

ARMOR



FAREWELL, SHERIDAN! *A Memoir of the Early Days*



In case you missed it, vehicle identification training recently took on an added emphasis. It used to be that during the “good old days” of the Cold War, our trigger-pulling gunners and pilots relied mostly on the shape of things to guide their decisions to fire or not to fire. If the turret looked like a frying pan and the vehicle were over on the other side of the FEBA, it was fair game. Target ID was easier in those days because there were basically two sets of equipment, NATO stuff (no kill), and Warsaw pact stuff (kill), and everything was shaped differently — those weird-shaped French vehicles notwithstanding.

That was then. Now, it is not so easy to discriminate good and bad, and it is getting more difficult by the day. Despite thermal and passive sights, deciding who is inside that shape your high velocity cannon is pointing at — a good guy or a bad guy — is the rub. Fratricide and near-fratricide incidents in Desert Storm certainly helped us relearn that target identification is a tough task. Complicating the identification task was the fact that, in this coalition war, some of our coalition partners’ equipment was shaped the same as that of our enemy. All T-72s were not alike. We probably will never again see the Cold War battlefields, where almost everyone was on the correct side of the line and pointing in the proper direction.

A recent addition to this battlefield complication is South Korea’s apparent decision to accept Russian military hardware, 30 or so T-80U tanks, as partial payment for development loans. One is hard-pressed to think of a more staunch ally in our recent history than the South Koreans. However, even they are going to have some equipment that looks an awful lot like what our training usually tells us is manned by the enemy. However, this isn’t the only

case of NATO and Russian equipment — once the standard used to tell foes apart — now coexisting in the same motor pools. Other potential coalition partners also are diversifying their equipment sources. Kuwait and the United Arab Emirates both field numbers of BMP-3s. Again staunch allies with equipment resembling that of other less-friendly states.

We have every reason to expect that, for both business and political reasons, some of the huge surpluses of lethal, ex-Soviet military hardware, as well as new-built equipment, will end up in the armories of other friendly nations. Russian fighter aircraft regularly make the short list of potential planes in air forces on nearly every continent. Even our next-door neighbor, Mexico, seriously considered adopting MI-17s as their future transport helicopters.

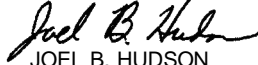
Given these realities and our observations and lessons learned in the Gulf War, the necessity of getting spoof-proof IFF (identification friend or foe) materiel into the hands of our ground forces and on their vehicles takes on greater importance than before. Look at John Sack’s book, *Company C: The Real War in Iraq*, to see the extraordinary and dysfunctional effort exerted at the lower unit level to avoid blue-on-blue engagement. The challenges posed by blue-on-gray engagements are even more enormous. We need hardware that we can loan to our coalition partners. We need to stress exact vehicle ID. Gone forever are the days of kill/no kill answers. Situational awareness, coupled with sound knowledge of vehicle types, what they look like in day, at night, from the front, back, side, and through thermal sights, is the only way to keep from killing ourselves and our friends.

— TAB

By Order of the Secretary of the Army:

DENNIS J. REIMER
General, United States Army
Chief of Staff

Official:


JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
02748

ARMOR

The Professional Development Bulletin of the Armor Branch PB-17-97-1

Editor-in-Chief

LTC TERRY A. BLAKELY

Managing Editor

JON T. CLEMENS

Commandant

MG GEORGE H. HARMEYER

ARMOR (ISSN 0004-2420) is published bi-monthly by the U.S. Army Armor Center, 4401 Vine Grove Road, Fort Knox, KY 40121.

Disclaimer: The information contained in *ARMOR* represents the professional opinions of the authors and does not necessarily reflect the official Army or TRADOC position, nor does it change or supersede any information presented in other official Army publications.

Official distribution is limited to one copy for each armored brigade headquarters, armored cavalry regiment headquarters, armor battalion headquarters, armored cavalry squadron headquarters, reconnaissance squadron headquarters, armored cavalry troop, armor company, and motorized brigade headquarters of the United States Army. In addition, Army libraries, Army and DOD schools, HQ DA and MACOM staff agencies with responsibility for armored, direct fire, ground combat systems, organizations, and the training of personnel for such organizations may request two copies by sending a military letter to the editor-in-chief.

Authorized Content: *ARMOR* will print only those materials for which the U.S. Army Armor Center has proponency. That proponency includes: all armored, direct-fire ground combat systems that do not serve primarily as infantry carriers; all weapons used exclusively in these systems or by CMF 19-series enlisted soldiers; any miscellaneous items of equipment which armor and armored cavalry organizations use exclusively; training for all SC 12A, 12B, and 12C officers and for all CMF-19-series enlisted soldiers; and information concerning the training, logistics, history, and leadership of armor and armored cavalry units at the brigade/regiment level and below, to include Threat units at those levels.

Material may be reprinted, provided credit is given to *ARMOR* and to the author, except where copyright is indicated.

January-February 1997, Vol. CVI No. 1

Features

- 6 Combatant Arms vs. Combined Arms**
by Dr. George F. Hofmann
 - 14 A Sheridan Memoir: The Early Days**
by Lieutenant Colonel Burton S. Boudinot (Retired)
 - 16 Too Late the XM8, Alternatives to the Armored Gun System**
by Stanley C. Crist
 - 20 Whither the 2d Cavalry?**
by Lieutenant Colonel Kevin C.M. Benson
 - 22 Japanese Armored Vehicle Development**
by Brigadier General Philip L. Bolté (Retired) and Iwao Hayashi
 - 26 Tank Warfare During the Rif Rebellion, 1921-1927**
by Dr. José E. Alvarez
 - 29 A Framework for Peace Operations**
by Major Sean B. MacFarland
 - 32 Training For Maneuver**
by Captain Robert Bateman
 - 36 Software Review: TACOPS**
by Captain Jerry A. Hall
 - 37 Making Killers, Imperatives for Tank Lane Training**
by Lieutenant Colonel James C. Crowley (Retired)
 - 42 TALIK: Steel Division-Six
Patton Museum Ceremony Honors MG Israel Tal (Ret.)**
by Major General Stan R. Sheridan (Retired)
 - 44 Fielding the Armor Force of Tomorrow:
Soldierization in the 1st Armor Training Brigade at Fort Knox**
by Lieutenant Colonel Eugene J. Palka and Colonel Fred A. Treyz III
 - 47 1st Armor Training Brigade Interactive Web Site**
 - 52 Comments Sought on Revisions to 71-1 FM and ARTEP**
- Back Cover Mounted Water Ration Heater on the Way
For Tanks, Bradleys, M113s, and Howitzers**
by Larry T. Hasty

Departments

- 2 Contacts**
- 3 Letters**
- 4 Commander's Hatch**
- 5 Driver's Seat**
- 53 Books**

Periodicals Postage paid at Fort Knox, KY, and additional mailing offices. Postmaster: Send address changes to Editor, *ARMOR*, ATTN: ATZK-TDM, Fort Knox, KY 40121-5210.

Distribution Restriction: Approved for public release; distribution is unlimited.

USPS 467-970

Directory — Points of Contact

DSN - 464-XXXX

Commercial - (502) 624-XXXX

ARMOR Editorial Offices

Editor-in-Chief
LTC Terry A. Blakely 2249
E-Mail: BLAKELYT@KNOX-EMH1.ARMY.MIL

Managing Editor
Jon T. Clemens 2249

Editorial Assistant
Vivian Oertle 2610

Production Assistant
Mary Hager 2610
E-Mail: HAGERM@KNOX-EMH1.ARMY.MIL

Staff Illustrator
Mr. Jody Harmon 2610

U.S. Army Armor School

Chief of Staff, Armor School (ATSB-CS)
LTC James R. Harrison 1050
E-Mail: HARRISOJ@KNOX-EMH1.ARMY.MIL

Armor School Sergeant Major (ATSB-CSM)
CSM Gerald D. Utterback 5405
E-Mail: UTTERBAK@KNOX-EMH1.ARMY.MIL

NCO Academy (ATZK-NC)
CSM Kevin P. Garvey 5150
E-Mail: GARVEYK@KNOX-EMH1.ARMY.MIL

16th Cavalry Regiment (ATSB-SBZ)
COL Gregory M. Eckert 7848
E-Mail: ECKERT@KNOX-EMH1.ARMY.MIL

1st Armor Training Brigade (ATSB-BAZ)
COL Fred A. Treyz III 6843
E-Mail: TREYZ@KNOX-EMH1.ARMY.MIL

U.S. Army Armor Center

Commanding General (ATZK-CG)
MG George Harmeyer 2121
E-Mail: HARMEYER@KNOX-EMH1.ARMY.MIL

Deputy Commanding General (ATZK-DCG)
BG Clayton E. Melton 7555
E-Mail: MELTON@KNOX-EMH1.ARMY.MIL

Chief of Staff (ATZK-CS)
COL William E. Marshall 1101
E-Mail: MARSHALL@FTKNOX-EMH7.ARMY.MIL

Command Sergeant Major (ATZK-CSM)
CSM Ronnie W. Davis 4952
E-Mail: POSTCSM@KNOX-EMH1.ARMY.MIL

Directorate of Force Development (ATZK-FD)
COL John F. Kalb 5050
E-Mail: KALB@KNOX-EMH1.ARMY.MIL

Directorate of Training and Doctrine Development (ATZK-TD)
COL G. Patrick Ritter 8247
E-Mail: RITTER@KNOX-EMH1.ARMY.MIL

TRADOC System Manager for Force XXI (ATZK-XXI)
COL Robert L. Westholm 4009
E-Mail: TSMFXXI@KNOX-EMH1.ARMY.MIL

TRADOC System Manager for Abrams (ATZK-TS)
COL David M. Cowan 7955
E-Mail: COWAN@KNOX-EMH1.ARMY.MIL

Mounted Maneuver Battlespace Battle Lab (ATZK-MW)
COL Gary Krueger 7809
E-Mail: KRUEGER@KNOX-EMH1.ARMY.MIL

Office, Chief of Armor (ATZK-AR)
Mr. Aubrey Henley 1272
E-Mail: HENLEYA@KNOX-EMH1.ARMY.MIL
FAX 7585

Special Assistant to the CG (ARNG) (ATZK-SA)
LTC Randall Williams 1315
E-Mail: WILLIAMR@KNOX-EMH1.ARMY.MIL

ARTICLE SUBMISSIONS: To improve speed and accuracy in editing, manuscripts should be originals or clear copies, either typed or printed out double-spaced in near-letter-quality printer mode. We also accept stories on 3½ or 5¼-inch floppy disks in MultiMate, WordStar, Microsoft Word, WordPerfect, Ami Pro, XyWrite, Microsoft Word for Windows, and ASCII (please indicate wordprocessing format on disk or cover letter and include a double-spaced printout). Tape captions to any illustrations or photos submitted.

SUBMISSION POLICY NOTE: Due to the limited space per issue, we will not print articles that have been submitted to, and accepted for publication by, other Army journals. Please submit your article to only one Army journal at a time.

GRAPHICS AND PHOTOS: We can accept electronic graphics and photo files in most formats except Harvard Graphics. Compressed formats — .jpg and .gif take up the least disk space. We prefer PC Paintbrush (.pcx). If you use Powerpoint (.ppt), please save each illustration as a separate file. Try to avoid the use of color and shading, but if you must use shading to illustrate your point, send us an unshaded version of the illustration along with a printout of your shaded version. (We have found that when we convert files to a format we can use, the shading

gets lost or distorted.) If you have any questions concerning electronic art submissions, call Vivian Oertle at the phone number above.

MAILING ADDRESS: ARMOR, ATTN: ATZK-TDM, Fort Knox, KY 40121-5210.

PAID SUBSCRIPTIONS/ST. GEORGE-ST. JOAN AWARDS: Report delivery problems or changes of address to Connie Bright or Darlene Kennedy, P.O. Box 607, Ft. Knox, KY 40121, or call (502) 942-8624, FAX (502) 942-6219.

UNIT DISTRIBUTION: Report delivery problems or changes of address to Mary Hager, DSN 464-2610; commercial: (502) 624-2610. Requests to be added to the free distribution list should be in the form of a letter to the Editor-in-Chief.

ARMOR HOTLINE — DSN 464-TANK: The Armor Hotline is a 24-hour service to provide assistance with questions concerning doctrine, training, organizations, and equipment of the Armor Force.

