February 1987 at

Fort Chaffee, Arkansas. Though it is a new organization, the results have been extremely positive. The post covers a total of 50,000 acres, mostly heavy brush, marsh and woods. Some scenarios call for all or portions of the exercises to take place in other locations.

Mission

The JRTC mission is to provide an advanced level of unit training for

Air Force and Army active and reserve component contingency forces in deployment and tactical operations under anticipated conditions of low- to mid-intensity combat. The training includes the execution of sustained collective tasks under conditions beyond those normally possible at unit home stations.

The mission of the Opposing Force (OPFOR) is to provide rotational training units with a highly-trained aggressor force that employs Threat tactics and is capable of operating at several levels of combat, from insurgent forces to mid-intensity mechanized units.

In common with the rest of the Army, the JRTC has suffered from severe manpower restraints. Because of these restrictions, someone who could perform in a dual role as both a light infantryman and a tankner was needed. The desired mix of 11B and 19E skills resulted in the selection of 19Ds for the job. 19D suitability for the job was evident when it became clear that small unit initiative and leadership was going to be a key ingredient for success. The cavalry scout is ideally suited for any mission that requires this mix. The organization of the JRTC is shown in Fig. 1.

Equipment

The JRTC NTC OPFOR is equipped like the NTC OPFOR, with OPFOR uniform shirt, insignia, and beret. (One difference is BDU pants, because of the greater need for pocket space.) The OPFOR is armed with the M16A1 rifle, M60 machine gun and the M249 SAW,

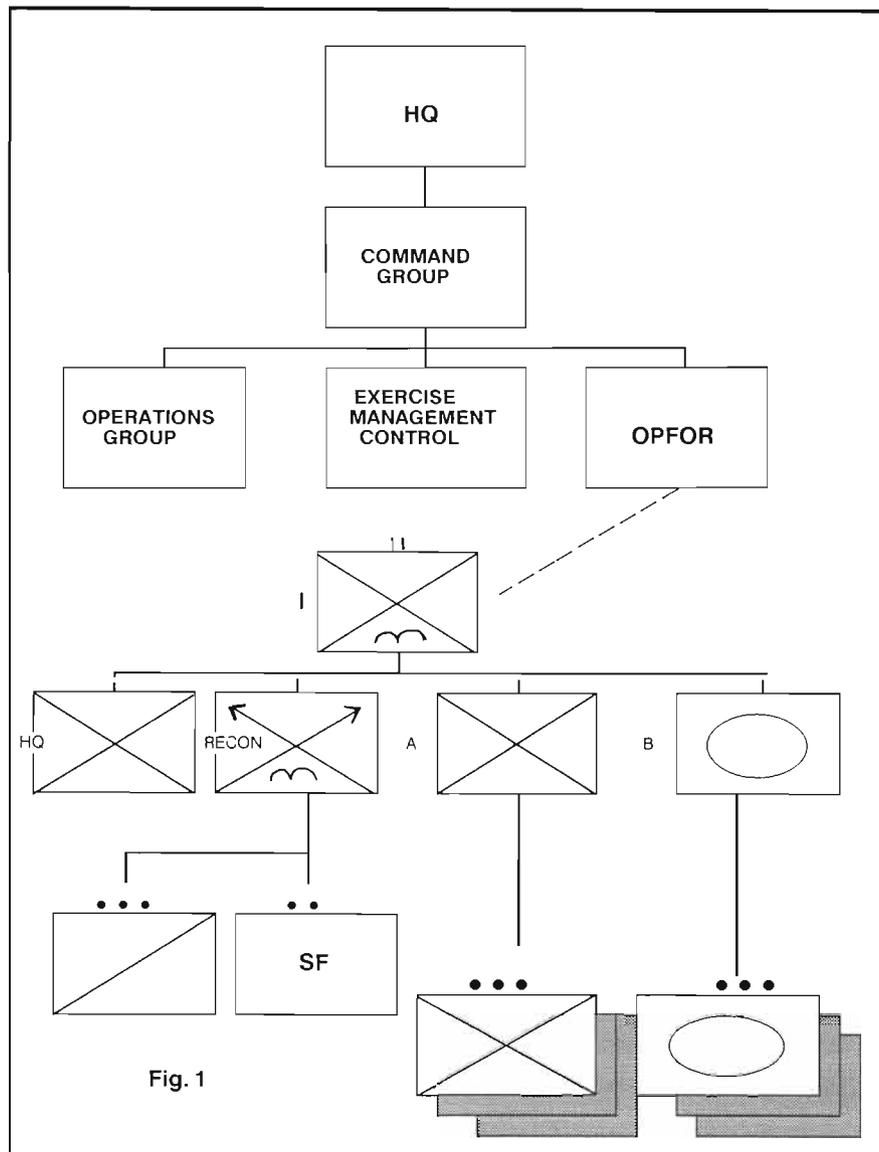


Fig. 1

though AK47s may soon replace the M16s. For mid-intensity battles, the M551 Sheridan armored reconnaissance airborne assault vehicle (ARAAV) is visually modified to resemble the T-62 tank. M113 armored personnel carriers resemble BMPs. Though most OPFOR artillery is notional, plastic tubes and plastic rounds represent 82-mm mortars. Stingers represent Grails, and a further M551 is visually modified to appear as a ZSU 23/4. For the low-intensity phase, jungle hats are worn with the MILES halo fastened on them. This allows for definite target recognition between forces, even in the heat of simulated combat. Plastic OPFOR helmets are used during the mid-intensity phase. Troops integrated all of this equipment during the train-up period for the first rotation in October 1987.

Training

Training for the first force-on-force exercise began in earnest in June 1987. The OPFOR spent most of June to September on terrain familiarization. The OPFOR at the NTC gives a large portion of credit for its continued successes against rotational units to its thorough knowledge of the desert terrain. Every cavalry scout at JRTC walked his terrain countless times, by night as well as by day. The unit also spent an enormous amount of time conducting MILES gunnery with small arms and tank weapons systems. Extensive use was made of the Small Arms Alignment Fixture (SAAF), Mobile Conduct of Fire Trainer (MCOFT), and rifle ranges. M551 Sheridan maintenance and training was constant. After each training period, drivers and mechanics gained valuable hands-on experience, and the OR rates for the vehicles stabilized in the high 80s or low 90s.

The training was physically tough, including long-range marches,

obstacle courses, and numerous field exercises in the sweltering summer heat. Temperatures topped 100 degrees, with humidity in the upper 90s. Heat injury training was a vital necessity. With the coming of winter, cold weather training became just as important. January temperatures of 15 degrees or below are not uncommon in the area, and are often backed up by 15-30-knot winds. In a tactical environment, the buddy system was constantly reinforced.

Additionally, the 19D training included the JRTC-OPFOR weapon of choice, the booby trap. Troops trained on numerous types of booby traps, including L600 simulated booby traps, L602 simulated flashes, and L495, surface trip flares. Excellent results during operations came from this intensive training. The inability of the average soldier to resist picking up magazines depicting the female body in various positions of repose led to many casualties. Naturally, these magazines (only the covers were used for military purposes) were attached to trip wires.

Scenario

On a fictitious island called Atlantica, the U.S.-backed Cortinians fight the Soviet surrogate Atlanticans. The Cortinians ask for U.S. military assistance, which is granted in the form of a U.S. light infantry task force. Each scenario is established around the rotational unit's mission essential task list. This, in turn, forces the OPFOR to remain flexible. Certain units land at nearby Fort Smith airport and march into the exercise area, while others jump into Arrowhead DZ.

Upon completion of the low-intensity phase of operations (usually five days), the Blue Force unit has 48 hours to prepare a defense capable of stopping a motorized rifle bat-

alion. The MRB attack is the major battle of the mid-intensity phase. Several smaller battles with smaller tank and/or motorized forces take place at the end of the training rotation, with the OPFOR in a defensive posture.

Rotations

Seven force-on-force rotations were scheduled for FY 88 and a similar number for FY 89. Each exercise lasts 11 days. The plan calls for light infantry units from CONUS to deploy to Fort Chaffee and the JRTC in the same way that heavier units deploy to the NTC. At this time, units from Forts Sill, Bragg, Drum, Ord, and Benning have rotated through the JRTC. Future rotations include the remainder of the active duty light units, as well as some National Guard/Reserve light units.

The Joint Readiness Training Center is here to stay. Whether its impact on light units will be as great as the NTC's on heavy units remains to be seen. What we can see, however, is the important role the cavalry scout has in a light environment, and the caliber of the job the 19Ds are performing.

Captain Alan R. Horn is the commander of Tank Co, 1/509th Parachute Infantry Regiment (OPFOR), JRTC. Previously, he had served in Germany as a fire support team chief, fire support officer and battalion S2. He transferred from field artillery and attended AOAC and was assigned to the NTC, where he served as assistant S3, S1, B Co. commander, and as 1-73 AR/2d Motorized Rifle Battalion commander.



Three famous German tanks of WWII, from left: Tiger I, Panther, and Tiger II on exhibit at RAC Museum.

The Royal Armoured Corps Tank Museum Has Expanded and Improved

by Richard M. Ogorkiewicz

The Tank Museum at the Royal Armoured Corps Centre at Bovington Camp — the British equivalent of Fort Knox — is the oldest tank museum in the world. Thousands of people have visited the museum, including more than a few readers of *ARMOR*. However, anyone who visited the museum a few years ago would hardly recognize it today because of its expansion and improvements.

The nucleus of the museum's extensive collection of tanks and other armored vehicles was created more than sixty years ago with the

decision to preserve some of the original WWI tanks. During the 1920s, the collection grew, and expanded in the 1930s with the addition of experimental vehicles that had completed their trials. During the early days of WWII, when invasion threatened Britain, museum officials dispersed the collection, and several of the WWI tanks took up duty again as pillboxes at vital road junctions. Other priceless vehicles were cut up to meet the nation's demand for scrap steel. Mercifully, some of the most valuable vehicles survived and they now provide a treasured link with the

earliest days of tank development. *Little Willie*, the first tank ever, built in 1915, is one such survivor.

Other examples of WWI tanks include six of the original, trapezoidal-shaped British heavy tanks of the 1916-1918 era. These range from the *Mark I*, which was the first type of tank to see action in September 1916, to the Anglo-American *Mark VIII* and the *Mark IX*, the latter representing the first attempt to build an armored infantry carrier.

Post-WWI tanks housed in the museum's collection include a *Vick-*

An M4 Sherman (105 mm. howitzer) and a British Churchill infantry tank guard the new entrance to Britain's Royal Armoured Corps Tank Museum at Bovington Camp. Many of the vehicles previously on display outdoors have been moved inside since the completion of new buildings.

(Photos by permission of RAC Tank Museum.)



ers *Medium*, which was the most numerous tank built anywhere in the world during the 1920s. The Royal Tank Corps used this tank in its pioneer experiments in mobile armored warfare.

Another interesting tank on display is the *Independent*, an experimental heavy tank with five turrets. This represents the most extreme example of a between-the-wars craze for multi-turreted tanks.

The WWII tanks and armored vehicles have been assembled in a new exhibit that includes not only British, but U.S., German, and Russian tanks, as well as French, Italian, Japanese, and Swedish armored vehicles. There are now more than 180 vehicles in this exhibit, and it continues to grow as newer models are donated by the British Army, or through exchanges of duplicate machines with other museums.

In addition to the collection of the earliest tanks and armored vehicles, the RAC Tank Museum houses a

very comprehensive collection of WWII tanks, including the famous *Tiger II*, which, at 76 tons, was the heaviest tank to see action in that war.

The museum's comprehensive collection of post-WWI tanks and armored vehicles includes the British *Conqueror* of the 1960s, the heaviest post-WII tank to see service, and the *Chieftan*, still the most numerous tank in the British Army. Among the newer acquisitions is a French-built Panhard *AML 90* armored car captured by the British in the Falkland Islands, and a Brazilian-built Engesa *EE-9 Cascavel* armored car, used in the recent Iraq-Iran war.

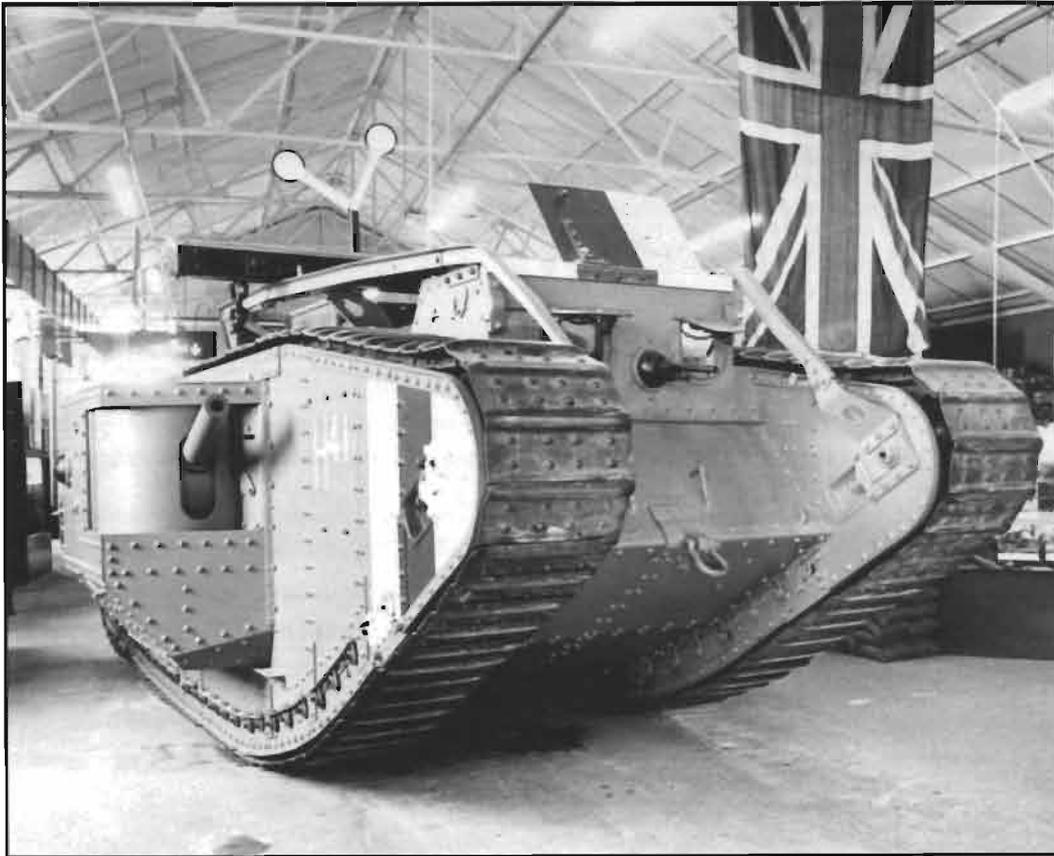
The inclusion of such vehicles in the museum makes it not only of historical but of current military and technical interest. As such, the museum is a source of general information about the development of armored vehicles and is visited regularly by Royal Armoured Corps Centre personnel, as well as those from other military establishments.