ISSUES IN ARMOR: Visit the *ARMOR* Web site at the following address: <http://www.entelechy-inc.com/docs/knoxdoc/armormag/cover.htm>.

LETTERS

There Was No Rush To Improve Sherman Armament

Dear Sir:

COL Eddy's critique of MAJ Mansoor's book review in the September-October issue of *ARMOR* has spurred me to comment. Two of the points made by COL Eddy — the discontent with the Sherman after North Africa and the role of the user in determining requirements — are inaccurate, as I documented in my book, *Faint Praise: American Tanks and Tank Destroyers during World War II*, Hamden, Connecticut: Archon Press, 1983.

First, neither the records of Army Service Forces, Army Ground Forces, nor the Ordnance Department reflect an outcry of discontent with the Sherman tank following the North African campaign. A query to all theaters about future tanks by the War Department G4 in October 1943 resulted in a mixed bag of responses, but no common view of future tanks and no evident criticism of the Sherman (*Faint Praise*, pp. 92-93). There was support for mounting the 76mm gun in the Sherman, but that decision had already been taken by the Armored Command in September 1943 (*FP*, pg. 84).

The lack of urgency from the field about any deficiency in penetrating German armor was underlined by the decision in Europe to defer issuing Sherman tanks with the 76mm gun to the first waves of troops invading Normandy because of problems with muzzle blast (*FP*, pg. 101). In large part, this lack of urgency was a result of overestimating the penetration capabilities of the 76mm and 3-inch guns, which had the same performance and were widely available in tank destroyer units. Only after firing tests in Europe in July 1944 did a common recognition of the deficiencies of U.S. firepower appear. General Eisenhower expressed the frustration of the troops when he commented:

Why is it that I am always the last to hear about this stuff. Ordnance told me this 76 would take care of anything the German had. Now I find out you can't knock out a damn thing with it. (FP, pg. 106)

Secondly, the major developmental tank program of the U.S. Army during World War II was very much an Ordnance project. A former member of the Armored Board during the war, MG (Ret.) Louis T. Heath, remembered very little input to the program from users until a prototype T26 arrived at Fort Knox in the spring of 1944 (*FP*, pg. 36). Glaring problems, such as a manifestly unsatisfactory ammunition stowage system, demonstrated the lack of user involvement prior to development of the prototype (*FP*, pg. 122). Hopefully, lack of user input to

major armaments programs is now a thing of the past.

In sum, MAJ Mansoor's comments about the armament of the Sherman tank are closer to the truth than COL Eddy's.

LTC (RET.) CHARLES M. BAILY, Ph.D.
Springfield, Va.

Abrams Himself Complained About Tank Gun Effectiveness

Dear Sir:

Dr. Eddy may be correct in stating (*Letters*, September-October) that it was Army users, not the Ordnance Department, who delayed upgunning of the World War II Sherman tank, but that was not necessarily the case at the working (and fighting) level.

While Lieutenant Colonel Creighton Abrams was commanding the 37th Tank Battalion in the drive across Europe, he was paid a visit by an Ordnance staff officer from a higher headquarters. That worthy observed that Abrams had mounted an Air Force .50 caliber machine gun, which had a very high rate of fire, as a coaxial gun on his tank. "But that uses up ammo too fast," objected the Ordnance fellow.

Then Abrams told the man that he would like to have a higher velocity main gun on his tank, because that would help him knock out German tanks better. "That would wear out the gun tubes too fast," explained the Ordnance warrior. "Well, hell," Abrams responded, "now we're using up tanks!"

LEWIS SORLEY
Potomac, Md.

"We Gave Away Our Seat On a Planeload of Warriors..."

Dear Sir:

I agree with MAJ Sherman about the value of the Sheridan to the 82nd ABN DIV in Panama. The real shame is that "they" (the Army money handlers) have decided not to replace the Sheridan with a new light tank. Why? Not force structure. Not based on demonstrated needs. But money. No money. Spent it in Bosnia.

So, leaders, which soldiers of the 82nd will we sacrifice to enemy fire because we didn't provide them what they needed? (refer back to MAJ Sherman's article and the incident at the bridge) What leaves a nasty taste in my mouth is that the Armor community let this happen. We gave it away. No guts. Parochial "them" vs. "us" trash. Too bad we (Armor officers) don't have the

intestinal fortitude to admit that we share the battlefield with OUR infantry, and that there are many circumstances where we SUPPORT the infantry.

The Sheridan, with its 152mm main gun, was the near-perfect light infantry support vehicle. It could swim. It had thermal sights. It had long range armor destruction capability equal to or greater than a Hellfire missile (check your PH/PK classified data!). The Shillelagh, with its 152mm HEAT round, could blow a hole in a reinforced concrete wall large enough for infantry soldiers to walk through side by side. An infantry leader could use the external phone, it boasted a fléchette round that could blast 17,000 one-inch nails into enemy infantry as close support, and, oh by the way, you could parachute it into combat for those nasty "forced entry" missions typically laid at the feet of the paratroopers of the "Devils in Baggy Pants," "Panthers," and "Falcons" of the 82nd.

Ironically, the new, better, all purpose "Armored Gun System" that was to replace the Sheridan wasn't half as good. OK, it wasn't old and out of repair parts, but it couldn't swim, blow holes big enough to walk through in walls, fire a devastating missile, or fléchette the enemy to death. It could be used in LVAD (low velocity air-drops) operations and it could fire 105mm antitank rounds at enemy armor. Great design by tankers to be a light tank meant to kill tanks. Too bad that's not what the 82nd needed. The 82nd needed a tracked (nothing strikes fear into the hearts of the enemy like a tracked vehicle!) vehicle capable of close infantry support — like the Sheridan. Not a light tank designed to fight other tanks. Let's face it, the 82nd should not (ever see *A Bridge Too Far?*) be dropping in to do battle with a tank-heavy force, if it is, it's in the wrong fight. It will, however, drop into the dead of night to secure an unfriendly airfield!

Too bad the Sheridans of 3-73rd Armor go away in January 1997, without even the

LETTERS (Continued on Page 48)

Correction

The following safety disclosure was omitted from "Enhanced Mine Detection For Limited Visibility Operations" in the November-December 1996 issue:

This modification is for emergency combat use only. Other use must be approved with a safety release through TACOM. Permanent modification has been submitted to the Army Suggestion Program and, when approved, will provide a kit for mounting the lights on a permanent mount with a wiring harness.

*MG George H. Harmeyer
Commanding General
U.S. Army Armor Center*



Focus on the Triad of Excellence

It is indeed a privilege for me to return to Fort Knox as the 37th Chief of Armor. Since my last assignment at Fort Knox, our Army has undergone vast changes. We have successfully defended the frontiers of freedom in Europe, causing the Iron Curtain to fall, and deployed overseas to participate in several differently demanding operations, such as Operation Just Cause, Operation Desert Shield/Storm, and Operation Joint Endeavor. Throughout this continuum of operational environments, the mounted force has fielded and fought on six versions of tanks and five versions of personnel carriers/fighting vehicles. Despite the diversity of operational environments, the mounted force continues to achieve success in all of its endeavors.

Our success comes from many sources, I will talk about three of those sources — a triad of excellence — starting with our people. Soldiers, civilians, and their families are the foundation for all of our success in the past, and they will continue to be that foundation in the future. Our soldiers continue to prove how smart they can be, regardless of the conditions or environment. We are continuing to build the force with the most intelligent recruits in the history of the Army. Every leader's charter in the mounted force should be to provide the most challenging environment available to these soldiers — they deserve it! However, let us not forget that we must provide our

families a comfortable and just environment whether at home or abroad.

As trainers throughout the mounted force, we owe our people only the best preparation for combat available. The world-class training at our Combat Training Centers (CTCs) continues to be the centerpiece of our preparation for future wars and military operations other than war. The National Training Center, Combat Maneuver Training Center, Joint Readiness Training Center, and Mounted Warfare Simulation Training Centers throughout the world provide our soldiers and their leaders training that is unmatched anywhere else on the face of the globe. The observer/controllers at these facilities shape our future achievements by providing the best possible coaching and teaching, through candid feedback after each mission. We must continue to use these training centers to provide the toughest and most realistic training available to maintain an edge over all of our opponents. However, this triad of excellence is not complete without the right equipment to provide the means to achieve our goals.

Currently, the equipment available to our mounted warfare soldiers is second to none. Continual developments in weapon system survivability, lethality, mobility, and digital capability are keeping our soldiers out front on the modern battlefield. We are making unprecedented achievements in the development of these new weapon systems

and their complementary tactics, techniques, and procedures to fight effectively on future battlefields. Providing the proper equipment for the mounted force is clearly a priority!

Our opposition today has many faces. Unlike the monolithic threat we trained to fight in the past, we face an enemy whose size, capabilities, and tactics are ever-changing. We must be prepared to fight a large or small enemy, with either high or low technical capability, and beat him regardless of his preference to fight a linear or non-linear conflict. Alongside this warfighting spectrum lies the environment of stability operations, peace support operations, and operations other than war. In these types of operations, the missions could range from the challenges of separating multiple warring factions, where the threat of combat is always present, to providing disaster relief in Africa or to our own citizens.

The challenges facing the mounted force of the future are many. This is our force, and I'm taking a personal stake in its future. I challenge all soldiers and civilians of our force to claim their own stake, whether it be providing for the needs of our fine soldiers and their families, in finding ways to enhance our training, or in improving our equipment. I want your ideas.

I am honored with this opportunity to lead the mounted force into the future.

FORGE THE THUNDERBOLT!

CSM Ronnie W. Davis,
Command Sergeant Major,
U.S. Army Armor Center



A Reflection of Success: The Excellence in Armor Soldier

The Excellence in Armor (EIA) program identifies outstanding Armor/Cavalry soldiers during One Station Unit Training (OSUT) and during service in Armor/Cavalry units. The purpose of the program is to fill the commander's hatches of tanks and Bradleys with highly motivated, intelligent soldiers whose performance is consistently outstanding.

Approved in October 1987, the program has grown into a model that other branches attempt to emulate. Soldiers from PV1 to SFC are eligible for selection and enrollment, which can take place either in OSUT or at a permanent duty assignment. Presently, 3,190 Active Duty soldiers and 876 Reserve Component soldiers are on the rolls.

The selection process in OSUT starts with the drill sergeant. He will recommend a soldier during the tenth week of training, based on performance, motivation, and leadership potential. The soldier's eligibility is then confirmed by a battalion or squadron board. Upon confirmation of eligibility, the soldier will receive fifty hours of additional training in Skill Level 1 and 2 tasks. Prior to graduation from OSUT, the soldier must meet the following criteria to be enrolled in the EIA program:

- Score 230 points or better on the APFT
- Qualify Sharpshooter or better with individual weapon
- Pass all end of block tests
- Pass all Armor Crewman Tests (19K) ACT I, II, III, or the Scout Gunnery Test (19D) with no more than one no-go per test
- Pass all Armor Stakes
- Possess a high school or equivalent diploma (this can be waived by the battalion or squadron commander)

Upon successful completion of all areas, the soldier is placed on the rolls of

EIA soldiers maintained by the Office of the Chief of Armor, Fort Knox. His DA Form 2-1 is annotated on line 19, reflecting his EIA enrollment and the effective date. His PCS orders will indicate his membership in the EIA program, and a letter will accompany him to his gaining commander, announcing his successful completion of the EIA program during OSUT. The impact is clear; the new soldier will arrive at his first duty station with additional skills through training that could prove vital to the overall success of the unit's mission.

Not all soldiers become enrolled during OSUT. A soldier can earn enrollment anytime during his career through the recommendation of his commander and the successful completion of the following:

- Receive a commander's evaluation emphasizing his technical proficiency and his potential for leadership
- Score 260 points or higher on the APFT
- Pass all elements of the CTT
- Pass the Scout Commander's Certification Level I (19D SCCT I) test
- Pass the Tank Commander's Certification Level I (19K TCCT I) test
 - M1 Series Tank/FM 17-12-1-2/TCGST
 - M3 Bradley/FM 21-1/GST
 - M998 (HMMWV)/FM 17-12-8/GST
- Qualify Sharpshooter or better with assigned weapon.

NOTE: OSUT soldiers have one year to meet the above standards. Should they fail to do so, they must be dropped from enrollment. Under special circumstances, the battalion commander may request a waiver for a deserving soldier who fails to meet the standards through no fault of his own, for example if the soldier has a temporary profile which prohibits him from taking a record APFT. Once the soldier

is enrolled, his DA Form 2-1 is annotated to reflect this. The end result is the identification of soldiers who represent the elite of the Armor Force.

NOTE: Should a soldier fail to maintain the required standards, the commander must remove him from the EIA rolls, and the soldier may never be re-enrolled, regardless of his future achievements.

EIA soldiers have the opportunity to receive special incentives:

- OSUT commanders have the authority to promote 10% of the class to PV2 upon the completion of the basic training phase, and that 10% may be promoted to PFC upon completion of the MOS-specific phase.
- A sergeant who is a BNCOC graduate may request to take the SCCT/TCCT II test through the local education center. This is a comprehensive two-hour examination on Skill Level 3 and 4 tasks. Upon achieving a score of 70 points or higher, he is eligible to receive fifty points toward promotion under the military education area for his staff sergeant promotion packet.
- All senior NCO selection boards are briefed about the EIA program and that soldiers who are enrolled should be considered a "cut above" the rest of the soldiers of the same grade.
- Identification of EIA soldiers improves their morale and allows them to be recognized as outstanding performers by their leaders, peers, and subordinates.

Although, the program is barely ten years old, a trend in the selection rate of EIA members is taking shape. The selection rates on the last three promotion boards are listed at Figure 1.

Continued on Page 50

Combatant Arms vs. Combined Arms

*The U.S. Army's Quest
For Deep Offensive Operations
And an Operational Level of Warfare*

by George F. Hofmann

*"If the military persists in thinking out tactical problems in terms of cavalry, infantry, and artillery, then we shall render our minds rigid to all new ideas."*¹



Christie-based Combat Car T-4 climbs log ramp during tests in 1934.

The prevailing attitude between "light" infantry, "heavy" armor, and "can-do-all" field artillery needs to be seriously addressed if the Army is to move into the 21st century. The purpose of this paper is to examine the post-World War I conflict between the traditional combatant arms concept, championed by the branch chiefs, and a combined arms idea based upon mechanization and deep offensive operations.

This paper will also explain why the Army was unable to execute an operational level of warfare (the theory of larger unit operations) with a combined arms mechanized force.² The interwar historical model is relevant because it has a contemporary analog in today's debate regarding doctrine and service traditions. Is the traditional decentralized organization of the combatant arms suitable for a modern modular combined arms force in a technologically driven army?

At the insistence of the Army General Staff in 1928, the Army launched its turbulent road to mechanization and the Armored Force. Shortly after he returned from viewing the British mechanized force, Secretary of War Dwight D. Davis made two important decisions. First, he ordered the creation of an experimental mechanized force during the summer of 1928. Second, he directed the Army Chief of Staff, MG Charles P. Summerall, to initiate a preliminary study of the employment of a mechanized force on the future battlefield and determine how the United States could effectively be prepared for such an employment. During World

War I, Summerall had been a member of a Board of Officers detailed to evaluate French and British tanks and their tactical deployment. Investigating British experiences, the Board quoted from a future proponent for armor warfare, then Lieutenant Colonel J.F.C. Fuller, that the creation of a mechanized army would be "one of the greatest epochs in the art of war."³ Based on his wartime experiences, Summerall became a firm believer in tanks. After the war, he supported a separate status for the Tank Corps and, during the 1920s, was an enthusiastic supporter of the role tanks would play in a future war. Summerall attempted to make their development his first priority. He told students at the War College that the United States always entered a war unprepared. He cautioned against viewing future military problems in light of the Army's World War I experience and warned that the next war would be different as the Army's experience was "a special case that cannot be repeated."⁴

Subsequently, Summerall delegated the study to the assistant chief of staff, G-3 (Training and Operations), BG Frank Parker, who directed members of his staff to execute the secretary's order. However, the chief architect of the study, "A Mechanized Force," was Major Adna R. Chaffee, Jr., who had been assigned to the General Staff in June

1927. According to historian Dr. Tim Nenninger, Chaffee became interested in mechanization shortly after he was assigned to the G-3 staff. A friend serving as a military attaché in England provided the inquisitive Chaffee with details of British efforts in mechanizing its army.⁵ Chaffee, the loyal cavalryman, initially wanted to revitalize the horse cavalry, but in 1928, he realized



BG Frank Parker, at left, as a colonel in WWI, and BG Adna R. Chaffee, then a major, were key players in U.S. studies of mechanization in the late 1920s and early '30s.

the part mechanization would play in a future war. He admired the Civil War cavalry officer, James Harrison Wilson. By the end of that war, Wilson had used his Union cavalry *en masse*, fought mounted and dismounted, cooperated with the infantry, and used the best weapons available. He was a strong proponent of open warfare, combining fire and movement with a mounted assault when feasible. Wilson's performance was a model of deep offensive operations and battle; he knew how to use a combined arms team. This was an example of what

Professor Schneider called distributed free maneuver, the essence of operational art.⁶

The most innovative conclusion from the G-3 study called for a tactical evaluation of the role of tanks in deep offensive operations. Fuller, one of the most creative proponents of armored warfare in the British Army, recalled meeting with Parker in August 1917. Fuller claimed Parker held “ultramodern views” and called him a “veritable he-man.” No doubt this was due to Parker’s agreement with Fuller on the need for mechanization and tank employment to end the position warfare that stalemated the Western Front. At the time, Parker shared with Fuller his views that a combined mechanized force, supported by aviation, could widen the breach after a breakthrough and then rapidly progress deep around the German defenses in depth. Parker believed this return to mobility would break the stalemate on the Western Front because the Germans were not capable of adopting such a plan. Fuller gave credit to Parker’s views and indicated they were “not put into practice until 1939, and then by the Germans in Poland, when it became known as Blitzkrieg.”⁷

The 1928 G-3 study called for a self-contained, highly mobile mechanized force capable of spearheading an attack and holding “distant key positions.” Regarding tactics and techniques, the study viewed the mechanized force reflecting more the cavalry’s spirit of mobility, rather than that of the arm of close combat, the infantry. The most controversial part of “A Mechanized Force” was the plan for a balanced combined arms force of light and medium tanks, self-propelled field artillery, mechanized infantry, engineers, air support, and a service detachment. This organization differed from the predominantly tank force assembled on the Salisbury Plain in England in 1927. The U.S. Army’s combatant arms at the time were the infantry, cavalry, artillery, signal corps, engineers, and air service — all autonomous and controlled by the their branch chiefs. “A Mechanized Force” was the first rational attempt to move the autonomy of the combatant chief of arms to a force structured upon a combined arms organization. General Parker’s directed study met approval from the secretary

of war, the G-1, the G-2, the G-4, and the chief of the war plans division. In addition, the branch chiefs concurred, except for the chief of infantry,⁸ MG Robert H. Allen, who was “heartily opposed” to setting up another branch with the tank as its focus. Instead, he recommended that tanks remain with the infantry, and that armored cars and self-propelled artillery remain with their respective arms.⁹ He based his opinion on the 1919 AEF Superior Board, which was convened to consider the lessons of the war and how they would affect tactics and organization of the combatant arms. The Board’s report noted that “tanks were accompanying weapons incapable of independent decisive action. There is no such thing as an independent tank attack.”¹⁰ Thus, the Superior Board established the tactical tone for the peacetime army. General John J. Pershing supported the Board’s recommendations during the 1919 Congressional hearings. Subsequently, the 1920 National Defense Act abolished the World War I Tank Corps and assigned all tanks to the infantry.¹¹

General Parker responded to the chief of infantry by noting that World War I tanks were used as auxiliaries to the infantry because they were slow, and that newer tanks allowed for a greater radius of action and greater mobility. This situation, he reasoned, “forces the consideration of [tanks] as a principal arm under certain circumstances, as well as auxiliaries of the infantry.” By continuing to acknowledge that the chief of infantry was better positioned to develop tanks, he concluded, tank development was tied to that branch and to the speed of the foot soldier.¹² Limiting tanks to the role of adjuncts of the infantry also obstructed creation of a more efficient organizational framework, a combined arms team, rather than a combatant arms policy, for the future Army.

Shortly after the G-3 study’s completion, the War Department directed that a board of officers from the various branches be appointed “to make recommendations for the development of a mechanized force within the Army and to study questions of defense against such forces.” One of the eleven officers detailed to the board was Major Chaffee, from the G-3 Troop Training Section. The board summarized its

results by endorsing a combined force, with tanks forming the backbone of the attack. The board also proposed that the infantry mechanize and that artillery be self-propelled to furnish mobile fire support. In addition, it suggested that the mechanized force act “as a tactical laboratory for the determination of the proper tactics involved in the action of fast tanks.” However, in an apparent compromise with the chief of infantry, the board recommended “that a new and separate branch should not be set up.”¹³

At this time, J. Walter Christie demonstrated his new, fast tank chassis, M-1940 so named because he believed it represented a ten year advancement in tank technology.

In September 1929, Chaffee delivered his famous lecture at the Army War College, entitled “The Status of the Mechanized Combat Organization and the Desired Trend in the Future.” The lecture was an elaboration on “A Mechanized Force.” He held that future offensive operations in modern war required a self-contained, highly mobile, mechanized corps with the ability to extend its striking power over great distances. For the first time, Chaffee discussed the impact of French and British experiments with mechanization. The French, who had adopted a defensive and passive orientation, viewed the tank as an adjunct to the infantry, while the British preferred to economize their manpower by equipping their army with movable armor, he told the audience.¹⁴ He added that the situation was different in the U.S., while the French and British were obligated allies under the Locarno agreements, “We have no ally who can be depended upon to furnish either the manpower or the armored mobility.”¹⁵ Chaffee understood and analyzed Fuller’s idea on a mechanized force, but questioned, as did Parker, its dependence on tanks, armored cars, motorized machine guns, artillery, and engineers at the expense of mechanized infantry or a balanced force.

The tactical principle of open warfare and the importance of fire and movement was critical to Chaffee’s thinking about developing a new doctrine. This traditional American doctrine was offensively oriented, the opposite of the position warfare that characterized

combat on the Western Front during World War I. To restore fire and movement, Parker agreed with Chaffee that a logical doctrine that would bring the Army into the future involved rapid and deep attacks by fast moving tanks, supported by a balanced combined arms team of mechanized infantry and self-propelled field artillery. This would provide an opportunity to move to an operational level of warfare, a theory of larger unit operations with a mechanized force capable of deep independent maneuver. But this could only become a reality if the combatant arms were willing to relinquish some of their autonomy.

Major Chaffee also assessed the intangibles of the officers serving in the British mechanized force, suggesting a similar profile for officers in our mechanized or armored force. They “must be imbued with the spirit of mobility, rapidity of action, and simplicity of control.” Furthermore, he explained: “They must be of a progressive, creative mind and not afraid of radical changes.” Apparently he was more impressed with psychological motivation than with British tank doctrine.¹⁶

One book that impressed Chaffee and an officer who later served under him, Major Robert W. Grow, was the award-winning study by George T. Denison, *A History of Cavalry* (1877). Grow recalled one impressive sentence: “A cavalry general should be possessed of a strong inventive genius, and be self-reliant to strike out a new line and adopt reforms where he sees them necessary.”¹⁷

Shortly before he left office in 1930, General Summerall had ordered the creation of a permanent mechanized force to be established at Fort Eustis. Because of the new Christie tank chassis’ speed, the G-1, BG Campbell King, visualized it as the basic maneuver weapon for this force.¹⁸ There was considerable interest in the General Staff in developing the Christie for deep offensive operations. The Christie system, with its long helical spring suspension, provided greater compression and extension amplitude for its large road wheels, which noticeably en-



MG Robert H. Allen, at left, and MG Stephen O. Fuqua, successive chiefs of infantry, opposed a new mechanized combat arm to be created from the horsed cavalry. Later, chiefs of cavalry also opted to hold onto their horses.

hanced the firing platform and speed of the vehicle, and had the potential of increasing the operational mobility of armored fighting vehicles. The chief of staff was so impressed with its possibilities that he ordered the Infantry Tank Board to test the Christie tank.¹⁹ The chiefs of infantry and cavalry also wanted to acquire the Christie for their respective branches. This competition over the Christie system altered tank development during the 1930s, because each arm had specific missions that were guarded with traditional reverence.