Students from the Royal Military College of Science (See "Graduate Studies in Combat Vehicle Technology," Sept-Oct 1987 *ARMOR*) are also frequent visitors.

Such visits uphold the original purpose of the museum, to provide a basis of instruction for members of the Royal Tank Corps and other components of British forces. In 1947, the museum opened to the public and has become one of the most popular British museums, with more than 200,000 visitors each year.

During the past few years, the museum has undergone a considerable expansion. Now, most of its vehicles are under cover. As far as possible, each vehicle is displayed against a contemporary background, which helps visitors acquire a better appreciation of its capabilities and characteristics.

The museum owes much of its military and public success to a succession of dedicated curators, all of whom have been retired officers of the Royal Tank Regiment. The



Mark V heavy tank fought with the 8th Bn. of the Tank Corps in WWI. This vehicle is still in running order.

museum has recognized the present curator, LTC George Forty, by naming one of the new display halls after him.

In addition to its great array of tanks and armored vehicles, the museum also contains other historical and technical materials. These include medals won by tankers in action, uniforms of different periods of the Royal Armoured Corps, and the first gas turbine engine designed and built for tank use in 1954. The museum also has an extensive reference library and a book shop, which contains what is probably the most extensive stock of books on armor.

For the past five years, the Society of Friends of the Tank Museum, a voluntary organization, has backed the expansion of the museum. The

society's several hundred members assist in vehicle restoration and in their operation on special occasions. The society is also instrumental in fund-raising activities for the museum.

Among the museum's operational tanks is a Mark V of 1918 vintage, as well as several WWII tanks. These vehicles frequently participate in demonstrations of armored equipment, and provide a valuable historical perspective with later models. Other uses for these operable tanks, especially the later models, include support of such current defense technology activities as the study of tank seismic (sound) signatures.

The Royal Armoured Corps Tank Museum more than meets its dual role of providing historical and tech-

nical instruction on armor to the British forces and educational recreation to the general public. It is a prime point of interest to visiting tankers and one well worth seeing when you come to England.

Richard M. Ogorkiewicz is a professor at the Royal Military College of Science and a consultant on armored vehicle technology. He is the author of two books and more than 300 articles on armor, including 76 in *ARMOR*. He is a consulting editor of *International Defense Review* and president of the Society of Friends of the Tank Museum.

IT WAS THE NTC - 40 YEARS
BEFORE THERE WAS AN NTC

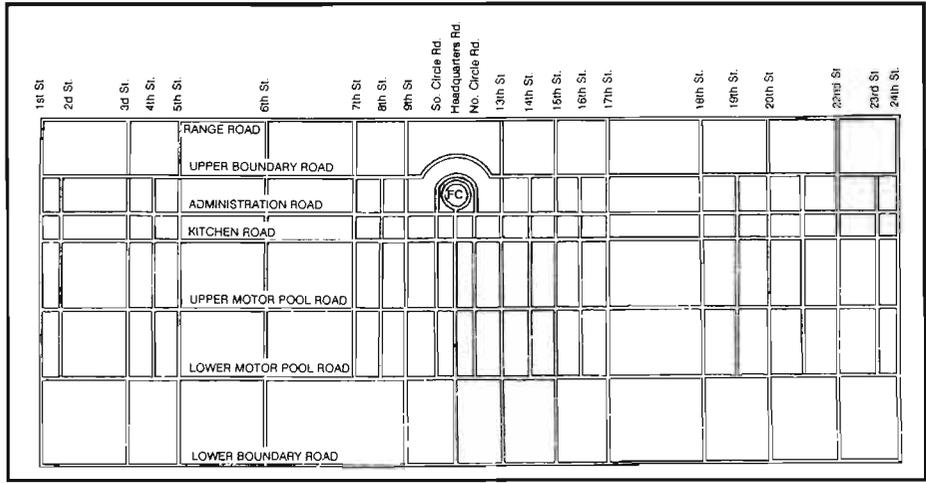
The Desert Training Center: Yesterday and Today

by Francis G. Blake



Above, the Freda QM Depot site is abandoned today, with only tank tracks to recall its history. The same scene in the 1940s included lines of Shermans, Lees, and Stuarts prepared for railroad loading. At right, MG Patton and MG Walton Walker observe an exercise.





Typical layout of DTC's tent camps is shown above. Each was about one by two miles in area. "FC" is the flag circle, the center of the camp.

Below, the camps were spread over a vast area of the Mojave Desert.

"Seven armored divisions and 13 infantry divisions trained there, but not one of them ever fought in the deserts of North Africa."

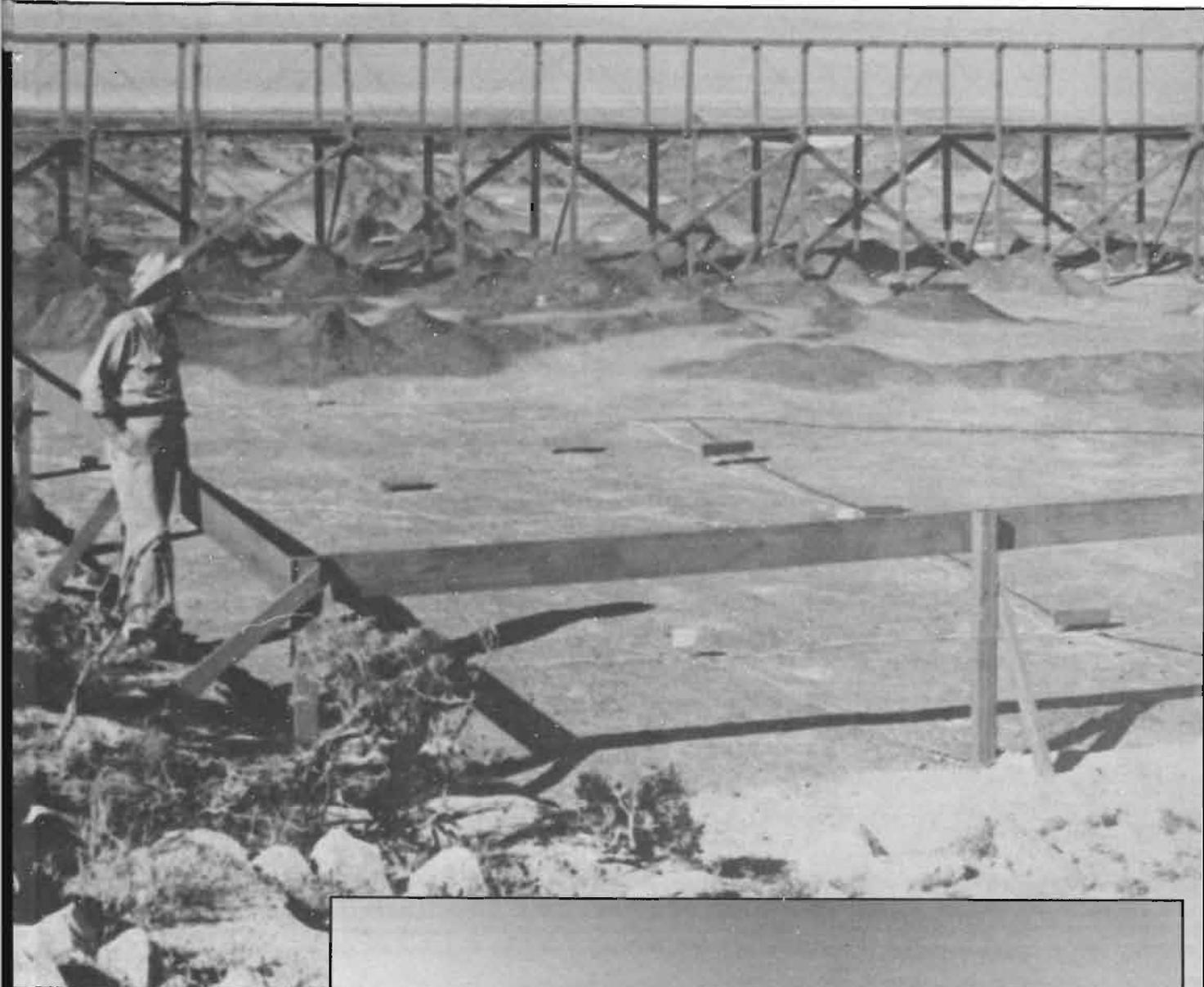


With an eye on the major armor battles in the deserts of North Africa in the early years of WWII, the War Plans Division of the War Department concluded that specially trained and equipped troops were needed to fight in desert and other extreme climatic conditions. The Army chose MG George S. Patton, Jr., commanding general, I Armored Corps, to survey, establish, organize and operate a training center where U.S. armor troops and their support elements could learn and practice desert fighting. The site Patton selected in southern California became the U.S. Army Desert Training Center (DTC) Mojave Desert, California. Seven armored and 13 infantry divisions trained there, but not one of them ever fought in the deserts of North Africa. All went to Europe and the Pacific theaters, including Alaska, because none of them completed their training in time for the North African invasion. The DTC became

the Army's largest maneuver area, unhindered by civilians and unrestricted as to property damage.

Although Patton remained in command of the DTC for only five months (Mar-Aug 1942), the center has always been "Patton's Training Ground." In 1943, the name officially became the California-Arizona Maneuver Area (CAMA), but the Patton connection remained.

Ten or more tent camps (see Figures 1 & 2) were built, at least six of them in California and as many as four in Arizona. Six major combined maneuvers were held on DTC-CAMA environs from mid-



A 1942 visitor to Camp Iron Mountain looks at the huge relief map of the maneuver area, a map so large a foot bridge was needed to see it all. Earth was shaped to duplicate topography and tar was sprayed on it for permanence. At right, only a few fence post stubs remain and desert scrub covers the map's "mountains."





The garrison flag flies over Headquarters, Desert Training Center in photo above. Camp Young is in the background of this photo, taken in 1942.

Today, the headquarters site is eroded and overgrown. The power lines were postwar additions to the landscape.

"...The combined DTC-CAMA enclosed 17,750 acres in California and Nevada and up to 190,000 men served there..."

1942 to early 1944, when CAMA ceased operations and was dismantled. Opposing "red" and "blue" armies consisting of armor, infantry, mechanized cavalry, tank destroyers, artillery, air units, and support units thrashed out the basics of armor doctrine in the desert wastes. They stressed operations with restricted water supplies, sustained operations remote from railheads, speed in combat supply, supply in darkness, desert navigation, laying and lifting minefields, maintenance and evacuation of vehicles, hygiene, sanitation, and medical training.

The DTC site was ideal for its purpose; the terrain varied from mountains to canyons, from dry lakes to sand dunes. Cactus and low bushes gave no cover, and summertime daytime temperatures zoomed to 130 degrees, while winter saw the mercury plummet to freezing. Occasional flash floods in the canyons taught troops to be aware of such occurrences. Nearby towns were small and ill-equipped to handle the masses of troops, which made life doubly hard for the sand-chewing trainees. Army Air Force planes, based at Rice Army Airfield, provided close-support--and attack,

for the ground forces.

Seven general officers commanded the DTC-CAMA during its brief existence: MG Patton, MG Alvan Gillem, Jr., MG Walton H. Walker, MG Charles H. White, MG Wade H. Haislip, MG Alexander M. Patch, and MG Jonathan W. Anderson. The combined DTC-CAMA enclosed 17,750 acres in California and Arizona and up to 190,000 men served there in all capacities from combat training to messing to medical to maintenance.

All that remains of these camps and training sites are some scattered camp name signs, a few paved bits of road, some wrecks of buildings, gravel paths, foxholes--and memories.



Above, ranks of M3 medium tanks of the 33d Armored Regt., 3d Armored Division, as seen in 1942 at Camp Iron Mountain. (Note relatively rare cast-hull version at left, front row.) View is to the east and the Turtle Mountain range, with the Colorado River aqueduct crossing the desert to rear of the tank park.. Today, little more than the tank tracks remain.

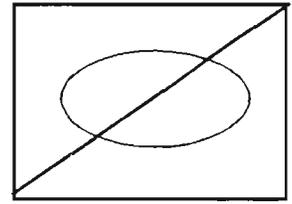


This outdoor stone altar, erected by the 183d FA Group at Camp Iron Mountain, is one of the few surviving landmarks from the DTC days.

Francis G. Blake is a paleontologist - a scientist who studies fossils and ancient life forms - and an amateur historian with particular interests in motor vehicles. He is a regular contributor to *Wheels and Tracks* and *Army Motors*, the quarterly journal of the International Military Vehicle Collectors Club. He has been studying the Desert Training Center sites since 1983.

Cavalry Missions and Structure

by Colonel (P) Jarrett J. Robertson



Introduction

For three key reasons, interest in reconnaissance, security, and economy of force operations has heightened in recent years. AirLand Battle doctrine places a primacy on a commander's ability to see the battlefield. It also stresses a nonlinear battlefield, requiring a commander to mass his combat power at the decisive point. Obviously, a commander cannot mass a reserve at the decisive point without owning a unit capable of an economy of force role. Finally, even if doctrine did not require these capabilities, recent practical experience at the National Training Center (NTC) has stressed their need. At the NTC, commanders have become painfully aware of the consequences of failure to see the battlefield. For all of these reasons, a commander should have organizations to fulfill these requirements.

Accordingly, this article will assume a requirement for reconnaissance, security, and economy of force missions, and will discuss how we can design these forces to accomplish such missions.

These thoughts are not resource-constrained. Structural trade-offs are not identified. The thoughts are not the results of any strict, clinical testing. Instead, they are the result of 24 years of observation and reflection regarding the cavalry force and, in particular, more than two years of experience at the NTC, where units continue to grapple

with the OPFOR under realistic, challenging conditions.

Historical Background

Cavalry contributions in North Africa and Europe in WWII were well understood in the late '40s and early '50s. General (Ret.) James H. Polk and several others sat down after the war and were instrumental in designing the type of cavalry organization they felt necessary to be successful on the battlefield of the future. Having fought WWII with inadequate structure and organization, and having had to deal with constant attachments and detachments, they were convinced that cavalry needed to be a self-contained organization, a combined arms team of scouts, tanks, infantry, artillery, and air defenders. The organization also needed sufficient organic logistical support to allow it to operate independently.