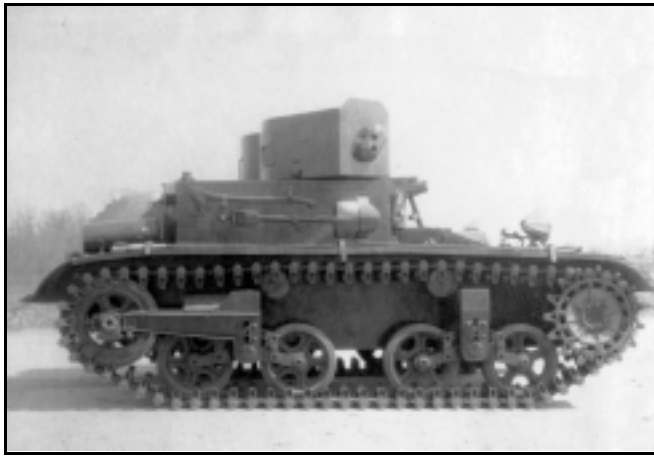
Meanwhile, the Red Army, through the Soviet Union’s purchasing agent in New York City, the Amtorg Corporation, contracted for two Christie tank chassis.

Though costs were a constraint in creating a suitable mechanized force, the main obstruction came from the chief of infantry, MG Stephen O. Fuqua, who had succeeded General Allen. The notion that the cavalry, because of its mobility, was more suitable for managing a mechanized force was rejected. “There is no such animal as ‘armored cavalry’ in these modern days. Remove the ‘horse’ and there is no cavalry,” was the comment. General Fuqua, in a highly charged memorandum to the deputy chief of staff, stated: “I am trying to lead infantry thought into the same doctrine of open warfare” that was adopted in France by General Pershing. Continuing, “the dehorning of these units [due to mechanization] will mean an irretrievable loss to the Cavalry.” General Fuqua believed fire and movement was the infantry’s phase of the attack, with tanks supplying close

combat support for the attacking foot soldier.²⁰ Thus, by the end of 1931, the American doctrine of open warfare conducted by fire and movement had created a conflict between the Army Staff in the War Department and the chief of infantry. The infantry believed open warfare could be restored by placing tanks with its attacking force, while the Army Staff concluded that it could be restored with a combined arms mechanized force.

At the time, the economic pressures of the Depression and a strong pacifist tendency in American politics affected military policy, activities, and technology. In addition, it imperiled doctrine and plans for a future ground war. Factors included the notion that World War I was “the war to end all wars,” the naval limitation treaties, the Kellogg-Briand Pact that outlawed war, a strong pacifist element in America, and the Great Depression. By the time General Douglas MacArthur became chief of staff, Congress and the President were trying to restore economic stability by balancing spending with revenue, so the funds required to modernize the Army were far from adequate. As a result, the Mechanized Force created at Fort Eustis was short-lived.²¹ General Summerall’s successor, General MacArthur, ordered its termination and directed all branches to adopt mechanization and motorization to their traditional roles. This action, though based upon budget restraints and the cost of fielding a mechanized force, kept the Army from developing a combined arms force for deep offensive operations. In addition, it deprived the Army from establishing an operational level of warfare. As a result, the combatant arms had retained their antiquated tactical orientation as World War II approached.

The army chief of staff’s decision to decentralize mechanization caused the branch chiefs, especially the infantry, to reinforce their traditional missions and combat tactics as outlined in the 1923 *Field Service Regulations: Operations*. The regulation reflected the French infantry-dominated *Instruction sur l’emploi tactique des grandes Unites* that



The T-5 Combat Car, 1934



The T-4 Combat Car, 1934

Lower cost, in-house design, and the cantankerous personality of inventor J. Walter Christie led the Army to adopt the T-5, an Ordnance design, over the superior Christie vehicle. The T-4 easily outclassed the Army's candidate in head-on-head tests.

defined combat missions within the separate arms. The French doctrine had been assimilated by the AEF during the war, and was echoed in the Superior Board report. Furthermore, the 1920 National Defense Act fixed branch autonomy, which dampened inventiveness during the interwar period. The 1923 *FSR*, which remained in effect until World War II, stated that combined employment of all arms was essential to success. However, the "coordinating principle which underlines the employment of the combined arms is that the mission of the infantry is the general mission of the entire force."²² So Chaffee could not politic for an all army mechanized force at the time, but had to settle for a decentralized effort to be determined by his branch chief. Consequently, his only road to furthering a mechanized doctrine was through his branch, cavalry.

Years later, then-BG Chaffee gave credit to General Summerall and Parker's G-3 Division for getting the Army thinking about mechanization.²³ The doctrine that emerged from the Army General Staff in 1928, embraced by Chaffee, broke from the 1923 *FSR* that gave primacy to the infantry over other branches. Instead, the General Staff perceived that future armies would be mechanized and organized on the combined arms idea, and positioned for deep offensive operations with the tank as the primary maneuver element. The propelling force behind this new doctrine was the traditional principle of open warfare, shaped by fire and movement. General Summerall's staff focused on this principle, rather than totally accepting the dogma of armored warfare advanced by England, and later

Germany. Colonel Daniel Van Voorhis, the commander of the permanent mechanized force assembled at Fort Eustis in October 1930 and later the commander of the mechanized cavalry at Fort Knox, added that the mechanized cavalry's characteristic of fire and movement was its strength. He also recalled German interest in developments at Fort Knox in 1933: "They were not particularly interested in our equipment....They were keenly interested in our views on the proper tactical and strategic employment of mechanized forces."²⁴ General Grow — then a major — recalled evenings with the German staff officers at the Doe Run Inn near Fort Knox. They said that the U.S. mechanized cavalry was ahead of them in tactical employment "of self-contained fighting units, but that they were ahead of us in the development of vehicular equipment."²⁵

While the mechanized cavalry at Fort Knox was developing an organization and tactics based upon their mechanical mounts, U.S. diplomats at the 1932 Geneva Disarmament Conference were proposing "the total abolition of tanks and all heavy mobile land artillery over 155mm in caliber."²⁶ General MacArthur had concurred. He was ready to give up tanks, because they were considered offensive weapons of war.²⁷

MacArthur's opinion undercut any mechanization policy, but another order, by the secretary of war in April 1933, further impeded conditions for establishing a balanced doctrine. This order, spurred by a desire to control costs, limited the weight of tanks and combat cars to 7.5-tons,²⁸ so it was evident the Army was being subjected not only to budget restraints, but facing

limitations on the type of vehicles it could develop. Finally, the drive toward mechanization was also hindered by a strong pacifist element in the United States that still believed America's geographical isolation would insulate it from the Japanese aggression then raging in Asia and the dangerous fascist regimes rising in Europe.

In spite of the mechanized cavalry's advanced thinking, branch tradition and budget pressures smothered the Army's ability to revitalize its doctrine to meet the demands of the future. An example was the main lesson drawn from the 1934 Fort Riley maneuvers, which demonstrated the conflict between tradition and modernity caused by General MacArthur's directive. The maneuvers were designed to determine how far the cavalry had progressed with mechanization, motorization, and new weapons development. The 1st Cavalry (Mechanized), commanded by Chaffee, demonstrated its ability to extend its "sphere of action" within the cavalry's prescribed mission. Generally his unit carried out all normal cavalry missions, such as "reconnaissance and counterreconnaissance, seizing and holding positions, flank cooperation, and delaying action."²⁹ Before the Fort Riley maneuvers, a new, convertible combat car, the CC T4, which was based upon the Christie helical suspension system, was tested at Fort Knox. The test committee recommended standardization of the vehicle, with certain modifications, a decision Chaffee supported because of the vehicle's operational mobility and speed. During the maneuvers, the Christie-type CC T4 outperformed an Ordnance-designed CC T5, which displayed an ominous profile and a less

sophisticated volute spring suspension system.³⁰ By the end of the year, the Army decided to acquire the CC T5 for the cavalry because of the high unit cost of the convertible CC T4 and the convenience of developing an Ordnance Department vehicle to be manufactured at Rock Island Arsenal.³¹ By that time, the stubborn Christie had so irritated the Ordnance Department officers that they refused to deal with him.³²

After extensively evaluating the Fort Riley maneuvers, the Cavalry School's Academic Division recommended further participation with both horsed and mechanized units.³³ The chief of cavalry, MG Leon B. Kromer, speaking later before the students at the Army War College, placated the horse soldiers by reiterating the Academic Division's recommendation.³⁴ General Grow later claimed the chief of cavalry "possibly could have made cavalry the mechanized arm, had he been supported by the General Staff and senior officers in his branch."³⁵

However, the Infantry Board observer at the maneuvers claimed the purpose of the exercise was to determine "first and foremost, whether or not mechanized cavalry could entirely replace horsed cavalry." The observer concluded that the mechanized cavalry's principal role was to supplement the mission of horse cavalry, and further noted that "independent mission will only occasionally be assigned."³⁶ This proved to be an unimaginative assessment of the future potential of mechanized operations.

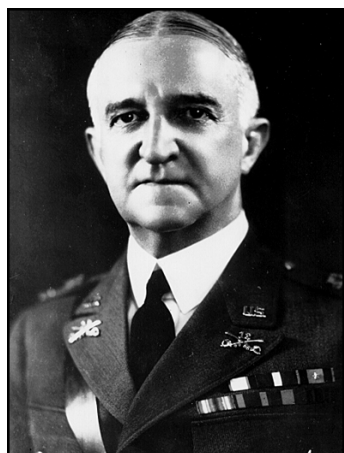


The Ordnance-designed Combat Car T5 was selected over the Christie design.

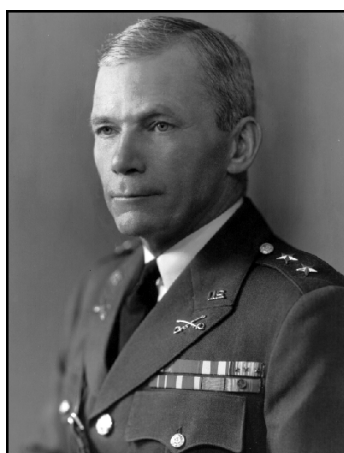
In effect, the 1934 maneuvers determined that combat cars, the cavalry's tanks, be harnessed to the horse units as the tank was anchored to the foot soldier. These developments fell in line with the 1923 *FSR* and further stifled the Army's effort in developing a new doctrine of deep offensive operations driven by a combined arms team. Nevertheless, the events at Fort Riley that spring convinced the Fort Knox contingent that a self-contained unit, with new equipment and organized as a mechanized division, could carry out the cavalry's role and fight independently. When the mechanized cavalry returned to Fort Knox, two mechanized field artillery firing batteries were added to the force. Years later, an attempt was made to establish a mechanized division. During 1936 and 1937, the Command and General Staff School published an instructional text

for the purpose of tactically employing a mechanized division and its table of organization. It stated such a force be all arms and self-contained capable of deep independent operations with the ability to exploit and consolidate advantages gained. To assist in its mobility, the text supported the use of aviation for control, reconnaissance, and tactical support. However BG Walter Krueger, chief of the War Plans Division, opposed efforts to establish a mechanized division because "it was too big and too much of a fighting unit."³⁷

Meanwhile, in the Soviet Union, the Red Army had developed the Christie system into the BT (*Bystrokhodnii Tahk*/fast tank) series, the backbone of its plans for deep offensive operations and a modern operational level of warfare. By 1935, the Red Army had es-



Colonel Daniel Van Voorhis, the commander of the permanent mechanized force assembled at Fort Eustis.



MG Leon B. Kromer, chief of cavalry, opted to keep both horse and mechanized units.



MacArthur's directive was for each branch to experiment with mechanization. Above, a dual-tandem-wheeled crane truck with tracked tires lifts a Signal Corps cable-laying car.



Following the Spanish Civil War, General Malin Craig, the Army Chief of Staff, believed tanks would be too vulnerable to antitank guns.



The chief of infantry, MG George A. Lynch, also believed that the use of tanks had been largely discredited in the Spanish Civil War.



MG John K. Herr, chief of cavalry in the late 1930s, favored keeping horse units. Ultimately, mechanization passed him by.

established an equilibrium between doctrine, mechanization, and an operational level with a combined arms force.³⁸ This allowed the Red Army to demonstrate the importance of operational art. The Soviet milieu was more receptive to arms development because, in Stalin's warfare state, the military budget was not controlled by elected officials and their constituents. In contrast, the U.S. Army — stressed by the reform liberalism of the New Deal, budgetary limitations, four Neutrality Acts, and an unimaginative tank policy — was unable to bring about a similar equilibrium, which could have established an operational level of warfare. The Army during the 1930s failed to implement the doctrine of deep offensive operations imagined in 1928 by the Army Staff and then elaborated by Chaffee in 1929, because it was driven by a flawed organization preserved by the 1923 *FSR*, which entrenched branch conservatism and decentralization. By deferring to the traditional autonomy of the infantry branch chief, the Army failed in any attempt to develop a doctrine of deep offensive operations with an armor-mechanized force.