These principles and requirements led to the cavalry structure that emerged in the '50s and '60s for both the cavalry regiment and the divisional cavalry squadron. The cavalry platoon in both divisional and regimental cavalry in the mid '60s was a typical result of this work. It consisted of a scout squad, tank section, infantry squad, and a 4.2-in. mortar crew — a self-contained combined arms team. The only significant change to the post-WWII organization was the addition of an air cavalry troop to complement the three ground cavalry troops in the divisional cavalry organization.

Another noteworthy aspect of the divisional cavalry organization was its robust organic CSS structure, which gave it the capability to sustain itself independently for some period of time. It was not a bad organization, and it gave the division commander great flexibility.

The next chapter in the evolution (or disintegration) of cavalry occurred in the late '60s and '70s. The U.S. Army became fixated with a need for firepower. The NATO dilemma of dealing with a large Warsaw Pact armor threat led the U.S. to start tinkering with the two border regiments in West Germany. We made the scouts into tank killers and eliminated the infantry. This carried over into the divisional cavalry as well. This era was followed by the leader-to-led issue and the Army of Excellence of the late '70s, in which we again tinkered with cavalry as trade-offs for other initiatives. In the process, we ruined the divisional cavalry squadron completely and damn near ruined the cavalry regiment. With the establishment of the NTC, we have come full circle and are now rediscovering the need for a cavalry structure very similar to the post-WWII organization. The NTC lessons learned clearly point to the need for reconnaissance, security, and economy of force missions to deal with the OPFOR. The NTC experience has also shown glaring deficiencies in our current force structure, particularly in the cavalry or reconnaissance organizations from battalion through division level. With only one rotation of

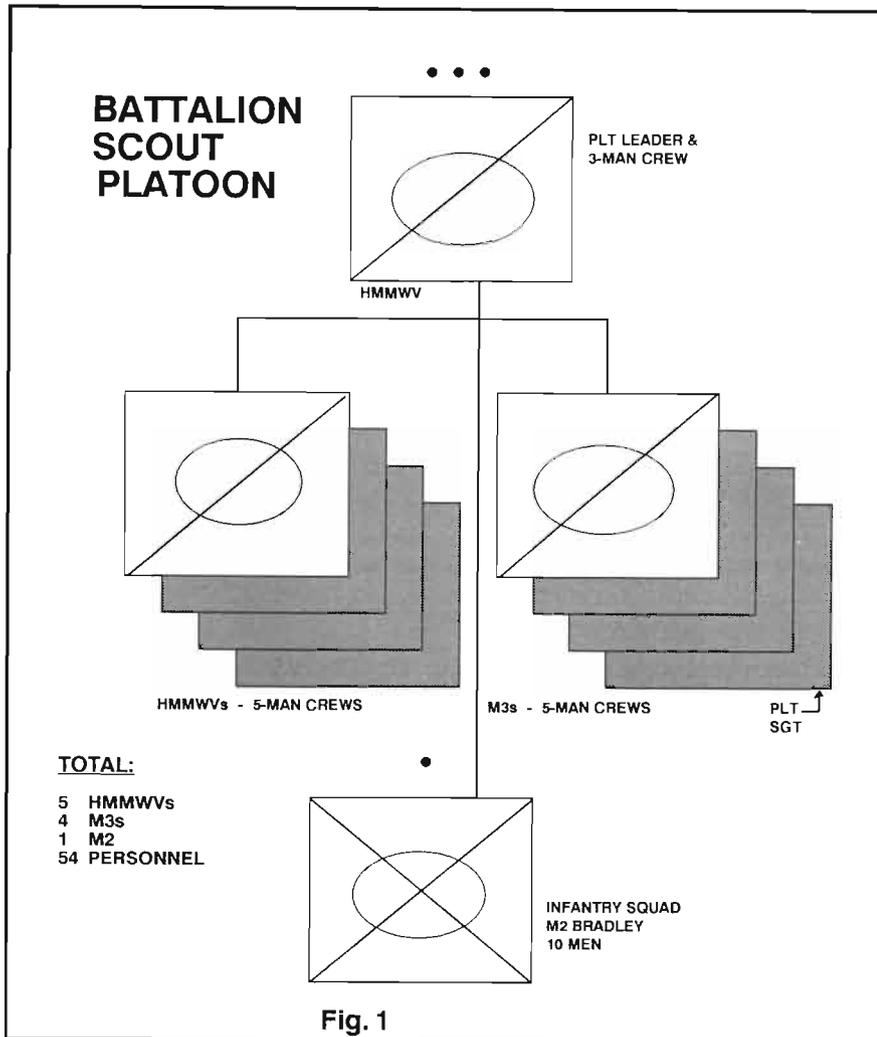


Fig. 1

"At the NTC, we've clearly seen the need for scouts at the battalion task force level. The structure of the platoon is not far off...."

squad would consist of M3 Bradleys. The other squad could be light, perhaps mounted in HMMWVs, for more close-in reconnaissance. Given people, equipment, and training, this organization should be able to do the job.

Brigade Cavalry Troop
(Figure 2)

Obviously, our divisional brigades are especially bankrupt of any recon or security capability. A brigade commander must rely on either subordinate battalion scout platoons or divisional assets for help. Neither solution works. The NTC proves this with every rotation.

In contrast, the 194th and 197th brigades have organic cavalry troops, consisting of scouts, tanks, and mortars. While these two brigades have only been allowed to bring their cavalry troops on recent rotations, the demonstrated potential influence in reconnaissance, security, and economy of force operations has been significant.

The separate brigade commander has a great asset. Its use need not be confined to reconnaissance and security operations. In fact, given the organization of the troop, the separate brigade also has an economy of force asset, which enables the brigade commander to

regimental cavalry completed at the NTC, it's too early to draw definitive conclusions regarding ACR structure, but the need for some modification is apparent. We will focus here on the need for an adequate cavalry organization for the maneuver heavy battalion, brigade, and the heavy division. Only passing comment will be made concerning regimental cavalry issues.

Structural Recommendations

The types of organizations detailed here are those I feel are required for reconnaissance, security, and economy of force missions from battalion through corps. Once again, I emphasize that these are personal opinions and are unjustified by empirical data.

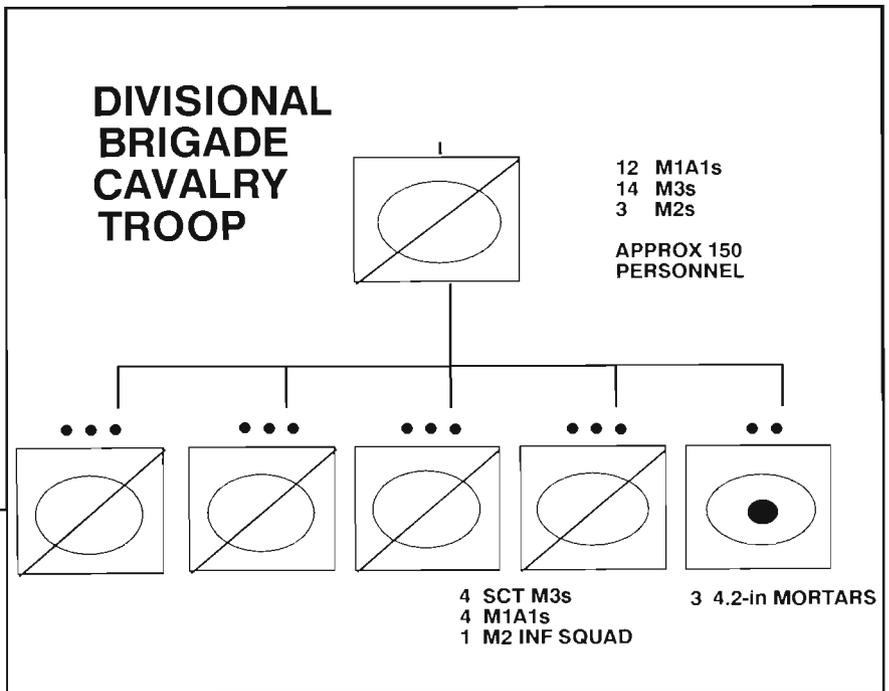
Battalion Scout Platoon
(Figure 1)

At the NTC, we've clearly seen the need for scouts at the battalion task force level. The structure of the platoon is not far off. It should be capable of reconnaissance and security missions (less guard, which brigade or division cavalry organizations should handle). The platoon should be capable of screening for the battalion and reconnoitering the kind of units the battalion would normally attack. I would add four vehicles to the platoon for a total of ten. One would transport an infantry squad for dismounted reconnaissance/security. The other vehicles would form two scout squads of four crews each. One

"One solution is to give every divisional brigade commander his own cavalry troop....The troop would have three line platoons and a headquarters platoon with a fair amount for CSS and communications capability for extended operations."

shape a battlefield to his best advantage.

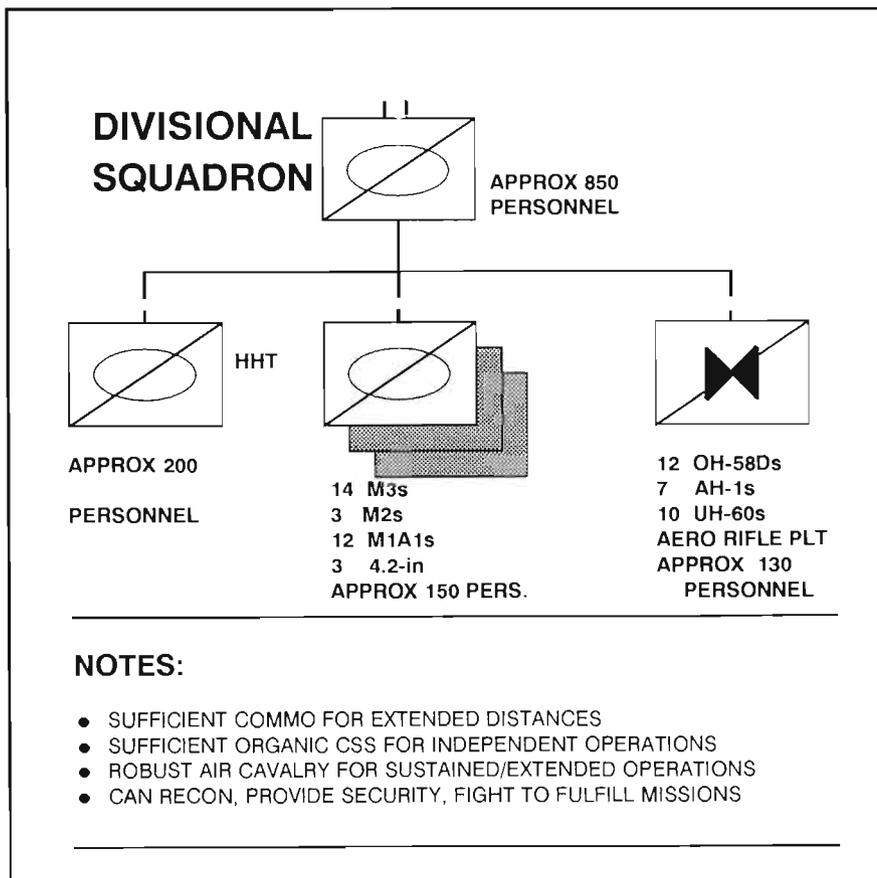
Therefore, one solution is to give every divisional brigade commander his own cavalry troop. The platoon organization reverts to the early H-Series TO&E, and integrates scouts and tanks within a platoon. The troop would have three line platoons and a headquarters platoon with a fair amount for CSS and communications capability for



extended operations. The infantry squads are added for dismounted reconnaissance and security missions.

Divisional Cavalry Squadron (Figure 3)

The current organization does not appear to be what a division requires for a cavalry force. Its design appears out of balance and it cannot fulfill necessary missions. With two ground troops of scouts and two rather small air cav troops, the squadron is a hybrid organization that really doesn't fit any normal scenarios for employment. Due to structural limitations, the squadron is only capable of performing reconnaissance missions either on the ground or in the air on limited axes and with little staying power. An inherent requirement of cavalry is the capability to fight, if necessary, to complete the reconnaissance mission. As an example, a cavalry unit should be able to probe the enemy's position and eliminate enemy recon and security forces. Our current divisional cavalry squadron really can't do that. On the other hand, its other mission of security can only be partially met. The squadron can *screen* for the division, both offensively and defensively, but it cannot *guard* anything. It cannot function as



NOTES:

- SUFFICIENT COMMO FOR EXTENDED DISTANCES
- SUFFICIENT ORGANIC CSS FOR INDEPENDENT OPERATIONS
- ROBUST AIR CAVALRY FOR SUSTAINED/EXTENDED OPERATIONS
- CAN RECON, PROVIDE SECURITY, FIGHT TO FULFILL MISSIONS

an advance guard, nor can the squadron guard a division flank. Finally, the squadron cannot provide the division commander a realistic economy of force capability. Therefore, the division cannot use the squadron to occupy a sector or a battle position in order to free maneuver battalions for other missions. The book says that if a unit requires such a capability, the division can beef up the squadron with maneuver companies. This solution will not work. We learned that during WWII. That's why we organized the type of cavalry units that we had in the '50s and '60s. The ability to blend scouts and tanks into an effective fighting force is a major training challenge.

The other problem that we have created centers around the aviation assets for the squadron. Because of these assets, most divisions put the squadron under the aviation brigade. While this helps aviation training and maintenance, it hinders the ground troops' training and maintenance requirements.

As a solution, I see no better answer than to return to the H-series TO&E. The three ground troops would be the mirror image of the brigade's cavalry troop discussed earlier. The air cavalry troop would be more robust than the current version, to allow for sustained air operations. This squadron is capable of all types of reconnaissance and can fight to fulfill its mission. It is also capable of providing security for the division, to include guard. Lastly, the squadron can provide an excellent economy of force capability to the division commander, freeing his heavier maneuver battalions for other missions. It should also have the communications capability and training to work under either divisional or brigade control.

Cavalry Regiment

Overall, the armored cavalry regiment is a sound organization. The evolution of the support squadron, air cavalry squadron, and the addition of certain separate companies make the regiment a fairly well balanced combined arms team. However, we require some additions and changes to complete a very capable, lethal, and well-rounded organization. Here's what we should change:

Engineers: One engineer company is insufficient to satisfy the requirements of a cavalry regiment. Two more independent engineer companies are needed. They should be integrated at the squadron level by giving each line squadron a separate engineer company. We don't need the engineer battalion headquarters. It is just overhead.

Artillery Batteries: We should convert each squadron howitzer battery to the 3-by-8 configuration. It is a proven advantage which cavalry, by virtue of its extended operational frontage, cannot be without.

ADA Battery: Addition of an ADA battery to the regiment is currently scheduled for the 1990s. It is a critical necessity now. We should expedite its integration into the force structure.

Cavalry Troop Structure: We should design the regimental cavalry troop in the same manner as the brigade and divisional cavalry troops, integrating scouts and tanks at the platoon level, along with an infantry squad. The third mortar should be returned to the cavalry troop mortar section to increase organic firepower and flexibility. It is important that the divisional and regimental troops be similar.

Squadron Tank Company: The 14 tanks in this company provide insufficient sustainable combat power for regimental squadron operations. Each tank platoon should be a five-tank platoon with the traditional two tanks in the headquarters platoon.

Conclusion

This represents a highly personal view regarding cavalry structure. Two points are worth emphasizing. First, more than one general officer has expressed the view that he would willingly surrender one or more maneuver battalions to gain a reconnaissance and economy of force capability at the brigade and divisional levels. Second, the next war will feature acute requirements for the capabilities which cavalry should be structured to provide. The U.S. Army must abandon narrow arguments concerning branch proponenty and space trade-offs to address legitimate war-fighting requirements. While we may argue over types of equipment required, or whether the old TO&Es are better, the overriding issue remains. We need to rethink the missions and structure requirements of our cavalry organizations as we continue the evolution to AirLand Battle doctrine. Let the debate begin.

Colonel Jarrett J. Robertson, a brigadier general-designate is the 3d ACR commander. He was commissioned in Armor at Southwest Missouri State University in 1963. Recently, he has served as deputy commander for Training and Commander Operations Group at the NTC.

Armor Training 1997

An Application of Embedded Training

by Major H. Critz Hardy

Technological progress in training now offers exciting opportunities to improve the U.S. Army's ability to effectively employ modern, lethal weapons systems in combat. Advances in computational capacity and storage, interactive dynamic high-fidelity imagery, networking, software and courseware, full-content voice recognition and generation, and artificial intelligence¹ may make possible far more effective training subsystems than previously available.

The way we train and when we train may dramatically change by the late 1990s and into the 21st Century. Moreover, the potential to actually apply this new training technology increases as our fighting vehicles become more technologically sophisticated — solid-state fire control computers, very high-speed integrated circuitry, and electronic display screens are a few key examples.

This same capacity to improve a vehicle's onboard data processing and storage capability permits a practical discussion of embedded training in future combat systems.

What is embedded training?

Embedded training is training "that is provided by capabilities designed to be built into or added onto operational systems to enhance and maintain the skill proficiency necessary to operate and maintain that equipment and item."²

Embedded training subsystems can range from training subsystems added on to equipment to subsystems that are built in. At the low end of the scale are appended training subsystems, which can be quickly attached to existing mounting hardware and data/electronic connections. At the mid-point are training subsystems that are permanently mounted to the combat system, but are adjunct to the operational hardware. On the opposite end of this continuum are training subsystems that are totally integrated into the operational hardware (subsystems that share the same black box).

Embedded training requires more than the simple presentation of information. It must assess the proficiency level of the user, feeding this assessment back to the user to improve his performance or reinforce correct performance. It must also keep records of the operator's training proficiency progress.

Most available training technology has been fielded after the new combat system has arrived at the using unit, but embedded training must be designed into the combat system at the earliest engineering stages. This training subsystem must then be tested and produced at the same time as the combat system. Embedded training will permit instruction on how to operate the tank without the need for instructors. This capability will permit rapid trainup of soldiers who must use un-

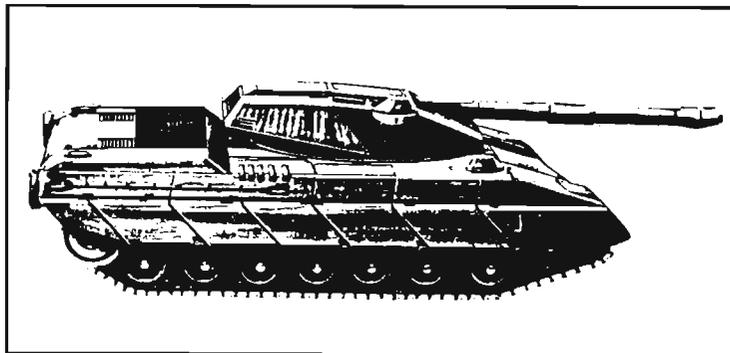
familiar tanks from either pre-positioned stocks (POMCUS) or war reserve. Embedded training will also provide a readily available training package for sustainment training in units, and a training management (record keeping) capability that will relieve this type of administrative burden from unit trainers. This capability may ultimately provide more objectivity in the readiness reporting system.

Another advantage of embedded training is that it standardizes training across the force, regardless of the soldier's geographic location or major Army command. The lesson content and performance standards originate from one source and are part of the combat system.⁴

Embedded training is not without its disadvantages. First, it is costly. This cost includes not only the acquisition price of the hardware and software to run the training subsystem, but also the cost of software development of each lesson and changes to those lessons as doctrine evolves over the life of the combat system. These costs will drive up the total procurement costs of the combat system — aggravated because the training system is often partially funded from sources usually not earmarked for combat system development.

A second disadvantage is that embedded training requires more frequent use of the combat system.

- PRECISION TACTICAL ENGAGEMENT SIMULATION
- LEADER AND CREW TACTICAL TRAINER
- NETWORKED PLT-THROUGH-BN BATTLE SIMULATION



- DRIVER TRAINER
- INDIVIDUAL CREW STATION OPERATING INSTRUCTIONS
- OPERATOR/ORG.MAINT. TRAINER
- GUNNERY PROCEDURES TRAINER
- PERFORMANCE FEED BACK

EMBEDDED TRAINING CAPABILITIES IN THE M1 (Block III)

Therefore, there is more risk to the reliability, availability, and maintainability of the system. The parts of the system used for training must be made just as rugged as the system itself to ensure the system can maintain its required operational rate. For those parts of the training subsystem that are fully embedded in the operational hardware, designers must ensure that failure of the training subsystem does not affect performance of the operational subsystem.⁵

Finally, because embedded training requires advanced technology, there are technical risks associated with choosing a technology that will be available in time for production. Failure to advance a key technology may dramatically change the embedded training approach (of course, this is a risk to the operational system as well, but in the past, training developers frequently relied on proven technology to develop training devices for existing systems).⁶

According to a 1987 Army policy letter:

*"An embedded training capability will be thoroughly evaluated and considered as the preferred alternative among other approaches to the incorporation of training subsystems in the development and follow-on Product Improvement Programs of all Army materiel systems."*⁷

The first armor combat system that possesses real potential for an embedded training subsystem is the Abrams Block III tank. It will be developed according to the guidelines of the Army policy on embedded training: The Abrams Block III is currently scheduled for fielding in the late 1990s. Its training subsystem will integrate embedded training applications into the four areas of armor training: gunnery, tactics, driving, and maintenance. Embedded training will support unit sustainment, cross- and transition training. Instruction at the Armor Center will likely rely on separate stand-alone trainers (e.g., ICOFT, driver trainer, close combat tactical trainer, and organizational maintenance trainer) to avoid requiring large numbers of the Abrams Block III at Fort Knox. However, institutional training will include instruction on how to use the embedded training subsystem on the tank.

So, what is the potential application of embedded training to the Abrams Block III? Gunnery training will include individual and crew "how to" training, crew gunnery procedures training, precision tactical engagement simulation, and larger unit (platoon, company) fire control and distribution training. Individual and crew "how to" training will be provided by artificially intelligent, computer-assisted instruction — in-

teractive instruction on display screens at each crew station. Crew gunnery procedures training will provide "how to fight the tank" training through on-board, computer-generated imagery presented on display screens and direct view optics. This training will be similar to today's tank commander/gunner training that occurs in the Unit Conduct of Fire Trainer, but will include the driver as well. Gunnery sustainment training (as well as tactical table-type training) will also occur during field training exercises through the use of an embedded tactical engagement system that fully represents the operational fire control system. This capability may share many of the components of the operational system, such as the laser rangefinder and fire control computer. The fire control and distribution training that now occurs in Simulation Networking (SIMNET) will be provided by the embedded systems of single tanks networked to three (platoon) or more (company/team) tanks. These tanks will be networked through a mobile central processing unit, which can be located at a field or garrison site.

Tactical training will employ many of the same embedded training components used to support gunnery training. Software will be added to the onboard computer (or provided from a central processing unit) to train the skills necessary for tactical

proficiency. Artificially intelligent computer-assisted instruction will provide leader instruction on the tactical employment of the tank, section, and platoon. Tank commanders and platoon leaders will be able to participate in tank TEWTs or CPXs using doctrinally-correct automated crewmembers (similar to ICOFT) and battle simulation presented on display screens and vision blocks. This will permit leader-only training (other crew members would be able to conduct other mission-related activities) under the physical constraints of his tank crew position. Trained leaders will then be integrated with their crews to conduct battle simulation exercises, much like today's SIMNET. Leaders, crews, and units trained using this embedded battle simulation will then apply this knowledge in field training exercises supported by the same embedded precision tactical engagement simulation used during gunnery training.

Driver training will occur through individual "how to" training and driver simulation training. Driver knowledge and procedure training will occur using the same embedded computer-assisted instruction with driver-specific software. Unit driver training will occur through embedded simulation using the same hardware interfaces that support the embedded gunnery procedure and tactical training. This unit driver training will build upon the driver proficiency gained from driver trainers at the Armor School and complement the driver training that occurs as part of embedded gunnery and tactical training, as well as the driver training that occurs as part of live-fire gunnery training and vehicle-based field training exercises.

Maintenance training will train crewmembers and organizational mechanics in the use of the onboard embedded diagnostic and prognostic maintenance systems. Simulated

fault programs will train the use of these systems, as well as provide practical experience in the use of the embedded maintenance software, which provides remove, replace, and repair instructions.

Training performance feedback will improve dramatically over what is available today. This feedback capability, engineered from the beginning into the training subsystem, will provide audio, visual, and hard copy (disk or paper) records of individual, crew, and unit performance during the training exercises that occur on the tank. These exercises include those that use embedded training subsystems, as well as training that uses the operational system (e.g. live fire and FTXs). This training performance software will also do the analysis required to enable trainers to provide immediate after-action reviews. This performance data will also be linked (easy data transfer via floppy disk) to the Integrated Training Management System (ITMS) so that leaders can assess what additional training is required.

Our goal is to provide the Armor Force with an improved Abrams that fully exploits the technological advantages we can bring to bear. This includes both maneuverability and lethal firepower, as well as trained leaders and soldiers who can effectively apply this technology in combat. Embedded training will provide the force a training capability that will help us to understand modern warfare better than previously imaginable. Our challenge over the next several years is to define the most effective mix of training capabilities for the Abrams Block III. It is this training capability mix that will sustain our training proficiency - a key element in our ability to provide a credible deterrence - until the next opportunity to apply training technology advances - the Future Armored Combat system (Armored Family of Vehicles).

Notes

¹Armored Family of Vehicles (AFV) Training Study, U.S. Army Project Manager for Training Devices, 30 Sep 87, pp 64-60 and 75-78.

²"Embedded Training," GEN M.R. Thurman and Hon J. R. Ambrose, Army policy letter, 3 Mar 87.

³Embedded Training as a System Alternative, H. C. Strasel, F.N. Dyer, J.T. Roth, Dec 87, VOL 2, pg 6.

⁴Implementing Embedded Training: Interim Overview, D.C. Finley, I.N. Alderman, D.S. Peckham, H.C. Strasel, Mar 87, VOL 1, pg 2.

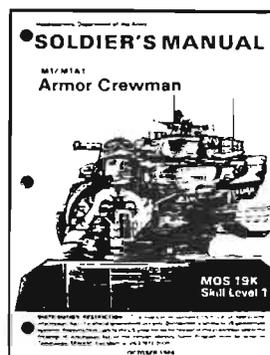
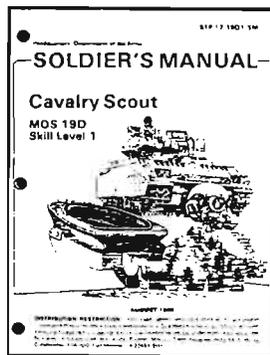
⁵Armored Family of Vehicles (AFV) Training Study, U.S. Army Project Manager for Training Devices, 30 Sep 87, pp B2-B4.

⁶Training Systems Concepts for the Armored Family of Vehicles with Consideration of the Roles of Embedded Training and Stand-Alone Training Devices, J.T. Roth, W.P. Cherry, H.C. Strasel, 31 Aug 87, pp 38-40.

⁷"Embedded Training," GEN M.R. Thurman and Hon J. R. Ambrose, Army policy letter, 3 Mar 87.

⁸This discussion of ET applications for the Abrams Block III was taken from the draft requirements documents for the tank, the approved final draft of TC 17-12-7, Armor Training Devices Macrostrategy, and the views of the author.

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Soldier Training Publications: Supporting Training in the 1990s?

by Major Albert E. Bailey

The evolution of AirLand Battle doctrine has resulted in the revision of the doctrinal manuals for all echelons of the Armor force. These manuals form the basis for all ARTEP Mission Training Plans (AMTP), which are currently under revision.

We have a tremendous opportunity before us, as we field these manuals for collective training, to steer the course for Soldier Training Publications (STPs) development in a way that will establish STPs as a significant factor in the training of soldiers, emphasizing individual tasks that support collective tasks.

My objective is to provide a brief overview of STPs and their development, a summary of some problems that have occurred in the past, and a way to make STPs a viable product for unit training.

Soldier Training Publications serve as the foundation of training support for the training and evaluation of critical individual tasks in both the training base and in units. STPs consist of Soldiers Manuals, which are the cornerstone of standardized individual training and evaluation in units, Trainer's Guides, which provide information for trainers to use in the management and conduct of individual training, and Job Books, which give trainers a means to record the results of training and evaluation for skill level 1 and 2 soldiers.

Soldiers Manuals are broken into skill levels that correspond with MOS skill levels specified in AR 611-201. The tasks found in these manuals represent the critical tasks that are essential for accomplishment of the unit mission, successful

skill performance, and/or survival in combat. Previous editions of Soldiers Manuals have usually been separated into a skill level 1 book and a combined skill level 2,3,4, Trainer's Guide book.