The Spanish Civil War era (1936-1939) further reinforced the parochial attitude of the Army, especially that of the chief of staff, General Malin Craig, and the ground combatant arm branches. General Craig noted that a balanced army operating in any theater of operations could never “dispense with a proper proportion of mounted cavalry and horse-drawn artillery.”³⁹ The chief of field artillery added that, despite tremendous improvements in mechanization and transportation, “horse-drawn is a little better than mo-

tor-drawn” artillery.⁴⁰ On tank development, the chief of staff had recommended “a type suitable for close support of [the] infantry.”⁴¹ The chief of staff summarized his feelings before a congressional subcommittee hearing on military affairs. He believed future military operations “must be carried out by the traditional arms; that well-trained infantry and artillery form the bulk of armies. Air and mechanized troops are valuable auxiliaries.” Regarding military operations in Spain, he observed that tanks were not successful due to antitank weapons, insufficient armor, and mechanical defects, tactical errors in their employment especially *en masse*, and inadequate support from artillery and tactical aviation.⁴² One of the officers influencing General Craig and the Army General Staff was the former chief of infantry, General Fuqua, who was the U.S. military attaché in Spain during that country's civil war. It was his opinion, and the opinions of his peers in England and France, that tanks did not prove themselves in separate offensive operations because they were effectively challenged by antitank guns. They concluded their only value was in support of the attacking infantry.⁴³

In April 1938, the War Department issued an important but reactive policy governing mechanization and its tactical employment. It noted that operations abroad — as in Spain — had demonstrated that “combatant arms will fight in their traditional roles.” Mechanized cavalry, in turn, adhered to its traditional mission in exploiting success.⁴⁴ The chief of infantry, MG George A. Lynch, ordained a board of officers to rewrite the Army's tank manual, taking into consideration that

the accepted use of tanks had been largely discredited.⁴⁵ *Army Ordnance* noted that “independent tank forces are delusion,” and suggested they be heavily armored and function as mobile supporting artillery or as accompanying artillery for the attacking infantry.⁴⁶ However, the Spanish Civil War provided many misguided observations: tanks on both sides were not tactically or strategically employed *en masse*; most models were deficient in armor protection; their handling was usually inadequate for a country that favored the defense.

Even before the German invasion of Poland in September 1939, the chief of cavalry, MG John K. Herr, made known his preference for the horse. The chief of infantry made no secret that his first love was for the foot soldier. Later — before the Armored Force was created — he vetoed a proposal to convert foot troops to tank units.⁴⁷ The chief of cavalry, who had initially supported the establishment of a mechanized cavalry division, changed his mind and refused to mechanize his horse units. Grow, who served in the Office of the Chief of Cavalry during General Herr's tour, claimed he “lost it all.”⁴⁸ Shortly after the German blitzkrieg consumed Poland, Herr, whose only commitment to mechanization was its use with the horse cavalry, told the attendees at the War College it was obvious “that the machine cannot eliminate the horse.”⁴⁹ Ultimately, mechanization slipped away from Herr; Chaffee and the forces at Fort Knox finally prevailed when the Armored Force was created. This, according to Grow, was not because a new combatant arm was necessary, but because General Herr and the cavalry did not

grasp the role of mechanization in the next war.⁵⁰

When the G-3, MG Frank M. Andrews, recommended to the chief of staff, General George C. Marshall, in November 1940 that the Armored Force created in June be legally established as a separate combatant arm, it was strongly opposed by Generals Lynch and Herr. The chief of infantry claimed “the Armored Force had only asked for a field force headquarters, not a separate arm; that the infantry and tank battalions under the Armored Force were suffering from a lack of combined arms training.” He requested that his units be returned to infantry control.⁵¹ The chief of cavalry claimed the G-3’s recommendation was a “petty effort,” arguing that “the Armored Force had been violating the terms of the National Defense Act of 1920 in creating non-infantry and non-cavalry armored units.” He reasoned that the attainments of the Armored Force “could have been accomplished equally well” in the established branches.⁵² Years later, after the war, a bitter General Herr still lamented the loss of his horse soldiers.⁵³ It was evident the self-serving autonomy of the combatant arms branch chief organization fueled a regression in military thinking. The chiefs of infantry and cavalry could not grasp the difference between traditionalism and modernity, and the role an independent combined arms mechanized force played in deep offensive operations.

The most detrimental position regarding the formulation of a cohesive doctrine guiding the Army on how it could fight its next war was the traditional combatant arms view, mainly articulated by the infantry. General MacArthur’s policy of decentralizing mechanization had intensified the autonomy of the combatant arm branches, which reinforced their concentric tactical orientation. This action, along with budget restraints, retarded any attempt to establish a unified tank program. It also deprived the Army of gaining experience in skillfully coordinating a mechanized combined arms force at the operational level. Chaffee blamed this on costs, pacifist tendencies, differences of opinion, and especially, a lack of branch chief awareness. He also agreed that — as in England — the United States “failed to evaluate properly the importance of combined arms in armored units.”⁵⁴ After General Summerall left office, the General Staff was



LTG Lesley J. McNair, who had once questioned the cost of funding an armored force, instead prescribed a tank destroyer force, established as a separate branch.



Established as a separate branch in 1940, the new Armored Force practiced combined arms operations as it rushed to prepare for war. Here, 1st Armored Division troops maneuver in Louisiana in September 1941 in the already-obsolete M2 medium tank.

driven by the austerity of the Depression, maintaining a conservative attitude toward doctrine, organization, training, and research. This in turn was reinforced by the autonomy of the combatant arm branches. The Army’s mission was fitted to an antiquated organization controlled by the self-directed of the branch chiefs and a General Staff prone to parochialism.

During the 1930s, the U.S. Army also looked at military innovations in other countries, especially in Germany and the Soviet Union, but still adhered to its linear tactical doctrine of fire and maneuver whose management was controlled by the infantry. This self-directed attitude among the combatant arms precluded any effort to establish the viable combined arms force necessary to bring the Army into the next decade. The Army’s elite were unable to identify the relationship between strategy and tactics and an operational level of warfare. Because of their fixation on the traditional combatant branch concept and the desire to defend their institutions, the chiefs became inflexible to significant ideas that could have moved the Army to change. Their military perception on how the Army was to fight the impending war became archaic. Thus, the conservative action of the branch chiefs and their organizations was inappropriate for preparing the United States for war. Even after the United States entered the war, they refused to rescind their autonomy until it was abolished in March 1942.

Conclusion

To summarize, the chief of infantry — as ordained by the 1923 *FSR* —

controlled the tactical level of engagement that was designed to force the linear battle of annihilation with fire and maneuver. This tactical dominance kept the mechanized cavalry from developing a large force capable of dislocating the enemy’s psychological and physical equilibrium through deep battle. Only a few farsighted officers recommended an emphasis on an operational level, beyond the realm of tactics, with a large combined arms force capable of deep operations. This would have been possible only if the combatant arms were willing to relinquish some of their autonomy to create a large, modern, mechanized maneuver force. But this was impossible due to the traditional autonomy of branch chief organization. Furthermore, this organization prevented the establishment of an equilibrium between doctrine and tank technology, a necessary factor to achieve an operational level. Added to this was a lack of a national interest in military affairs that financially affected the Army, depriving it of the means necessary to prepare for and fight the next war.

During World War II, the tactically oriented army fought with infantry and armored divisions. The infantry retained separate tank battalions to assist in their attack. The armored divisions fought with a combined arms team, with the tank as the main maneuver element. Pursuit and exploitation in the tradition of the cavalry were their primary role. For antitank action, the Army Ground Forces commander, LTG Lesley J. McNair, who had once questioned the cost of funding an armored force, prescribed a tank destroyer force as a separate branch, but this concept

soon proved invalid.⁵⁵ Supported by the productivity of American industry and an abundance of weapons and manpower, the Army was able to meet the challenges of World War II. Though successful in defeating the German forces in Western Europe, it is questionable whether the Army's organizational arrangement would have been suitable for the tank-versus-tank environment that existed on the Eastern Front. There, the major engagements were initially driven by the *Wehrmacht's* blitzkrieg and then by the Red Army's reintroduction of deep offensive operations and battle with tanks *en masse* providing the maneuver element for the combined arms mechanized force. The critical vehicle for executing deep offensive operations and the Red Army's version of an operational level of warfare was the medium tank, T34, which, through continued product improvement, was the final development of the Christie BT. Recall that in 1930, before General Summerall left office, the general staff, especially the G-1, General King, was suggesting the fast Christie for deep offensive operations as outlined in the G-3's "A Mechanized Force."

In the early 1980s, U.S. armed forces adopted the nonlinear AirLand Battle doctrine that depended on speed and depth, a concept worked out by a Vietnam-era generation of officers, led by General Donn Starry. The Abrams and Bradley weapons systems were critical to this doctrine. With the publication of the 1986 edition of *FM 100-5: Opera-*



General George C. Marshall ordered the creation of the Armored Force despite the opposition of the chiefs of infantry and cavalry. He is seen here in his postwar role as Secretary of Defense.

tions, a stress on operational art began to emerge, calling for the capability of conducting an operational level of warfare. This was finally demonstrated with the remarkable success of LTG Frederick Franks' VII Corps, and its long left hook during Desert Storm. Thus, the realization of a mechanized operational level conceived by Chaffee and the Army general staff in 1928, was finally achieved in 1991. This delay was caused, in part, by the Army's elite. It was their failure during the interwar period to establish a prerequisite for operational art, an operational level of warfare with a combined arms mechanized force.

The interwar period offers an interesting paradigm today, as the Army thinks

about its future. Budget restraints and force reduction have always been a challenge, but this should not affect the revision of doctrine and warfighting concepts as long as inspiration, innovation, and intellectual growth are not hampered by service conservatism. History feeds the imagination; more awareness of it would be appropriate in a technologically driven Army. Unfortunately, the same kind of interwar branch parochialism still exists. If the Army is to embrace change with a mixed organization and a modular force, then it needs to go beyond the traditional service arms. One movement in the direction of change would be the creation of a combined arms officer designation for the Mounted Force rather than the traditional infantry, armor, and field artillery option. The success of Full Dimensional Operations and modernization objectives will depend on identifying the vulnerabilities and deficiencies of the past and present, and then making adjustments and corrections as the Army moves to information-age technology and Force XXI.

Notes

¹J.F.C. Fuller, "Tactics and Mechanization," *Infantry Journal* (May 1927), pp. 457-65.

²Dr. James J. Schneider sees the first discriminators of an operational level as a prerequisite for operational art during the Civil War. See Schneider, "Theoretical Implications of Operational Art" in Clayton R. Newell and Michael D. Krause, eds., *On Operational Art* (Washington: GPO, 1994), and "The Loose Marble—and the Origins of Operational Art," *Parameters* (March 1989).

³Board of Officers, Report on Tanks, "Tanks Types to be used by AEF," Appendix 6, Fuller, "The Tactical Employment of Tanks in 1918," 8 August 1917, G-3 Report, AEF-GHQ, Tank Corps Folder No. 1, Records of the American Expeditionary Forces (World War I), 1917-23, Record Group 120, National Archives (NA), p. 13. (Hereinafter cited by RG 120)

⁴Letter, Summerall to BG Samuel D. Rockenbach, Chief of Tank Corps, AEF France, 13 January 1919, "Tanks," File No. 42-1, United States Army Military History Institute (USAMHI), p. 1; "Summerall Paints War of the Future: It will conserve soldiers and use planes and tanks in attack," *New York Times*, 2 September 1927, p. 18; and R.H. Allen, "A Resume of Tank Development in the United States Army," Lecture, Army War College, 27 October 1927, USAMHI, pp. 1-2.



General Donn Starry, who developed the AirLand Battle concept, an approach to an operational level of war.



Then-LTG Frederick Franks, who led VII Corps during Desert Storm, demonstrated a new U.S. approach to operational art.

Continued on Page 51

A Sheridan Memoir: The Early Days

by Lieutenant Colonel Burton S. Boudinot (Retired)

"Good-Bye, Sheridan"

These were the headlines on the 23 September 1996, *Army Times*. The Sheridan may be gone from combat units, but its chassis will be around at the National Training Center for many more years.