This combination has been the result of a smaller number of tasks for anyone above the skill level 1 soldier. Development of these books has occurred backward, starting at SL 1, instead of SL 4. Soldiers Manuals fall into two general categories, MOS-specific manuals, for which each service school is responsible, and the Soldiers Manual of Common Tasks (SMCT), for which the U.S. Army Training Support Center is proponent. The MOS-specific Soldiers Manual is the basis for the Skill Qualification Test (SQT), while the SMCT is the basis for the Common Task Test (CTT). Both tests are administered

annually to the Active Component soldier, biannually to the Reserve Component soldier.

Often overlooked as a training management tool is the Trainer's Guide, usually found in a higher skill level Soldier's Manual. The Trainer's Guide provides the trainer with information on the level of training given to a soldier in the institution, recommended training frequency, and the ARTEP tasks that a given individual task supports). The Trainer's Guide has been plagued with several problems in the past:

- Hidden in a Soldier's Manual, it is often overlooked by training managers, reducing its value as a training management tool.
- The frequencies established for sustainment training have too often been arbitrarily assigned.
- The ARTEP interface has been somewhat weak, negating some of its value in supporting unit training.

These problems are the object of change in forthcoming Trainer's Guides for CMF 19 MOSSs.

A recent addition to the family of STPs is the Military Qualification Standards (MQS) manual, designed to support officer training and professional development. MQS manuals are broken into MQS I, Precommissioning; MQS II, Lieutenants; and MQS III, Captains. Designed as a manual-based professional development system for officers, MQS identifies tasks that are combat critical and also tasks that are critical in peacetime. MQS addresses duty position tasks, tasks common to all officers, and tasks (or skills/knowledge) necessary to the success of officers in the daily work environment. MQS manuals are also broken into a com-

mon manual and a branch specific manual. The MQS common manuals can serve as a guide for the officer in the daily administration, leading, and training of a unit (see Table 1).

The MQS manuals being developed for the Armor Force maintain an exclusive "combat focus," complementing the ARTEP Mission Training Plans with the critical leader tasks that support the critical unit tasks listed in the ARTEP MTP.

Development of Soldier Training Publications (STP) for the Armor Force has been marked by biannual revisions of Soldiers Manuals. These revisions have occurred throughout the 1980s, as a result of the doctrinal, organizational, and equipment changes (see Fig. 1). A large number of tasks have remained virtually intact, varying only editorially. However, the manuals were revised in their entirety. The result has been a tremendous expenditure of time and money producing manuals that have inundated the field. This has had a ripple effect in the development of the SQT for CMF 19, requiring total revision after each Soldier's Manual. (All SQT questions must be validated with samples of soldiers. Any change to a task requires review of the questions and revalidation. This not only expands the workload of SQT developers, but also becomes a training distractor, because soldiers have to be pulled from training to validate the SQT questions.)

As we look to an era of diminishing resources, especially in the area of training development, a credible alternative must be pursued for developing and fielding STPs. The recent development and approval of ARTEP Mission Training Plans for the heavy brigade, battalion/task

force, company/team, tank platoon, and scout platoon has presented us with an opportunity to create stability in the STP process, and effectively link these publications with ARTEP Mission Training Plans. Previous attempts to link STPs with ARTEPs have focused on higher echelons (i.e. ARTEP 71-2); however, the preponderance of tasks in the CMF 19 and SC 12 inventories fall within the crew, platoon, and company/team.

We must closely link these STPs with ARTEP MTPs for the company/team, tank platoon, and scout platoon. This will enable trainers to utilize standardized individual training and evaluation that complement standardized collective training and evaluation. In this way, there will be minimal need to stand down to prepare for the SQT, which is based on the Soldiers Manuals.

Individual hip-pocket training will be directly related to ARTEP tasks, and constrained training time will be optimized. This has tremendous implications for the Reserve Components, who utilize the same training products for individuals and units, but with less than 20 percent of the training time available to their Active Component counterparts.

Linkage of STPs and ARTEP MTPs must be followed by a reduction in the size of the STPs, especially for the skill level 1 soldier. This can be done by determining only the most critical individual tasks (within the collective context) and developing concise, yet meaningful, task summaries. This would eliminate the reference-based task summaries that exist in current manuals. (Reference-based task summaries provide nothing more than an evaluation guide, conditions, and standards. These normally require the soldier to perform the

TASK SUMMARIES IN STP-21-II-MQS

Leadership	26 tasks
Operations/Tactics	15 tasks
NBC	2 tasks
Training Management	8 tasks
Munitions Management	5 tasks
Land Navigation	1 task
Maintenance Management	5 tasks
Supply Administration	7 tasks
Radio/Wire Communication	1 task
Unit Administration	15 tasks
Health Service Support	2 tasks
Military Law and Justice	6 tasks
Communication Skills	11 tasks

TABLE 1

SUMMARY OF SOLDIERS MANUALS REVISION HISTORY

1979	-Soldiers Manuals revised upon conversion to CMF 19
1982	-Soldiers Manuals revised upon elimination of MOS 19 F,G,H, & J
1984	-Soldiers Manuals revised to reflect new STP literary category. Incorporates pass/fail format. Updates 19K tasks.
1986	-Soldiers Manuals revised to reflect Division 86 doctrinal changes. 19K Soldiers Manuals updated to reflect M1A1 tasks.

FIG. 1

task to the standard established in the reference, normally a TM.) These tasks do nothing more than take up space, ignoring the fact that unit leaders will require manuals for such tasks as perform PMCS, troubleshoot. This will lead to the development of Soldiers Manuals that are smaller and similar to the small unit ARTEP MTPs.

To link our training publications and create stability, we must slow the pace of revision. STPs should follow a five-year cycle, allowing two years for development and three years for uninterrupted use in the field. The two-year development cycle will ensure subsequent revisions are linked with ARTEP MTPs. During this period, any changes due to errors, new equipment, or other factors can still be accommodated. TRADOC service schools are allowed to create SQT supplements to incorporate tasks omitted from STPs. These supplements can also provide tasks for training on new equipment, and serve as an interim document, pending an STP revision. The SQT supplements would be forwarded with the SQT notice, minimizing distribution problems.

In concert with the slower pace of revision, publishing manuals by skill level will allow service schools to produce STPs that comprise the largest complement of tasks re-

quired for a given skill level. As revisions take place in the future, confining these to one skill level will enable training developers to concentrate their efforts, resulting in a more thorough product. This will mean that Soldiers Manuals for higher skill level soldiers may increase in size. As an example, the recent revision of Armor ANCOG has resulted in a significant expansion of the skill level 4 Soldiers Manual.

Other options to improve Soldiers Manuals include deleting low-density, system-specific tasks from the basic manual and producing system-specific manuals to be distributed only to units possessing that equipment. For example, the tasks on the M551 vehicle are found in every copy of the current 19E and 19D Soldiers Manual.

A separate manual for M551 system-specific tasks can easily be produced and sent only to the one battalion possessing the M551. Not only does this make training sense, but it reduces the page count in all other 19E and 19D manuals, thereby saving money. Similar task supplements can be applied to the units using the HMMWV. As we project the decreasing density of a certain vehicle, we can pull it from the main manuals and only target units that will continue to have that vehicle, and the units designated to

receive that equipment. It just makes sense to reduce the size of these manuals where possible.

Change is inevitable, given the state of continual equipment transition and evolving doctrine. The effectiveness of our training will hinge on our ability to provide the best possible resources to trainers. The support of individual training must focus on products that support unit training and provide stability in the standardization of training. As we look to the 1990s, the question that we must answer now is:

"Will we control the changes before us, or will the changes control us?" How we answer that question will shape individual training into the 21st Century.

Major Albert E. Bailey was commissioned in Armor in 1975 from ROTC at the University of Georgia. He has served as a cavalry platoon leader, cavalry troop commander, and on various staff positions at battalion level. He also was an ROTC instructor at North Carolina State University. He is currently assigned as chief, Training Division, Directorate of Training and Doctrine, U.S. Army Armor School, Fort Knox, KY.

Aviation Doctrine - Where Are You?

by Lieutenant Colonel Gordy Sayre

When Armor Branch was the proponent for air cavalry and attack helicopter units, the doctrine and tactics those aviation units used were basically similar to those of armor and armored cavalry ground units. The only difference was the means used to accomplish a given mission. The Armor Center was in the forefront of pushing the rest of the Army to get aviation out of the "support" role and to fully integrate it into the maneuver scheme. Air cavalry and attack helicopter units are, after all, maneuver units, not support units, possessing superior mobility at the expense of armor protection and the ability to dominate terrain. The Armor Center stressed that air cavalry and attack helicopter units were combat units and should receive such treatment. When we gave air cavalry and attack helicopter commanders definite missions, they task-organized to best accomplish the ground commander's intent. What has happened to change that concept?

Since the proponenty for air cavalry and attack helicopter organizations went to Fort Rucker, the emphasis on their maneuver role has been lost. Fort Rucker is "systems"-oriented and continues to emphasize the system (e.g., LHX, OH-58D, etc.) instead of the missions those systems must execute. In response to this changing nature of doctrinal employment of aviation, we at the Armor Center have adopted a position of "benign neglect," since Fort Rucker is now the proponent and "it is not our af-

fair." I feel that we have taken a giant leap backward. We no longer consider aviation to be a maneuver asset and employ aviation units in the same manner as we employed them in the 1965-1970 time frame — as aerial antitank reinforcing fires.

Where have the concepts and supporters in the armor community gone that supported such novel ideas as TRICAP, ACCB, attack helicopter companies and battalions, air cavalry squadrons, ACATs, and ACAB? What has changed the thinking within the Armor Branch to make us believe that air cavalry and attack helicopter units are incapable of conducting independent operations and being employed as combat aerial maneuver units? Is it the perceived threat? If so, then why do we think that the helicopter is so vulnerable, yet the tank and the Bradley are not? Why do we seem to believe that Soviet helicopters are a tremendous threat to close combat (heavy) operations, but our helicopters are not the same threat to Soviet forces? Maybe we ought to stop painting the Threat as being nine feet tall and reflect upon our capabilities and experiences.

We know that air cavalry and attack helicopters can operate superbly in a low-intensity conflict environment (50 to 70 percent of the commitment of combat forces in Vietnam was as a direct result of air cavalry reconnaissance). European tests and exercises, as well as CONUS tests and Mideast after-action reports, tell us that aviation

units can operate successfully in mid-intensity conflicts. There is no known reason to believe that aviation units cannot operate over a high-intensity battlefield. The mobility of the helicopter provides the commander his most responsive combat maneuver firepower on today's battlefield. No other units can move to trouble spots in the close battle, rear battle, or deep battle, as quickly as attack helicopter units. With the more capable sensing systems for night- and limited-visibility operations now available, there is no other unit that can perform area or zone reconnaissance and shift to screen missions more quickly than air cavalry. It is time that we start to realize these facts once again.

If we at the Armor Center truly believe in the combined arms concept, then let us stop treating aviation like an ugly step sister and make aviation units respond as equal partners in the missions of finding, fixing, and destroying the enemy. We need to determine the missions, roles, and functions we want air cavalry and attack helicopter units to perform. Once we have done that, then Fort Rucker can design organizations, equipment, and the personnel to accomplish those missions. We can then assess the capabilities of aviation units to perform those missions.

We need to define the roles, missions, and functions of the Combat Aviation Brigade and decide whether or not it should become a fourth maneuver brigade. When the

Armor Center, in conjunction with Fort Rucker, developed the Combat Aviation Brigade concept for Division 86 (1978-1981), there was no question at the time that the organization would become a fourth maneuver brigade. We were pushing for that to happen. Somewhere along the line, that concept was lost. I believe that the Combat Aviation Brigade should be the fourth maneuver brigade of the division. Its mission should be to find, fix, and destroy armored, mechanized, or other forces as an aerial maneuver unit. It must use fire and maneuver as an integrated, full-fledged member of the combined arms team.

The Combat Aviation Brigade should conduct offensive, defensive, delaying, economy of force, and security missions. To make that happen, the Combat Aviation Brigade needs to be resourced with the proper staff and assets comparable to ground combat maneuver brigades. Yes, sin of all sins, I would OPCON tank and mech forces to give the Combat Aviation Brigade a ground-holding capability and give it a separate sector on the battlefield. Aviation combat

maneuver units (air cavalry and attack helicopters) cannot currently perform those missions by themselves, but then neither can pure armor units. My only parochial concern is whether the ex-Transportation Corps CH-47 pilot, who may be in command of the brigade, has enough ground and air maneuver experience to handle it!

Either the Combat Aviation Brigade is a combat maneuver brigade or it is a combat support brigade like DIVARTY. We must make the choice. The Combat Aviation Brigade cannot be both! I recommend that we start defining the missions, roles, and functions that we want air cavalry and attack helicopter units to perform, continue to press for more firepower and mobility in aviation operations, and once again become the "driver" for aviation employment. Aviation assets can be used in all battlefield environments and on all areas of the battlefield. We have spent considerable time and resources demonstrating to the non-believers (aviators and non-aviators), from both within and outside the Army, that the bulk of aviation units are combat maneuver organizations. It is a shame that we seem to be

regressing back to the same arguments cavalry had for retaining the horse:

It (mechanized cavalry) has not yet reached a position in which it can be relied upon to displace horse cavalry. For a considerable period of time, it is bound to play an important but minor role, while the horse cavalry plays the major role so far as our country is concerned... I feel that the psychology of the public, as well as that of important key men in our legislative branches and men in the Army itself, has mistakenly become unfavorable to the horse... We must not be misled to our own detriment to assume that the untried machine can displace the proved and tried horse.

-Memorandum from the Chief of Cavalry to the Chief of Staff, 1938.

Due to similar arguments, we seem to be unable to realize the full potential of Army Aviation.

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Interoperability:

Training Now to Fight with Our Allies

by Captain James F. Nolan

To fight alongside our allies will be a future battlefield reality. To work the kinks out now is the key to success.

Your mission: Counterattack as part of a West German-U.S. task force. Your platoon is on the German flank, so you must coordinate to provide the German mechanized infantry company with tank support.

On the way to link up with the German company commander, hundreds of questions race through your mind. What are you going to do?

Because it will be the platoons and companies that fight the battle, our armor leaders down to platoon level must be prepared to work effectively with allied units. The following

list offers some ideas that help make working with allies less traumatic for platoon- and company-grade leaders. These suggestions are based on personal experiences during numerous training exercises with a German armor battalion, but are applicable to other situations as well.

- Train your crews extensively in vehicle identification. This helps out

at SQT time but, more important, it can be a vital skill when cross-attached to, or coordinating with, an allied force. To mistake a Marder for a BRDM could cause you to shoot your "new" company commander. Also, learn about the basic capabilities of allied vehicles. How many men do they carry? What's the range of their primary weapon system? Your unit S2 can give your platoon or company classes on this.

- Make a "language sheet" part of the basic load for every vehicle. This is most applicable to units deployed in Germany or Korea, but stateside units with specific missions can also benefit from this practice. A single sheet of paper, with columns listing key phrases in both English and German (or other appropriate language) can help bridge language barriers. Again, your unit S2 can help you out in this area. Make sure all of your soldiers understand the sheet. Even when your allied unit leader speaks some English, or you speak some German, such a sheet can be helpful.

- Prepare a flank coordination plan. The allied platoon leader on your flank will probably speak a different language and will not be used to working with you. He may forget to tell you if he moves. Basic armor tactics tell us flank coordination is especially critical in defensive operations. Have the tank commander closest to the allied flank of your position make physical contact and maintain visual contact with the other unit's vehicles if at all possible. Consider putting yourself and/or your platoon sergeant on the flank(s), and your wingmen in the center of your sector.

- Make a checklist of things to discuss with an allied unit commander if you are cross-attached or are responsible for making coordina-

tion. Be sure he understands your full capabilities. Let him know, for example, that you have thermal sights and also that you can shoot on the move. Ask about his set-up. In particular, remember to check on radio frequencies and refueling. As a platoon leader on an ARTEP with a German tank battalion, I was surprised at how long it took to refuel four M1s using five-liter German fuel cans. I was also shocked to hear 28.50 given out as the new company command frequency (Remember that 32.00 is as low as our FM radios will go, and you must operate in the "old squelch on" mode to interface with older model radios).

Even your best checklist won't cover everything. Still, to take the time to think about it now will help you be more successful when you must do it on the battlefield.

Once you actually begin to operate with an allied unit, aggressively work to make sure you both agree on your mission. Your concept of a delay operation might differ from his. Define your terms as specifically as time and language allow.

After you both understand the mission, key on interoperability. By interoperability, I mean doing everything possible to become one cohesive force. If at all possible, link up face to face. Establish signals for attack, engage, withdraw, etc., so that language doesn't interfere with understanding commands during a critical point in the battle. Find out what types of ammunition you have in common, and if there are any maintenance assets (the Germans also have M88s) that you both can use. Trade information about personnel strength, equipment status, and so forth, exactly as you would with any cross-attached U.S. unit. Go into as much detail as possible. Learn as many names as you can. In

"...After you both understand the mission, key on interoperability. By interoperability, I mean doing everything possible to become one cohesive force."

short, do everything you can think of to make sure you're working together, not as separate entities.

Perhaps most important is to instill a positive attitude in your soldiers about the joint operation. Highlight any advantages (your own maintenance team, priority of fires, platoon medic, extra ammo, etc.) that you receive because of your unique situation. Explain some of the strengths of the allied unit (like detailed knowledge of terrain). Emphasize that this is a chance for your tankers to show how good U.S. soldiers really are.

I have led a cross-attached platoon during German ARTEPs, gunneries, and two-week-long field exercises, and have observed numerous German platoons perform as they were attached to my company. I'm convinced that the motivation and professionalism of the cross-attached soldiers is the key difference between success and failure.

Regardless of where or when we fight the next war, odds are we will fight with our allies. We must train now to ensure the leaders of our tank platoons and companies can effectively operate with allied forces to close with and destroy the enemy.

Captain James F. Nolan served in Germany as an M1 tank platoon leader and company XO, and was later an ADC in the 3d ID. He wrote this article while a student in AOAC 3-86.

Applied Mentorship: Officer Professional Development

by Captain Jeffrey R. Witsken

The good commander is always teaching and training, and one activity complements the other.¹

An officer incurs a great responsibility to develop subordinates. For the commander and staff officer, the development of his subordinates is a high priority for both training benefit and professional development. Leader development pays immediate dividends and contributes to the success of an officer in that he becomes more proficient and better understands the goals and standards of his superior. As this officer continues on in the Army, he will develop his own subordinates in turn. This education effort has the potential to affect many units and individuals over the years.

Despite the clear advantages of developing officers, there is a tendency to treat OPD classes as just another requirement to be accomplished. Important subjects are covered, but the overall program stops with the periodic classes, and does not emphasize comprehensive, complete training of officers. Officers are expected to do well on their own without assistance. Counseling only occurs under extreme circumstances. Because OPD is often lightly treated, this article will consider how to develop a thorough program that best fulfills the needs of the unit and the officers themselves.

Officer Professional Development programs are much more than a weekly or monthly effort to "spread the word" about some current issue

or policy. The commander must consider officer development as the goal of his overall mentoring program. A fully developed program goes far beyond generic classes in the officers club and strives to develop the officer in all areas. It is a comprehensive, integrated program tailored to the individual officer and the needs of the unit. The Officer Professional Development Program encompasses all activities that aid subordinate officers.

The program that a commander institutes aims to train the officers, better develop their standards, and expand their horizons in many professional areas. To do this, the leader who is directing an OPD program must bring many elements into play. He must formally train his officers, counsel formally and informally, and constantly describe what he expects and wants to see. The overall program must allow those officers who need more help to receive greater assistance, while others headed in the right direction receive "attaboys" and positive reinforcement. The desired result is informed, competent officers with a team perspective who know what must be done.

All officers are included in the Professional Development Program. This does not mean that every officer should be at each class. Tailor classes to certain ranks or duty positions in the unit. The officers participate in several concurrent classes, or in classes at different times which address specific groups of of-

ficers. This approach keeps the training worthwhile and maintains the interest of the officers. The initial challenge in developing a program is to study what can be trained. There are many subjects, but they can be categorized into four groups.

The armor officer must have a thorough knowledge of gunnery and tactical skills and techniques. He must be able to meet the same standards as his soldiers and continually work to be an expert. Subjects can range from basic gunnery techniques and individual tactics to advanced gunnery skills and coordination of complicated tactical problems at any unit level.

Officers need constant development of professional and staff skills. These classes cover discussions on ethics, professional values, planning skills, briefing techniques, managerial skills, writing ability, information briefings on other branches of the Army and the other services, and classes meant to round out the officers' training. This training is meant to serve the officer throughout his career.

The great quantity of complicated weapon systems and associated equipment in armor and cavalry units demands a detailed knowledge of supply and maintenance systems. Our officers must know the system in order to troubleshoot it when things do not happen as fast as needed. Officers have to be proficient in maintaining their assigned vehicle(s), and they particularly

need to understand property accountability.

Of course, OPD classes are excellent opportunities to emphasize command programs and subjects of particular interest to the chain of command. For example, classes could discuss changes to critical areas of unit SOPs, command philosophy, goals, standards, and current events.² Plan the OPD program to occur on a continuous basis, covering many subjects, in spite of the limited time and resources available. This training can be scheduled formally, but much training and development takes place informally.

Personal example is also a great training tool for every officer teaching subordinates. Specifically, the commander should try to take every possible moment to conduct some type of officer training. To take the officers aside in the motor pool for specific vehicle training or maintenance training is a good example. The leader should find ways to give his officers continuous feedback on their performance and discuss with them other ways to do their duties. The daily training should provide plenty of opportunities for this. Make formal training time by placing NCOs in charge of the unit for a day or more to allow the officers to train.

An example is to place the NCOs in charge of recovery from major training. The commander will find himself with several hours, perhaps a day or more, in which to train the officers. This takes advance planning and coordination, but it can be done. The key point is that NCOs can fill the gaps whenever the commander wishes to pull out his officers for training. This action has the added benefit of developing the NCOs.

The actual conduct of officer development can vary greatly with minimum strain on the unit. Available tools fall into general categories of tactical training aids, gunnery training aids, professional study, and feedback mechanisms. Which tool to use depends on the subject(s) trained and the resources available.

The armor officer needs a complete understanding of tactics to be successful. These essential tactical skills can be covered in the classroom, on the hood of a vehicle, or just described and sketched out on paper. A terrain board can help the initial training on tactical missions and principles. You can easily build your own or order one through a training support center. Miniature vehicles or unit symbols allow the officers to go through a tactical problem and demonstrate their knowledge. Tactical Exercises Without Troops (TEWTs), map exercises, and command post exercises can further develop principles learned on the terrain board.

Gunnery skills can be initially reviewed in the motor pool. If no vehicles are available, perhaps access is available to an ICOFT/UCOFT facility, or other gunnery simulator. Most skills in this area will be taught during actual unit gunnery training. To ensure that the officers can complete the TCGST for their assigned tank is a good start for initial training.

Book reviews, whether oral or written, have a two-fold benefit. First, the officer improves his knowledge by reading the book. Second, he will exercise his oral presentation and/or writing skills. If assignments for book reviews are properly rotated, then the reading load will not be severe.

Military history provides a superb vehicle to bring out the principles of war, illustrates the value of training and good tactics, and provides insights into problems facing the Army today. Research can find many examples of lessons learned in any area in history, regardless of the specific war or time period. The study of successful tacticians and leaders helps to provide insights to help solve the problems we face today.

During OPD sessions and actual unit training exercises, after-action reviews (AARs) are good vehicles for assessing performance and indicating room for improvement. Particularly in collective training, the officer may be unsure whether his judgment errors or his unit's execution caused the problem. AARs help identify the true causes.

Feedback on performance and the discussion of alternative methods of leadership and problem solving is essential to broaden the officer's horizons. Counseling, either formal or informal, plays a major role in the officer's development. The actual counseling format is up to the counselor, but the feedback should be frequent and continuous. This is difficult to put into practice, but attention to counseling will improve the officer and clarify the standards and goals.

A superior method to develop officers is to insist on their participation in the training actually going on in the unit. They will then learn the standards and quality of training present in the unit. In addition, they will know many of the duties of their soldiers and be better able to plan and manage their unit's training.

The critical step in developing the OPD program is to prioritize the

"About 45% of the officers in the Army are assigned to TDA organizations. For these officers professional development is harder because many resources are not available."

list of subjects and keep the training tied to the officers' most critical needs, the important events coming up, and those subjects needed to benefit the officers throughout their career (so called "survival skills"). Obviously, this process involves a detailed review of unit and individual needs. Guidance from higher headquarters must also be considered during planning. Finally, the planner must determine who will be the instructor for each training event. The commander may want to emphasize some of the subjects by teaching them himself. Members of the staff can teach subjects in their specific areas of interest.

Classes can be rotated among the officers, either at random or based on the expertise of each officer. For exceptionally difficult new subjects, bring in outside experts. Don't overlook warrant officers and NCOs within the unit. They represent a valuable source of information, knowledge, and experience. Besides, to present the subject to officers will help to improve the NCO's training and presentation skills.³

The execution of an officer professional development program in a TOE unit can be readily integrated into the unit's current training schedule without disruption. Times and locations can be identified during training that minimize the overall impact on the unit. More am-

bitious and lengthy training events can be incorporated into the unit schedule by planning for the NCOs to continue the operation of the unit.

About 45% of the officers in the Army are assigned to TDA organizations. For these officers professional development is harder because many resources are not available. However, much training can be done. The actual form of the OPD program will have to be tailored to the specific location, mission, and makeup of the TDA unit, but the following alternatives may be available:

First, use nearby available training locations. This may be an active or Reserve installation, or even a Boy Scout camp or state park. Obtain maps, and conduct tactical exercises as described above.

Second, contact the training extension offices at service and branch schools that will provide training material by mail. You can use these references to build training programs for a very diverse group of officers. Third, focus the OPD program on basic skills like writing, military reading, professional subjects, historical lessons learned, and leadership. You can include briefings on new organizations and equipment in the Army to keep the officers informed of current events. The program may be limited, but with imagination and effort, it can serve the basic needs of the officers of the organization. A properly executed OPD program involves thought and planning by the commander and his staff. Although the training itself does not necessarily demand great resource requirements, the planning and preparation do. The dividends are great, because an intense, comprehensive OPD program provides better officers and leaders. These officers will go on to other assignments and

spread their skills and knowledge, extending the impact of the OPD program well into the future.

Most important, officer development is planned and executed because it is a fundamental responsibility of the leader. As Perry M. Smith states:

"A leader should not only be a teacher of subordinate leaders but should teach them also how to be teachers themselves, by establishing personal standards, by being an example others can emulate, by taking the time to teach, and by teaching systematically and regularly."⁴

Notes

¹ Common Sense Training, Arthur S. Collins, Jr., Presidio Press, San Rafael, CA, 1978, p 56.

² Taking Charge, Perry M. Smith, National Defense University Press, Washington, D.C., 1986, p 146.

³ FM 22-103, Leadership and Command at Senior Levels, June 1987, pp. 54-55.

⁴ Smith, Op. Cit., p. 146.

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Famous Firsts:

"The first battlefield appearance of an armored car took place in Libya in 1912 during the Italo-Turkish War."

-From Tank Facts and Feats, by Kenneth Macksey (Guinness Books)

The Key to Maneuver

by Captain Clemson G. Turregano

The key to maneuver is logistics.

Picture, if you will, the Alpha Company commander of an armor battalion, situated somewhere near the East German border. A recent Armor Officer Advanced Course graduate, he pauses over the latest edition of *ARMOR* as his crew fixes the track he has just thrown to the inside. As the crew labors outside, he monitors the radio and ensures the heater is working. As he mindlessly flips through the pages, he encounters this article. Let's take a little trip through his mind:

"Oh, no! Not another logistics article. Well, maybe I can switch to the Recognition Quiz or Professional Thoughts. Anything but logistics!!! Logistics is boring, and it has no action. Everyone knows that the real activity is up front, where the bullets are flying. What is so exciting about cooking 'T-rations' and fixing trucks?"

*"By the way, where is chow? It was supposed to have been here over an hour ago. And while we are at it, where is the fuel? We haven't topped off since yesterday, and the tanks are living off fumes and memories of fuel long gone. Just how do they expect us to conduct an attack to glory if **THEY** can't get us any fuel or food?"*

"Oh, the log reports: Hell, no one is on the admin-log net anyway, so why waste my time? I've got a battle to plan for, why should I worry myself with minor details when nothing really changes? My first sergeant goes back to the field trains and picks up chow and fuel. He always gets it up to us, maybe a little late, but he al-

ways makes it. That stuff about logistics rallying points is bunk anyway. The first sergeant can make it twice as fast, and I don't need to worry about making any silly coordination with the log guys.