Considering that the M551 was a vehicle and weapons system nobody wanted, it has spent more than 27 years in the Army inventory. For a combat vehicle, that places it among the immortals. Like General Sheridan himself, who was reported killed at least five times during the Civil War, the M551 was dropped from the inventory at least as many times, yet survived each cut. It served a three-year combat tour in Vietnam, and was employed by U.S. Cavalry units in Germany and Korea for nine years.

When I showed an old Army buddy a local paper, which included a photo of Sheridans being pushed off a barge into a bay off the Virginia coast to become marine life habitats, he said, "They belong with the fish." There seemed to be a love/hate relationship between the soldier and the M551 from Day One.

In 1960, while I was attending the Armor Advanced Course at Fort Knox, Kentucky, my class was shown a concept called the Armored Reconnaissance Airborne Assault Vehicle. We were told it was not a light tank, but something the airborne wanted to protect their troops from enemy tanks. It was to have a powerful missile/gun weapons systems that could meet numerous threats. It would float and could be parachuted or LAPESed. We were told Armor Branch was in doubt about this *thing* for the cavalry, so we forgot about it.

Well, time passes. In 1967, as a young LTC with the Combat Developments Command - Armor Agency, I found I was getting very involved with development of the Shillelagh missile and the 152mm M409 multipurpose round. Both of these were fired down the same tube on the XM551 which, by the way, looked very much like an Armored Reconnaissance Airborne Assault Vehicle. I wondered what Armor was going to do with this system... why were we testing it? That is a long story.

Earlier, we had taken the best light tank in the world, the M41, out of the inventory.

We all knew light tanks had not been a favorite in the U.S. Army since the M41 was pulled out of cavalry units in Germany in 1959. A friend in a high position on the Army staff told me that Armor was never going to buy the M551. It was too controversial and complicated. Then, at a "Combat Vehicle Review" held in Cleveland, Ohio in about 1965 or 1966, we learned the M551 was to be type-classified and enter the inventory as the "Sheridan." One general asked why we were putting light tanks back into armored cavalry units. Another general said it was not a light tank, but a long-range weapons system to counter the Soviet tank threat in Europe. Another general said the Army only names its tanks after famous generals. This started the frequently repeated question: "The 551 Sheridan, what is it?" The Armor and Engineer Board at Fort Knox was not satisfied with the progress of the Sheridan, and reported the M551 was not ready for issue to the troops.

By July 1968, times changed again. I found myself assigned to MACV J3 in Saigon. I had not even signed in when a colonel came to my hotel room to ask if I knew anything about the M551. When I told him "yes," the colonel was ecstatic. He said the theater commander, General Creighton Abrams, was familiar with the Sheridan, but nobody else was. The general wanted to know why the M551 should not come to Vietnam. He knew there were 1,500 of them parked on a ramp in Cleveland, Ohio. He also thought the M409 round would make a great bunker buster. The next morning, I explained to the J3 that the Armor and Engineer Board did not think the M551 was ready for issue. He ordered me to do a study and have recommendations in one month. In a few days, I asked the Armor School Sheridan project officer, the A&E Board M551 test officer, and the commanding officer of the 73rd Tank Battalion at Fort Bragg, North Carolina, where the M551 was in operational field test, to be brought to Vietnam. The three LTCs arrived in about a week. After a few days of studying the proposal, we told the J3 we thought the M551 was not well-suited for Vietnam.

Well, said the J3, think again. General Abrams wanted to know if the M551 would



More than 300 Sheridans were destroyed or damaged in Vietnam, mostly by mines and rocket-propelled grenades.

be of any use at all in Vietnam. My colleagues thanked me for their free trip to Vietnam and returned home. I then briefed Abrams, with these recommendations: The Shillelagh missile and its guidance control system should stay at home, and only 27 vehicles should be brought into country, all with added armor enhancement, especially belly armor.

General Abrams said, "Let's do it."

In early January 1969, the first Sheridans and their new equipment training teams arrived in Vietnam. The reception by the 11th Armored Cavalry was cool. Then, on January 29, two Sheridans were on picket duty along the Long Binh highway. At about 0230, the crewmen were alerted of movement to their front. The Sheridan searchlights were turned on, and enemy troops were sighted crossing a dirt road. Two 152mm rounds were fired, each sending hundreds of small, arrow-like flechettes down range. At daylight, 125 bodies were found, along with dozens of blood trails.

In short order, the M409 round was soon blowing dirt, pieces of bamboo, and the enemy thirty to forty feet into the air. The M409 was a very effective bunker buster. With all of its shortcomings, the M551 had gone to war.

During the next three years, over five hundred Sheridans were issued in Vietnam. During that period, over three hundred were damaged or destroyed by mines and RPGs, mostly by mines. Personnel casualties were high. A wounded crewman once told me that the Sheridan was the "devil's chariot." Under Vietnam conditions, it is hard to measure the effectiveness of a system that was designed to fire a missile at long range. Close-in combat was not the Sheridan's strong point. But even its greatest critics had to admire its reliable suspension and power train. Its longevity is probably a result of the Sheridan's chassis.

In 1978, the M551 was retired from active duty TO&E units, except for the 73rd Tank Battalion of the 82nd Airborne Division. What was to be done with the rest? That did not take long to figure out. The National Training Center needed realistic-looking Soviet vehicles, and these were adopted on the M551's chassis. T-72 and BMP VIS-



MODs were created with fiberglass molded overlays.

The Research & Development people also tried putting different gun and missile systems on the Sheridans over the years, and the M551 chassis was also used in many experimental field tests of other developmental items. Everyone seems to have had ideas on what to do with the M551's great chassis.

Most of us probably have no idea of all the places the Sheridan has traveled with the 73rd Tank Battalion. We do know it went to Panama, Haiti, Desert Shield, and Desert Storm.

Eventually the Sheridan will go away. Many more may become homes for marine life, but that is not all bad either. Then we can really say, "Good-bye, Sheridan."

Author's Note: For those who are interested in much greater detail on the development of the Sheridan, R.J. Hunnicutt includes a very thorough and comprehensive account in his book, *Sheridan, A History of the American Light Tank, Vol. 2*.

Lieutenant Colonel Burton S. Boudinot, a veteran of Vietnam and Korea and a former chief of testing at the Armor-Engineer Board, also served as the 31st editor of *ARMOR*. He is retired and living in Radcliff, Kentucky.

Above, a very early prototype Sheridan launches a Shillelagh missile in tests during the 1960s. The Sheridan shared the Shillelagh missile system with the M60A3 MBT, but when it was sent to Vietnam, no need was seen for the missile.



At right, a C-130 delivers a Sheridan using low-altitude parachute extraction. The vehicle's airmobility, and the need for a rapidly-deployable fire support vehicle for airborne troops, kept the Sheridan in Army service for a remarkably long time.



One experimental attempt to extend the Sheridan's life was this 105-mm low-recoil turret developed by Cadillac Gage.

Too Late the XM8: Alternatives to The Armored Gun System

by Stanley C. Crist



United Defense L.P.

The XM-8 Armored Gun System: It's gone. Now what?

The cancellation in early 1996 of the XM8 Armored Gun System program deprives the 82nd Airborne Division of a state-of-the-art bunker buster/tank killer. Although this action was a disappointment to many in the armor community, the decision to terminate the XM8 was probably justifiable and rational; the AGS was more sophisticated and expensive (the XM8 costs roughly as much as an M1A1 main battle tank!) than necessary for the mundane task of destroying bunkers and buildings, but was considered by many to be too lightly armored for tank-versus-tank duels.

Where does that leave the paratroopers of the 82nd when they have an exceptionally hard target to neutralize? Currently, they can call on the M551A1 Sheridans of 3/73rd Armor for direct-fire support, but there is reportedly no funding to keep the Sheridans in service beyond September, 1997. The realities of modern warfare dictate a continuing requirement for a large-caliber, direct-fire weapon system

to operate with parachute infantry forces, but the realities of the constrained defense budgets anticipated for the near future apparently rule out the acquisition of a new design like the XM8.

In order to be affordable, it would seem that any alternative to the AGS will have to be an adaptation of equipment that is already in the system. Indeed, this is how the XM8 should have originally been designed, instead of as a completely new, non-standard item unique to one or two units. If airborne forces are to operate an armored vehicle, it should be — ideally — standard issue to the rest of the Army, although modifications to create an airborne-specific variant of the standard combat vehicle would be acceptable. Some AGS alternatives that can be easily implemented are:

- Deactivate 3/73 Armor, leaving 82nd Airborne with no direct-fire support.
- Deactivate 3/73 Armor; attach M1A1 tanks to 82nd Airborne.
- Keep 3/73 Armor; keep (and possibly upgrade) the M551A1.
- Keep 3/73 Armor; replace the M551A1 with the HMMWV.
- Keep 3/73 Armor; replace the M551A1 with the M113A3.
- Keep 3/73 Armor; replace the M551A1 with the M3A2.

Analysis

Option 1. No direct-fire support.

Although this alternative generates substantial cost savings, it does so by preventing the 82nd Airborne from

conducting combined arms operations, except in conjunction with follow-on forces. The resulting negative impact on overall combat effectiveness makes this option less than desirable.

M1A1 Main Battle Tank

- Airdrop Capability:** None
- Armor Protection:** 125mm APFSDS, HEAT
- Primary Armament:** 120mm cannon
- Effective Range:** 3000+ meters
- Number of Rounds:** 40
- Fuel Capacity/Cruising Range:** 505 gallons/289 miles

Option 2. The M1A1 MBT

This would provide the paratroopers with support by the most lethal, survivable "armored gun system" in the world. Unfortunately, since the *Abrams* cannot be parachuted into the drop zone, an airhead would have to be seized and secured to allow C-17 or C-5 transports to bring them in. This means the airborne infantrymen would not have tank support when it might be most needed — *during* the initial attack.

Also of consequence is the voracious appetite of the *Abrams*' turbine engine. The enormous fuel consumption rate — *twenty times as great* as the HMMWV — makes this tank much less than ideal for airborne operations, where the quantity of fuel available for resupply efforts is necessarily limited.

XM8 Armored Gun System

Airdrop Capability: C-130, C-141, C-5, C-17

Armor Protection: Basic: 7.62mm, Bolt-on: 14.5mm, 30mm, RPG

Primary Armament: 105mm cannon

Effective Range: 3000+ meters

Number of Rounds: 21 in autoloader, plus 9 in hull stowage

Fuel Capacity/Cruising Range: 150 gallons/300 miles



The HMMWV, shown here with TOW launcher. Would a 106mm recoilless rifle be a better armament system?

Option 3: The M551 Sheridan

Currently in service with 3/73rd Armor, the M551A1 Sheridans are all about 30 years old and, reportedly, require excessive amounts of maintenance to stay in operation. Like all armored vehicles developed in the 1960s, it is a low-survivability design, with no separation between the crew compartment and ammunition stowage. Like the XM8, the M551A1 is a non-standard weapon system, on active service (for combat duty) only with the 82nd Airborne Division.

M551A1 Sheridan

Airdrop Capability: C-130, C-141, C-5, C-17

Armor Protection: Basic: 7.62mm, Bolt-on: None

Primary Armament: 152mm gun/launcher

Effective Range: HEAT: 1800 meters
ATGM: 3000 meters

Number of Rounds: 29

Fuel Capacity/Cruising Range: 160 gallons/370 miles

On the plus side, there are still sufficient numbers of Sheridans stored at Anniston Army Depot to make up for

any vehicles destroyed in training mishaps or combat actions. Also, the destructive power of the high explosive round is second only to that of the 155mm howitzer, enabling Sheridan gunners to make short work of enemy-occupied bunkers and buildings.

Option 4: The HMMWV

In the breakthrough to Task Force Ranger during 3-4 October 1993, 40mm MK19 grenade machine guns — mounted on HMMWVs — were used by 10th Mountain Division soldiers to provide direct fire support during the movement through Mogadishu's streets.³ The minimal capabilities of the 40mm HEDP round seem unlikely to overcome a well-fortified bunker — let alone the steel hide of any but the lightest of armored vehicles — but the effects on the buildings in Somalia were claimed to be quite devastating. Combining the MK19 with the vastly increased protection of the M1109 up-armored HMMWV would improve the survivability of this combination as a direct-fire support vehicle, but the small amount of explosive in the 40mm projectile seriously limits its usefulness against well-trained and well-prepared foes.