"Why do they need the supply sergeant in the field trains anyway? He could be forward, where he would do us some good. He doesn't do anything except sit on his can. Just like everyone else who works in the rear."

While our intrepid commander has been worrying over the deficiencies of the logistics system, his first sergeant was ambushed and killed by OPFOR. The supply sergeant is in the field trains awaiting instructions, and since he never operated on his own anyway, will probably wait for the first sergeant. The S4 never received any log reports from Alpha Company, so he didn't project any fuel or ammo to send to that company, other than the regular push package. And because the S4 can't project requirements out of thin air, he told the HHC commander to send Alpha Company's LOGPAC out short. After all, they never did call in, so they must not be in very bad shape!

The HHC commander is concerned, because he has no input from Alpha Company, and must send out the LOGPAC short of what he would like to give. They'll get to the LRP and sit around, and no one from that unit will be there. Eventually, like always, the first sergeant will show up and go get them, but he would never go to the LRP.

He always comes back to the field trains first. Curious. What a mess.

If this scenario is all too familiar, you have discovered that the biggest show-stopper, the biggest SNAFU, the biggest problem that could easily be solved is logistics. Battalion and squadron-level logistics is very simple. It is an interweave of reports, anticipations, coordinations, discipline, and execution. If one of these links is broken, either by enemy action, lack of communication, or failure to understand the system, the battle, maneuver, or operation is as good as stalled from the beginning.

In North Africa, Rommel, one of history's most mobile tacticians, lost two consecutive battles because of improper or poor logistical planning and execution. His logisticians did not understand the meaning of short supply lines and the "push package." Thus, Rommel had a 400-mile supply line stretching from Benghazi to the Alam Halfa Ridge. The distance, combined with the trickle of fuel he received from this supply line, restricted his freedom to maneuver. This lack of tactical advantage resulted in his defeat at the Battles of Alam Halfa and the First Battle of El Alamein.

Rommel learned that the key to maneuver is logistics. Today, in this Army of huge, gas-guzzling monstrosities of tanks and helicopters, the demand for fuel, quality fuel, has increased ten-fold. Operational and logistical leaders must report status, anticipate needs, dis-

cipline commanders, and *execute logistics*.

Discipline in the logistics chain, both in reporting, anticipation/coordination, and execution, is the key to the logistics battle.

Logistics is a battle just like the front. In a forward-moving screen, the logistics executors and operators must keep pace with a rapidly advancing element. With a unit such as a divisional cavalry squadron, the logistics operators must keep pace with helicopters and Bradleys, all of this while in a chemical environment or under attack by retreating forces. Supporting forces must defend themselves, and still cook, fix, arm, and refuel forward. How is this accomplished?

Very easily. There are four easy steps to logistics:

- Report
- Anticipate
- Discipline
- Execute

Let's go back to my favorite officer. He didn't like to send reports — and look where it got him: hungry, out of fuel, and out of bullets. He is now sitting in a tank in the truest 1918 sense of the word; his vehicle is fit for only one thing — holding water.

Reports are the nervous system of the battalion/squadron body. Just as operational reports go to the S3 to reflect the changing battlefield situation, reports *must* go to the ALOC to describe the constant flux in the logistical situation. First sergeants, this is *your* job. If you don't send reports, you aren't taking care of the soldiers or the unit. Reports start the log chain working. They are the nerve pulses that cause the logistics muscles to flex. Reports tell

the logistics planner, the S4, which unit is in the most dire need of supplies. Then, with his emergency supply of Class III and V, he can send them to where they will have the greatest impact on the battlefield.

Where do replacements come from? Why is it that Bravo Company always gets the new replacements? Well, commander, check your reports status. Is the first sergeant sending his personnel reports? Or is he relying on the "Good Ol' Boy" system, and depending on his ol' buddy in G1 to square him away?

Good reports reflect good logistics discipline, good units, and strong units that can truly sustain combat operations.

Why? Because reports allow the logistics planners, the S1/S4 cell, to anticipate requirements for all classes of supply and personnel. Without the information in the reports, this is impossible. Once it has the reports from the frontline fighters, the S4/S1 cell makes them into requests to send higher to obtain more fighting material.

The S1/ S4 cells are the brains of the logistics system. They are the logistics planners. They receive the nerve impulses from the first sergeants and convert them into complete plans, to be sent to the flexing arm of logistics, HHT. The ALOC consolidates reports, balances them against the overall combat situation, then reacts accordingly. It coordinates with higher and adjacent units to obtain the needed materials for sustained combat operations, as well as plan future logistics operations.

This planning requires the ALOC to monitor the command and admin-

log nets, and remain abreast of the frontline trace. The HHT commander cannot do this, he doesn't have the assets. The S4/S1 must also integrate logistics into maneuver planning. The S4 must be an integral part of the present and future operations planning. He must collate all information available concerning logistics, and gauge the impact of logistics on maneuver.

Now, who does this if the S4 is at a decon site because of a chemical attack while he was in the field trains? The battalion XO. If the logistics planner is not present during an orders drill, the XO is responsible for obtaining the information and ensuring the logistics situation is considered during operational maneuver planning.

Now we have sent reports and integrated the logistics picture into the operational scenario. What next? The HHT commander comes into the picture. This is the coordination and execution phase. While the S4 was planning the operation, he checked with the HHT commander to ensure that HHT could support the logistics plan. Now, with the logistics annex published, the S4 needs to assist the HHT commander in coordinating the collection of assets needed to support the OPLAN. HHT must draw wire, food, more fuel, body bags, and everything else needed to support the operation. The S4 calls higher and ensures the coordination is made, so the HHT commander can dispatch the assets to retrieve the material.

As you can see, this is an area where the HHT commander and the S4's roles overlap. The logistics planner, the S4, and the logistics executor, the HHT commander, coordinate logistics priorities and establish the execution phase of the log

order. The HHT commander must be intimately familiar with all the support assets assisting him, so in the absence of the S4, he can make all necessary coordination. This is crucial. If the plan is not made in a timely manner, coordination for material cannot be made in time, and resupply suffers. If resupply suffers, or is insufficient, maneuver is crippled.

The field trains are the muscle of the logistics chain. They make things happen. They are the backbone of the squadron, providing a firm foundation of all classes of support. The cooks, mechanics, and medics all combine to put out a LOGPAC. The HHT commander must plan and coordinate their activities to fit into the S4's OPLAN to support the operation forward. Now that there is a plan for the squadron, the HHT commander must put together his own plan.

The field trains' support plan is crucial to avoid congestion, confusion, and chaos within the field trains during LOGPAC times. Everyone within the field trains must understand his role in support of the operation. The HHT commander puts together all requirements, balances resources against demands, then develops a comprehensive LOGPLAN to ensure all the supplies that are needed get out to the forward troops. This includes any LOGPAC items that may be different from the SOP, and all the changes that battle will force the HHT commander to make in his logistics plan.

The key to HHT's successful execution of the LOGPLAN is discipline. Every soldier in the log chain must understand his role as key to the operation forward. Every leader must understand the "cruciality" of logistics. A good

"The key to HHT's successful execution of the LOGPLAN is discipline. Every soldier in the log chain must understand his role as key to the operation forward. Every leader must understand the "cruciality" of logistics."

SOP is necessary, but logistics execution discipline is vital.

Battles will dramatically alter the logistics picture. The commander must rely on a good SOP and good leaders when he is forced to alter or adapt the plan. Mass casualties, NBC, unanticipated battle success or failure, sending soldiers forward as replacements — all will occur. If the commander has not instilled discipline into the support chain, it will not be able to handle the rapid changes, and logistics support will break down. If the commander has not disciplined his personnel to adapt to a rapidly changing battlefield situation, to loss of personnel, to operation in an NBC environment, the logistics battle is lost.

Now, a quick review. We have discussed the generation and importance of reporting, and the responsibility of the first sergeant in the support chain. We have seen the reports generate the coordination and allocation of resources, and the S4 and HHT commander implement the support plan. We have demonstrated the importance of discipline throughout the support chain, both in reporting, planning, and training.

Now, *EXECUTE!!!*

The HHT commander must execute logistics with the same intensity, urgency, and precision that the line commander uses forward. Logistics is a battle, and the com-

mander must treat it as one. He must instill in his log operators a sense of *immediate* urgency and purpose. If the logistics chain does not have a sense of immediacy, the log operators place the forward fighting troops in peril.

The log battle will be intense and unyielding. Every soldier will be screaming for support. Task overload on all logistics systems will be commonplace. The log commander must plan and fight his battle, just as the line commander forward. Every log system must have a sound, tested SOP, and *use it!!!* If it does not work, the leaders must have the flexibility to be able to change the system to make it work. The commander must be able to control logistics, plan for the next operation, and defend himself concurrently. Only if the commander and the log systems overcome this task overload, and execute sharply, will they be able to support the line troops forward.

Logistics requires a synergism that must occur even under intense battlefield conditions. Many say that the logistics system will break down completely once the first round is fired. I disagree. Just like a forward unit, the reaction to the first round is directly related to the training, esprit, and discipline of the unit. If the logistics chain considers itself an integral part of the battalion team; if it has been well-trained and well-led, the log system will work. HHT commanders, battalion XO's, and battalion S4's must understand that the log chain is not to be ignored, but employed as a rearward maneuver arm, one with different equipment, but a vital mission.

The alternative is failure.

So, let us look at Bravo Company, set in a tree line about four



"The key to maneuver is logistics."

kilometers from Alpha Company. It has just finished chow, and the soldiers are putting the final rounds from the cross-level into their ready racks. The HEMTT fuelers are topping off the third platoon, and have only one tank to go.

The commander is conducting an AAR with his officers and the first sergeant, discussing the plans for the next day.

Suddenly, the commander is called to his HMMWV to speak with the battalion commander:

"W57, this is W64. Move immediately to Passage Point 6 and act as passage point for the covering force. Alpha Troop screwed up its reports and did not get the right LOGPAC. You need to take its place and ensure the cav gets through safely and correctly. I know you were supposed to go into reserve tonight, but since Alpha Company dropped the ball, you will have to cover for it. Good Luck."

The Bravo commander understood the old saying; and the Alpha

commander was relieved of his command because he could not fathom it:

The Key To Maneuver Is Logistics.

Captain Clemson G. Turregano served in Germany as platoon leader, mortar platoon leader, and company XO with the 3d Bn., 63rd Armor in the FRG. He currently commands HHT, 2nd Sqn., 4th Cavalry, at Fort Stewart, GA.

Recognition Quiz Answers

1. T-72 MBT(USSR). Crew, 3; combat weight, 41,000 kg; max. road speed, 60 km/hr; max. road range, w/o auxiliary tanks, 480 km, w/auxiliary tanks, 700 km; armament, 1 x 125-mm main gun, 1 x 7.62-mm coaxial machine gun, 1 x 12.7-mm AA machine gun.

2. 152-MM SP Gun-Howitzer(USSR). Crew, 6; combat weight, 23,000 kg; max. road speed, 55 km/hr; max. road range, 300 km; armament, 1 x 152.4-mm main gun, 1 x 7.62-mm AA machine gun; main gun elevation, +65 degrees, depression -3 degrees; range, up to 37,000 meters, depending upon ammunition type (i.e., high explosive, rocket-assisted).

3. T-64 MBT(USSR). Crew, 3; combat weight, 38,000 kg; max. road speed, 70 km/hr; max. road range w/o auxiliary tanks, 450 km, w/auxiliary tanks, 700 km; armament, 1 x 125-mm main gun, 1 x 7.62-mm coaxial machine gun, 1 x 12.7-mm AA machine gun.

4. BMP-1 MICV(USSR). Crew, 3 + 8 infantry; combat weight, 13,500 kg; max. road speed, 80 km/hr; max. water speed, 6-8 km/hr; max. road range, 500 km; armament, 1 x 73-mm main gun, 1 x 71.62-mm coaxial machine gun, 1 launcher rail for Sagger ATGW.

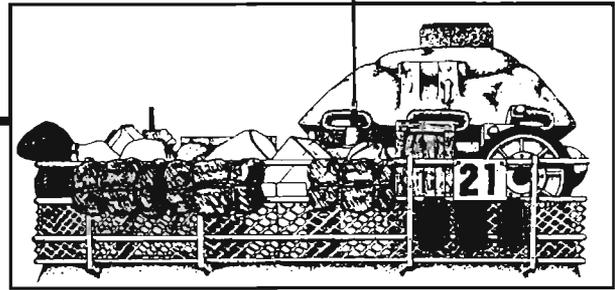
5. BMD(USSR). Airborne combat vehicle. Crew, 7; combat weight, 6,700 kg; max. road speed, 70 km/hr; max. water speed, 10 km/hr; max. road range, 320 km; armament, 1 x 73-mm main gun, 1 x 7.62-mm coaxial machine gun, 2 x 7.62-mm forward-firing machine guns, 1 launcher rail for Sagger ATGW.

6. T-55 MBT(USSR). Crew, 4; combat weight, 36,000 kg; max. road speed, 50 km/hr; max. road range w/o auxiliary tanks, 500 km, w/auxiliary tanks, 600 km; armament, 1 x 100-mm main gun, 1 x 7.62-mm coaxial machine gun, 1 x 7.62-mm bow machine gun, 1 x 12.7-mm AA machine gun.

THE BUSTLE RACK

News and Notes

On the Armor Branch



Who Were the "Tank Aces?"

The Armor Simulator Division of the Armor School, Fort Knox, KY, is seeking information on the best combat tankers of the U.S. Army in WWII. The division will use the information to set up a hall of honor at the school's Tank Conduct of Fire Training Complex at Hill Hall.

According to a spokesman for the project, documentation has been hard to find. Guidelines are that the nominees should have had five confirmed kills against enemy armor. He said the project directors will also consider exploits of action against non-armor units.

He asked that those with information — photographs, names, biographical details, and accounts of specific actions — contact Mr. John Sanders, USAARMS, Attn: ATSB-WP-ASD, Fort Knox, KY 40121-5212 (502-624-1571).

17th Cavalry Activated

The 17th Cavalry was activated under the Army's Regimental System in a ceremony at Fort Bragg in July.

LTG Julius W. Becton, Jr., (U.S. Army, Ret.) commander of the 2d Squadron in Vietnam, is Honorary Colonel of the Regiment, and SGM Clifford Hart, who served

twice as the 1st Squadron's command sergeant major, is the regiment's Honorary Sergeant Major.