A low budget platform that *can* demolish bunkers and buildings could be assembled from surplus M40A2 106mm recoilless rifles, by mounting them on open-top M998 cargo HMMWVs.⁴ As there is still a number of these weapons — as well as a large quantity of 106mm ammunition — in storage, it would enable a potent bunker-busting capability to be provided to the paratroopers for little more than the cost of the weapon mounts. The existing HEAT round is able to defeat most of the armored vehicles on any likely battlefield; if greater lethality is desired, the Swedish 3A-HEAT-T ammo can penetrate nearly twice as much steel armor, even when fronted by explosive reactive armor.⁵ There are, however, at least two significant disadvantages to affixing the 106mm recoilless rifle on the M998, complete lack of armor protection for the vehicle crew and a rather meager quantity of stowed ammunition. A possible solution is to use the M1109 or XM1114 up-armored HMMWV and develop a mount for the 84mm M3 RAAWS (Ranger Antiarmor, Antipersonnel Weapon System).⁶

HMMWV: M998 & M1109

Airdrop Capability: C-130, C-141, C-5, C-17

Armor Protection: M998: None
M1109: 7.62mm

Primary Armament: M998: 106mm recoilless rifle; M1109: 84mm RAAWS

Effective Range¹: M998/106mm: 1700 meters; M1109/84mm: 800 meters

Number of Rounds: M998/106mm: 6
M1109/84mm: 24²

Fuel Capacity/Cruising Range: 25 gallons/300 miles

The 84mm HEDP round does not have the same destruction potential or effective range as the 106mm HEP round, but it is still quite potent *and* requires only half as much stowage space.

There is a useful variety of 84mm ammunition, too, including HE (with airburst fuzing), illumination, smoke, and two different types of HEAT rounds.

Should it be necessary to do so, the RAAWS (also known as the Carl Gustav) is light enough for easy dismounted operation — a characteristic



The RAAWS: Potent and compact...

that could come in handy in a number of plausible scenarios.

The HMMWV, however, has no more than bare minimum capabilities in close combat. Mobility is inferior to tracked vehicles,¹⁰ as is armor protection and load-carrying capacity.



The M113-106mm RCLR solution: Unbalanced weight was a problem.

Option 5: The M113A3 APC

There is only one tracked combat vehicle currently in the Army inventory that meets the AGS requirements for both air transportability and armor protection: the venerable M113 APC.

Although the basic M113 design is even older than the M551, the first of the A3 versions entered production in 1987; the initial 1,600 M113A3s are all less than ten years old, so they are able to serve for quite some time.¹¹ Crew survivability and tactical mobility have been greatly improved,¹² compared to earlier models, and the versatility of the design remains unmatched by newer, more complex infantry vehicles. 3/73rd Armor presently operates two M113A3s — one as a battalion command post, one for the maintenance section — so the logistical and operational base is already in place for this vehicle.

During the Vietnam war, one route to increasing the combat power of the M113 was to attach an M40A2 106mm recoilless rifle to the right of the cargo hatch, bolting the weapon to the right rear antenna mount. This configuration is currently undergoing trials for antiarmor use by the Australian Army, after prolonged dissatisfaction with the mobility of M40A2-equipped Land Rovers.¹³ The same concept could provide a parachute-deliverable, fire support vehicle at virtually *zero* cost. The 106mm HEP round has nearly the same target effect as the 105mm HEP ammo fired by the XM8, which should make it a fairly capable bunker-buster. The addition of an AN/PSG-501 CLASS laser sight, with its full-solution fire control characteristics, extends the maximum effective range well beyond

what was once considered possible for recoilless rifles.¹⁴

As might be expected, this idea has drawbacks, too. The rate of fire of the APC-mounted recoilless rifle is no better than that achieved by the Sheridan — two to four rounds per minute, depending on the strength and skill of the loader. Also, weapon traverse is extremely limited with the side mounting; a better — but slightly more costly (in both development time and money) — method

M113A3 APC

Airdrop Capability: C-130, C-141, C-5, C-17

Armor Protection: Basic: 7.62mm
Bolt-on: 14.5mm, 30mm, RPG

Primary Armament: 106mm recoilless rifle or 84mm RAAWS

Effective Range⁷: 106mm: 1700 meters;
84mm: 800 meters

Number of Rounds: 106mm: 26⁸;
84mm: 100⁹

Fuel Capacity/Cruising Range: 95 gallons/300 miles

would be to develop a centerline mounting for a modified M125 mortar carrier, similar to the configuration of the Australian *Milan* ATGM carrier.

Another possible problem with the side-mounted M40A2 was pointed out by Major Hal Spurgeon, who — as a young soldier in the headquarters scout section of 2/47th Mech Infantry in early 1970 — had personal experience with the M113/recoilless rifle combination. According to Major Spurgeon, the right track of the “one-oh-six” APC regularly became stuck in muddy terrain that posed no obstacle to other M113s.¹⁵ This was attributed to the unbalanced loading (all of the ammunition — as well as the weapon — was stowed on the right side of the vehicle) of the recoilless rifle carrier. It would be interesting to learn if the Australian

Army is experiencing this problem with their trials versions, too, or if the difficulty was unique to the one particular Vietnam-era APC.

Option 5: The Bradley M3A2 CFV

With the planned acquisition by the Air Force of significant numbers of the C-17 transport, it becomes feasible to plan for parachute delivery of Bradley fighting vehicles. As the M3A2 version is, in essence, a light tank, it has some potential for employment in the AGS role. While the 25mm cannon is only marginally effective in defeating bunkers and fortifications, it is fairly capable at the task of knocking out light armored vehicles and older model tanks;¹⁶ newer main battle tanks can be engaged with TOW missiles.

Basic armor protection of the M3A2 is actually superior to that of the XM8, and add-on tiles can be attached for protection against hand-held HEAT weapons like the RPG. The vehicle commander and gunner — since they operate inside a fully-enclosed turret — have better survivability than the exposed gunners of HMMWVs and APCs.

A definite logistical advantage would result from having 100% parts commonality with the Bradleys of follow-on forces. One disadvantage, however, is the rather high fuel consumption rate, which is exceeded only by that of the Abrams. The other major drawback is the inability to be airdropped by any transport aircraft other than the C-17 Globemaster III, limiting the options for delivery during airborne missions.

One possible solution would be to develop an armored gun system variant

M3A3 CFV

Airdrop Capability: C-17 only

Armor Protection: Basic: 30mm
Bolt-on: RPG

Primary Armament: 25mm cannon and TOW ATGM

Effective Range: 25mm: 3000 meters;
TOW: 3750 meters

Number of Rounds: 25mm: 1500;
TOW: 12

Fuel Capacity and Cruising Range:
175 gallons/250 miles



United Defense L.P.

The up-armored M113A3: A viable choice, perhaps the only choice...

of the M3A2, incorporating a low-profile turret mounting a recoilless rifle (for engaging bunkers, buildings, personnel and light armor) and an ATGM (for engaging main battle tanks). If considered worth the increase in complexity, a dual or quad recoilless rifle mount — similar to what was used on the old M50 Ontos antitank vehicle — could be developed to provide a rapid-fire capability; this would overcome one of the objections to the use of recoilless rifles.

Another frequently-voiced criticism of this type of weapon centers on the prominent firing signature. Potentially, this could cause a problem when fired from an unarmored HMMWV, as the occupants would be vulnerable to return fire from enemy rifles and machine guns, but it seems like a non-issue if the weapon is mounted on an armored vehicle.

There is no appreciable difference between the firing signatures of a 106mm recoilless rifle and a 105mm tank gun — if one is visible to the enemy, so will be the other. Survival then becomes more a question of armor protection.

To improve strategic mobility, utilizing the XM8 bolt-on armor concept would allow the width of the Bradley-AGS to be reduced enough to enable it to fit in the cargo hold of the C-141. A properly designed low-profile turret ought to reduce the height enough to permit parachute drop from both the C-141 and C-5, in addition to the C-17, thereby greatly increasing the number of delivery aircraft.

Conclusion

It is unfortunate that the XM8 was cancelled. Even though it was a non-standard weapon system, it had enormous potential to expand the warfighting capabilities of airborne forces. If the AGS program is not to be revived in the foreseeable future, and if the Sheridans truly are to be withdrawn from combat duty by the end of 1997, the alternatives are few.

The M1A1 Abrams would seem to be a non-starter, due to its incompatibility with the parachute delivery requirement. The standard Bradley fighting vehicle is just slightly better, as it can be airdropped only from the C-17. The HMMWV — even in up-armored form — has minimal armor protection, tactical mobility, and payload capacity, although it has superior transportability; it can be carried by Blackhawk and Chinook helicopters, as well as Air Force cargo planes.

The remaining option is the only full-tracked, armored vehicle small enough for airdrop from all four models of USAF transport aircraft: the M113A3. Armed with a recoilless rifle, a MK19 grenade machine gun, and Javelin ATGMs, a single “one-one-three” would possess rather significant combat power. In comparison, *three* HMMWVs would have to be employed in order to provide mountings for the same weapons. Undoubtedly some will object to the use of the M113A3 as an interim armored gun system because “it is not a tank.” The fact remains, however, that there is no more viable option available for immediate employment, and for virtually no cost.

When equipped with the CLASS laser ranging sight; without CLASS, effective range is reduced.

Notes

¹When equipped with the CLASS laser ranging sight; without CLASS, effective range is reduced.

²Estimated quantities. Actual figures may differ, depending on load plan and ammunition type.

³CPT Charles P. Ferry, “Mogadishu, October 1993: Personal Account of a Rifle Company XO,” *INFANTRY*, September-October 1994, pp. 28-29.

⁴Mike Sparks, “Improving Light Force Firepower With HMMWV-Mounted Recoilless Rifles,” *ARMOR*, November-December 1995, pp. 42-44.

⁵Bofors Weapon Systems information pamphlet on the 3A-HEAT-T ammunition.

⁶“Infantry News,” *INFANTRY*, September-October 1990, p. 6.

⁷When equipped with the CLASS laser ranging sight; without CLASS, effective range is reduced.

⁸Estimated quantity, based on the 16-round stowage of the Australian M113A1/106mm.

⁹Estimated quantity, based on 114-round stowage of the M125A2 mortar carrier, and similar sizes of 81mm mortar rounds and 84mm HEDP ammunition. If HEAT rounds are employed, total quantity will be reduced.

¹⁰CPT Kevin J. Hammond and CPT Frank Sherman, “Sheridans In Panama,” *ARMOR*, March-April 1990, p. 15.

¹¹“Infantry News,” *INFANTRY*, January-February 1992, p. 4.

¹²*Ibid.*

¹³CPL Darren Booker, “Armor Hunters May Get Mobility,” *ARMY*, November 3, 1994.

¹⁴Letter to the author from Computing Devices Canada, maker of the CLASS Computerized Laser Sight (NSN 1220-21-912-2232 Sight, Lead, Computing AN/PSG-501): “The 106mm RR, for example, under test conditions at CFB Gagetown, hit targets at 1,700m by day and 1,400 by night. Likewise, the [84mm M3] with CLASS is capable of hitting both stationary and moving tank targets at 800m by day and 600m by night.”

¹⁵From a conversation with MAJ Hal Spurgeon, AUS (Ret.).

¹⁶Tom Carhart, *Iron Soldiers*, Pocket Books, 1994, p. 224.

Stanley Crist is a former tank commander, having served with the 3d Battalion, 185th Armor. He is a previous contributor to *ARMOR*.

Whither the 2d Cavalry?

by Lieutenant Colonel Kevin C.M. Benson

The Armored Gun System is gone. The senior Army leadership decided it was an important but not vital program. The cold reality of money, or lack of it, couldn't be ignored. Regardless of the Army's size, our current National Military Strategy remains based upon power projection of forces from the continental United States to areas of vital national interest. Strategic mobility by both air and sea is therefore very critical.

The Army and the Department of Defense will thus require units which can operate relatively independently at a reduced cost, and without major reinforcement along the operational continuum. Recent operations in Haiti and the ongoing operation in Bosnia highlight this need. Based upon all of this, where does the 2d Armored Cavalry Regiment need to go in terms of its TO&E? With the demise of the AGS, what form should the 2d ACR take that both meets the needs of the regional CINCs and is affordable?