The 1st Squadron, now a unit of the 82nd Airborne Division, will serve as the regimental headquarters. The unit's current commander, LTC William D. McGill, was the commander of troops at the ceremony. Also present were the current commanders of the other active squadrons in the regiment, LTC Henry C. Ruth III, commander, 2d Squadron (101st ABN Div.); LTC William A. Belich, 3d Squadron (10th MTN Div.); and



LTG (Ret.) Julius W. Becton, Jr. inspects the troops at activation of the 17th Cavalry.

LTC Gene M. Lacoste, 5th Squadron (2d ID).

Horse-mounted soldiers passed in formation, amid the unit's modern helicopters parked beside the parade field. LTG Becton, now the head of the Federal Emergency Management Agency, reviewed the troops in a cavalry Stetson.

The unit's history dates from 1916 and includes service along the Mexican border, in the Dominican Republic, Vietnam, and Grenada.

USAREUR Battalions Continue M1A1 Transition

The 3d Armored Division has completed its rollover to the M1A1 while the 8th Infantry Division continues its transition. There are now 20 battalions of M1A1s fielded in Europe.

Affiliation Certificates For Ordnance Soldiers

The Ordnance Corps has announced that its certificates of affiliation are now available for all Ordnance enlisted men, warrant officers, and commissioned officers. To be eligible, the soldier must hold an Ordnance MOS or area of concentration.

Schools within the branch are now issuing certificates. Certifi-

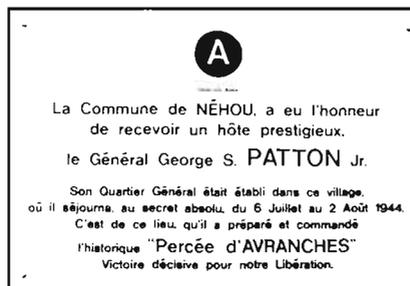
ates for Ordnance soldiers already assigned to units can be obtained on request, but the branch asks that battalion level or higher consolidate the requests and forward them to: Office Chief of Ordnance, ATTN: ATSL-O-S, Aberdeen Proving Ground, MD 21005-5201. Requests should include the name of the unit, the soldier's name, his UIC, military address, the unit point of contact and phone number, and the number of certificates required.

Patton Monument Dedicated in France

The city of Nehou, France, honored a famous visitor of 44 years ago — then-LTG George S. Patton — in a June ceremony which included the unveiling of a monument to the legendary Third Army commander.

French national and local officials, representatives of French and American veterans groups,

and more than 600 townspeople joined in the day-long celebration. Patton stayed, in utmost secrecy, at Nehou in July and August of 1944 while planning the Allied breakthrough at Avranches, a key battle in the liberation of France.



Monument inscription reads:

"The city of Nehou has been honored to host a prestigious guest, LTG George S. Patton.

"His headquarters was set up in this village, where he stayed, in the utmost secrecy, from 6 July to 2 August 1944. It is from here that he planned and commanded the historic Avranches Breakthrough, a decisive victory for our liberation."



Officials dedicate the Patton Memorial at Nehou, France.

Armor Branch Professional Notes

Official Military Photos play a critical role in how board membership views an officer's promotion or school selection file. A quality, current photo can often make the difference between selection and pass-over. At Armor Branch, we are committed to assisting our officers in their efforts to prepare for DA boards; however, we continue to experience difficulty in securing quality, timely photos. To clarify the photo process, we have outlined the steps an officer should follow in order to ensure his photo is a quality product, which arrives in a timely fashion. Our recommended steps for success are:

- Schedule the photo appointment at least four months prior to the convening date of the board. This early start will allow the required time for a re-shoot should the product not measure up to your expectations.
- On the day of the scheduled appointment, take your freshly pressed uniform to the studio on a hanger, do not wear it there. Additionally, try to take a trusted contemporary along to offer critical advice on posture, etc.
- When the photo has been developed, take a critical look at it prior to authorizing its release. When in doubt, seek the advice of your commander. If the photo is not the best image you can portray, get another taken. It's that important!
- If you're close to the wire, send a personal copy of your photo straight to your assignment officer at Armor Branch. As is true with a precombat inspection, the mission isn't complete until you check one final time! After mailing your photo directly to branch, wait 10 to 15 days and call your assignment officer to verify its receipt. Never take anything for granted.

August 1944:

The battles behind the lines complicate the fighting during this historic month of World War II



American armor and infantry approach Paris in August 1944.

August 1944: The Campaign for France, by Robert A. Miller. Presidio Press, Novato, CA, 1988. 255 pages. \$17.95

This is reading for the historian, but the layman will benefit much from this book, too. A day-by-day account of the historic and crucial month of August 1944, when the Allies battled to establish and expand their Normandy bridgehead, this book is telling in more ways than one.

One does not often get to delve too deeply into the interpersonal and international politics that bedevil high level commanders of every army in the world, but *August 1944* gives some excellent insights into the machinations of the generals and their politico backers, as the battles raged in the hedgerows. The commanders made a number of crucial military decisions in that month, based solely on political advice or outright pressure. The German generals, of course, had to fight Hitler as well as the Allies, and they had a losing battle on both hands. Hitler's megalomania, his so-called "insight," led him to order many military moves in France that were cataclysmic to the German armies. Most notable of these was his insistence on the counterattack at Mortain. This attack failed, and led directly to the Falaise Pocket and all but total disaster for the German armies in France.

Nor were the Allied generals free from such political pressures. Allied, military and civilian, insistence on more progress on the eastern flank of the beachhead — the British sector — led to several ill-fated offensives against superior enemy armor; but the politicians had their say, and the GIs and the Tommies did the dying. There was an abundance, too, of interpersonal rivalries among the Allied generals that led to ill will and to some battle

decisions made in spite. The outspoken Patton was no stranger to such controversies, and his own statements broadcast his ridicule of the British and Canadians who faced the bulk of German armor.

There was another, much less publicized, invasion of France during that historic month, Operation DRAGOON, (originally ANVIL), the invasion of southern France. The book documents this campaign well, too, and illustrates

how a massive two-pronged attack can disrupt a centrally-located enemy's plans, operations, and logistics. OVERLORD captured the imagination, but DRAGOON was equally important.

Miller has done his homework. This is popular military history at its best. Professional or layman, if you have an interest in the invasion campaign, this book is for you.

ARMOR Staff



In Vietnam, airmobility grew from a concept into an everyday combat reality for the first time.

The Helicopter Comes of Age In Vietnam

PLEIKU; The Dawn of Helicopter Warfare in Vietnam, by J.D. Coleman. St. Martin's Press, N.Y., 1988. 293 pages.

This is a great book, military history as it should be written. LTC (Ret.) J.D. Coleman has done a magnificent job in making history readable. From a strictly historical perspective, he has written a factually accurate and complete account of the formation of the U.S. Army's first airmobile division, the unit's transfer to Vietnam, and its first campaign against the enemy. But, of more significance, he has captured — in an extremely interesting, often exciting style — the human drama associated with these historically important events.

Pleiku tells the story of the Army's first experiments in using the helicopter to bring added mobility and firepower to the battlefield. Using official documents and interviews with key players, the author re-

lates all of the institutional and personal resistance they encountered in those early days of "airmobility," and the determination of the visionaries who persevered to make it a reality. The unexciting but necessary details of who had how many of what type assigned to which unit are dealt with accurately, then dispatched in short order. At this point, the narrative assumes its own inertia. The reader is drawn on, as in any good story, anxious to find out what happens next. Who lives and dies, who's a hero and who isn't. The reader invariably will not be disappointed by reading on.

Perhaps the greatest asset which LTC Coleman brings to this work is his personal involvement. He was there in the Central Highlands in 1965, when the events took place. He was in a position (as a public information officer) to observe first-hand and to collect documents on the scene. Moreover, he has sought out the leaders and the led, and he frequently uses their words to explain not only what happened, but also why.

But the strongest point of the book is its use of captured NVA and VC documents — original operations orders, after-action reports, etc. — to complete the story, to tell what the other side intended to do and what it actually did. This alone makes *Pleiku* unique among the spate of recent

Vietnam War books, and assures it a special place on anyone's bookshelf.

Some may wonder at the author's exuberance and obvious pride in "his" division. "Hyperbole," they may scoff, at the claims of "firsts" for the First Team. But in 1965, in the Ia Drang Valley of South Vietnam, before airmobility was an accepted way of life in the U.S. Army, the 1st Cavalry Division was making historical firsts, and J.D. Coleman has done these deeds justice.

DONALD C. SNEDEKER
LTC, Cavalry

Excellent Photos And Authoritative Text Describe U.S. Systems In a New Reference By Two Experts

U.S. Mechanized Firepower Today, by Stephen J. Zaloga and Arnold Meisner. Arms & Armour Press, New York, 1987. 72 pages. \$9.95.

Two world-recognized authorities on armor have produced another noteworthy volume for the armor pro or buff. Scores of highly detailed photographs will entice the avid modeler and bring to the attention of other readers the intricate details of armored artillery and other mechanized firepower weapons fielded in support of the foot soldier.

Covered in detail are the M109 and M110 series of self-propelled artillery pieces, the M48 tank, and the M163 Chaparral and Vulcan air defense systems, DIVADS (Sgt. York), the M728 combat engineer vehicles, the M88 tank recovery series, LAVs, M60 AVLB and counterobstacle vehicles.

Arms & Armour Press has established itself as a reputable publisher on military matters. *U.S. Mechanized Firepower Today* continues that reputation and the authors enhance it. This is good material for the serious armor buff, the armor pro, and the serious modeler.

ARMOR Staff

Military Pistols and Revolvers, by Ian Hogg. Sterling Publishing, New York. 128 pp., \$24.95.

Well written, well illustrated, authoritative books on small arms are remarkably hard to find, which is surprising in a nation as well-armed as the U.S. Too much American gun literature, unfortunately, is written by opinionated windbags and laced with questionable "war stories," rather than information about the guns themselves. Another problem has been a clear bias against weapons not invented here.

This new book, by veteran British small arms authority Ian Hogg, is an exception. Hogg writes well, combining a thorough knowledge of the history of military pistols and revolvers with clear information on how they work. What's more, Hogg has a fine writing style, often peppered with understatement and humor sorely missing in the typical columns of U.S. gun books and magazines.

While relatively expensive, this hardbound is a good example of a finely made book. The black and white half-tone illustrations are clear and detailed, reflecting points made in Hogg's text. The typography is clean and modern. Three appendixes are useful and interesting: one is a list of the major nations and their service pistols over the years; another covers data on the weapons mentioned; and a third gives specifications on service pistol ammunition.

Hogg's chapters cover the military revolvers first used in the 1800s, the early automatic pistols, 20th Century revolvers, and automatics of the two world wars. A final chapter traces developments since 1945, bringing the reader to the current era of high-capacity service automatics like the U.S. Beretta, Austrian Glock, Swiss SIGs, and Spanish Stars and Astras. The author manages to pack a lot of information in limited space. His inclusion of many historical details also helps the reader understand much of the "why" of firearms design over the years. This book is a fine reference for the soldier, who often knows a lot about the small arms he trained on, but has little perspective on what's been going on in the rest of the world. And pistols, after all, grew out of the cavalry tradition. They may seem small potatoes in the world of the Ultimate Magnums — the high-pressure cannons cavalry and armor soldiers work with every day — but there are more similarities than you might suppose. And with Hogg as your guide, this package tour is both informative and enjoyable.

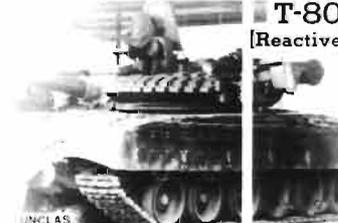
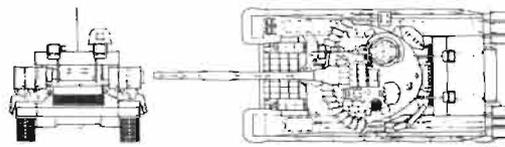
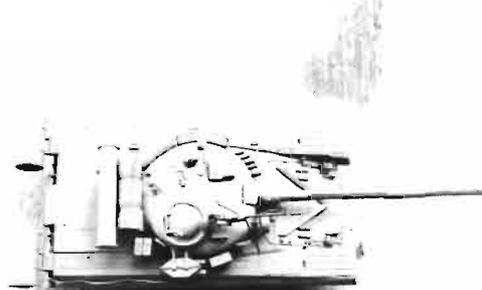
JON CLEMENS
ARMOR Staff

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T-80

SOVIET MAIN BATTLE TANK



T-80 CHARACTERISTICS

CREW	3 (Cdr, Driver, Gunner)	CALIBER (mm)	125
WEIGHT (mt)	42.0 (Add 3 Metric Tons for Reactive Armor)	TYPE	Smoothbore Tank Gun
LENGTH		RATE OF FIRE (rd/min)	6-8
Gun Forward (m)	9.70	AMMUNITION (types)	Frag-HE (FS), HEAT FS, HVAPFSDS, AT-8 Songster ATGM
Without Gun (m)	7.20	ARMOR PENETRATION (mm)	400+ (HVAPFSDS); 500+ (HEAT-FS any range)
WIDTH, Overall (m)	3.48	(@ 0° Obliquity @ 1,000 M)	
HEIGHT, Overall (m)	2.30	BASIC LOAD (rd)	40
ENGINE	1000 HP GAS TURBINE	SECONDARY ARMAMENT	
SPEED (Maximum)		NUMBER/TYPE	1/Coaxial Machine Gun
Road (km/hr)	85	CALIBER (mm)	7.62
ROAD RANGE (km)	385 (500 w/Aux Fuel Tanks)	NUMBER/TYPE	1/Turret-Mounted AA Machine Gun
(on unimproved roads)		CALIBER (mm)	12.7
TRENCH CROSSING (m)	2.70	INFRARED	
VERTICAL STEP (m)	0.80	Driver	Yes
GRADABILITY (°)	30	Gunner	Yes
FORDING (m)	1.4; 3.5 (with snorkel)	Commander	Yes
ARMOR (Maximum)		NBC PROTECTION	Yes
Hull (mm)	Greater than T-82 Armor @ 102 (mm)		Yes
Turret (mm)	Greater than T-82 Armor @ 242 (mm)		Yes

This 24-by-27-inch poster of the Soviet T-80 is the first in a series on Soviet tanks, armored vehicles, helicopters, and ATGMs to be produced by Threat Division, Directorate of Combat Developments, Fort Knox. Units may request copies by phoning AV-464-5764 or 502-624-5764.

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