The hallmark of Army operations is operations in depth across the land force battlespace. The requirement to expand thinking to develop a vision that both dominates the enemy and protects the force across that battlespace demands constant reconnaissance, and that demands cavalry. The 2d ACR's combination of capabilities — three ground cavalry squadrons that can put 180 scout teams on the ground and an air cavalry squadron that can extend the vision of the battlefield to the limit of the OH-58D's FLIR range — is unbeatable and unmatched by any other unit in the Army.

On the other end of the operational continuum is the growing mission of Operations Other Than War (OOTW). It is axiomatic that the toughest mission facing any unit is combat. The military exists to fight the nation's wars. Since war is an extension of policy by other means, so too these operations are an extension of policy through other means. From January 1995 to the completion of the UN mission in February 1996, the 2d ACR implemented national policy by placing disciplined, trained troopers on the streets of Port-au-Prince, maintaining a secure and stable environment.



The thrust of this essay is to discuss some thoughts on the organization of the regiment and then propose a hybrid organization which, I believe, will meet the Army's needs.

The 2d ACR, in its current form — all wheeled with no cannon-equipped, tank-killing systems — can perform peace operations and fulfill the XVIII Airborne Corps' reconnaissance requirements. In accord with the mission essential task list, the regiment cannot perform guard or cover missions against heavy forces without significant reinforcements.

The 2d ACR is a proven, deployable force. The regiment also proved it can incorporate light infantry reinforcements, such as the two light/airborne rifle companies attached to regimental squadrons during the Haiti mission. The regiment, as an existing combined arms team, has no problem adding to the team.

The notion of adding light infantry as a permanent part of the regimental MTOE was a favorite at the Joint Readiness Training Center. Adding light infantry as a permanent part of the regiment will detract from, not add to, the regiment's flexibility. It is not a bad idea to reinforce the regiment with light infantry when the situation calls for this type of reinforcement, such as occurred during the Haiti mission. The

need for a dismount element exists, but the addition of infantry without a means to transport the rifleman does not address the dismount need. (The addition of infantry to a cavalry regiment has some historical basis. The Cavalry Reorganization Board of 1946 recommended the addition of a "Dragon Troop" to the then-current cavalry TO&E. This troop was mounted in half-tracks and intended for town-clearing, obstacle reduction, and dismounted overwatch missions. This was an addition to a heavier cavalry organization. The means to transport the infantry was provided by the half-tracks.)

Other proposals for the future of the regiment range from a mix of squadrons of long range recon, light cavalry, and heavy cavalry, to the most familiar — a return to the heavy cavalry we all grew to love from the days of the inter-German border. None of these proposals makes sense in light of ongoing and future Army missions. A mix of long-range recon, light, and heavy would amount to a bastard organization which could not fight as a regiment. The heavy cavalry is oriented on the two major regional contingencies we may face, but what else can it do? The solution, in this cavalryman's mind, is a hybrid.

I believe that the most affordable future organization of the 2d ACR, in

terms of both money and equipment, is the replacement of the TOW-equipped HMMWVs in the antitank troops, and the M198s in the howitzer battery with M1A1s and M109A6s, respectively. The squadrons of the 2d Cavalry will then be organized with three cavalry troops, a tank company, an SP howitzer battery, and the HHT. The Regimental Support Squadron (RSS) would also receive M88 recovery vehicles and turret and hull maintenance personnel.

The regiment's current and future home of Fort Polk and the JRTC make this organization viable in terms of training. By FORSCOM regulation, the regiment must provide a squadron per JRTC training rotation as OPFOR augmentation. 2d ACR must also fit its unit training in between the training unit rotations at the JRTC; this means during weekends and clean-up time at the end of a rotation, as well as holidays. The training of three tank companies and three howitzer batteries is infinitely more manageable than coordinating the gunnery of an entire heavy regiment. For the foreseeable future, Fort Polk's primary reason for being will be the JRTC. The Multi-Purpose Range Complex at Fort Polk can easily handle the gunnery requirements of a few companies of armor. The tank companies can also fit into the BLUE FOR training rotations as augmenting forces. This step would save transportation dollars for CONUS units.

The addition of tanks and self-propelled artillery will require the replacement of some wheel mechanics by hull and turret maintenance personnel in the squadron HHTs and the RSS. The support platoons will need to exchange some 5-ton trucks for fuel and cargo HEMMTs. The RSS Supply & Transport troop will also require PLS. The RSS Maintenance Troop will also require the addition of M88s and turret and hull mechanics. The regiment's ASL will need to reflect the addition of tanks and SP artillery. All of these additions to RSS will somewhat affect the tactical mobility of the unit, but not materially affect the strategic mobility.

The modifications to the 2d ACR's MTOE, as stated above, allow the regiment to retain an element of strategic mobility via air while increasing the lethality of the regiment to perform the cover and guard missions outlined in FM 17-95, *Cavalry Operations*. It will strain, somewhat, the RSS, but no more than the current level of support required by the regiment across a broad

front. The Army also retains a unit which can operate, without major reinforcement, across the entire continuum of conflict.

Let us theorize a regional contingency in a desert environment. Corps-sized counterattacks and ripostes leave open flanks. The 2d Cavalry can guard these flanks with its armored HMMWVs, tanks, self-propelled artillery, and OH-58Ds. The cavalry troops equipped with armored HMMWVs can range across the flank in screening observation posts or a moving screen. The air and ground scouts can put eyes on target, confirming or denying information the corps receives from airborne sensors. The scouts can also provide terminal guidance for precision munitions delivered by either the corps artillery, corps Apache battalions, or Air Force aircraft. The addition of the SP artillery ensures the regiment has agile artillery which can maneuver and then mass fires at the decisive point. There is also commonality between the howitzer batteries of the regiment and any reinforcing field artillery. The tank companies provide the squadron commanders an effective means to strip away enemy reconnaissance and force the deployment of enemy forces, all the while buying time for the corps commander to respond to a threat to his flank, the traditional role of cavalry.

A peacekeeping or enforcement commitment is also within the range of missions for the 2d Cavalry. The regiment does not now and will not put exclusive peacekeeping missions on its METL. The 2d ACR found that the discipline required for combat makes it easier to transition to the tasks and discipline required in OOTW. In short, albeit intense, training periods, the regiment can train to standard and then deploy on these missions, as it proved in Haiti. In the regiment's experience, PEO and PKO missions require the presence of overwhelming firepower, or the potential to mass such force as needed. Potential bad actors need to know the PEO/PKO force can crush them, if required. A regiment armed as proposed can accomplish this mission. The armored HMMWVs can effectively patrol city streets or country trails with the tanks and air cavalry providing the ultimate in quick reaction forces. The artillery provides an unmistakable touch of menace, the steel hand inside the velvet glove of the PEO/PKO force. The best way to keep the peace on these missions is to ensure all potential bad actors know the cost of

breaking the peace or attacking the enforcers.

The Army will continue to downsize. The units the Army retains must be able to respond to missions across the operational continuum. These units must be able to deploy by air and land or use the prepositioned afloat stocks available. The primary warfighting focus — our two potential major regional contingencies — require forces which can contribute to the fight. The 2d ACR can conceivably be called on to fight in either region. The hybrid organization I propose can significantly contribute to the fight in either prospective theater and make use of the full range of strategic deployment, including prepositioned stocks. It can also, and just as importantly, effectively and efficiently train at the regiment's current home station.

Corps commanders, Army commanders, and CINCs all require information obtained by reconnaissance units. The 2d Cavalry with M1114 armored HMMWVs, M1A1s, M109A6s, and OH-58Ds can fulfill this requirement. The regiment will also have the wherewithal to fight for information through terminal guidance of precision munitions, agile artillery fires, or the killing punch of the best tank in the world. The Army and the Armor School have the time now to evaluate this proposal quickly and then make a fielding decision which will retain a strategically mobile, operationally useful, and tactically lethal force.

That is one cavalryman's opinion.

LTC Kevin C.M. Benson is currently serving as a planner on the Third U.S. Army/Army Forces Central Command staff. Prior to this assignment he served as the regimental executive officer of the 2d Armored Cavalry Regiment. He also deployed with the 2d Cavalry to Haiti on UN duty. He served in armor and cavalry units in the U.S. and Germany, and as a planner on the XVIII Airborne Corps staff. He is a graduate of the Army Command and Staff College and the School of Advanced Military Studies.

Japanese Armored Vehicle Development

by Brigadier General Philip L. Bolté (Retired) and Iwao Hayashi

The killing in Cambodia continues. China threatens Taiwan. North Korea announces that it will no longer respect the Korean truce agreement and moves combat elements into the Demilitarized Zone. Okinawans object to the continued presence of U.S. troops. President Clinton travels to Japan and renews the Japan-U.S. security agreement and promises to maintain 100,000 troops in the Far East. Meanwhile, U.S. troop strength in Europe has reached its lowest level since World War II.

In Germany for fifty years after World War II, the U.S. armor community has known its German ally. It watched the post-war development of a renewed German Army and followed the development of its armored vehicles: Leopard I and 2, Marder, and others. Now, with eyes turned more to the Far East, it behooves us to learn more about the armed forces of Japan, the Japanese Self Defense Force. Few Americans realize, for example, that the U.S. and Japan together account for 40 percent of the world's defense spending and that Japan is third in the world in allocating funds to defense.

History

The start of Japanese military mechanization can be traced to 1918, when several Mark IV tanks were obtained from England. A few other wartime tanks, such as the French Renault FT (called "Ko" or "A" in Japan) and the British Medium Mark A, were delivered some time later. Little more was accomplished until 1925, when the Japanese formed two tank companies to develop tactics and launched a domestic tank development program.

Japanese tank design began with completion at the Osaka Arsenal in 1927 of a prototype vehicle known as "Experimental Heavy Tank 1," a 19-ton tank with a main turret mounting a 57mm gun and two smaller turrets with machine guns. After several additional heavy tank prototypes were developed



Japan is building about 20 of these Type 90 tanks each year.

in the 1930s, the Japanese dropped the heavy tank concept.

Continued development of both light and medium tanks resulted ultimately in production of some 5,000 tanks during the war, making Japan sixth in wartime tank production, behind the U.S., UK, France, Germany, and the USSR. The final Japanese medium tank of the war was a 37-ton vehicle mounting a 75mm gun of questionable value.

The major obstacle to Japanese tank development during the pre-war and wartime period was the philosophy that the primary role of tanks was infantry support. The major areas of progress in Japanese tank design were in the early adoption of diesel power and in development of amphibious tanks.

Little effort was devoted during the period to the development of other fighting vehicles. The Japanese abandoned the concept of wheeled armored vehicles because most Far East terrain favored tracked vehicles. A tracked combat car mounting a machine gun was dropped in favor of a light tank.

Post World War II

From the end of World War II until formation of a security police force in 1951, Japan had no armed forces of any type. In 1954, the security police force, which had been under control of the U.S. occupying force, became the Japan Defense Agency (JDA). Because of the background of U.S. control, the

JDA was organized and operated in a manner similar to U.S. forces and was generally supplied with U.S. equipment. The first armored vehicles were M4A3, M24, and M41 tanks and half-tracks. Ground Self Defense Force (GSDF) officers, most of whom had served during the war in the Japanese Army, found U.S. equipment greatly superior in performance to Japanese armored vehicles, all of which had been destroyed anyway.

Equipping the GSDF with U.S. armored vehicles quickly closed the technology gap that resulted from lack of Japanese post-war development. The standard caliber Japanese tank gun of 57mm, with an 800 m/s muzzle velocity, was now replaced by the U.S. 90mm gun, with its 1,000 m/s muzzle velocity. The U.S. 20 HP/ton replaced the Japanese 15 HP/ton or less vehicles, providing significantly more mobility. The U.S. 100mm of armor protection doubled that of earlier Japanese tanks.

The Japanese public attitude in 1950 was a strong desire for peace, and there was little enthusiasm for rearmament. However, the U.S., involved in the Korean War and watching the growing Soviet threat in Europe, sought assistance in an Asian defense and began to encourage a Japanese rearmament program. In responding to this encouragement, Japan concluded that it should redevelop its own armament industry. It was a defense industry that had pre-



The Type 61, above, was Japan's first postwar tank design. It mounted a 90mm gun.



The Type 74, at left, was upgunned to 105mm, with a modern fire control system and hydropneumatic suspension. The suspension and turret shape are reminiscent of the Soviet T-62.



The tank recovery vehicle above is a variant of Japan's new Type 90 MBT. There is also a bridgelaying variant.



At left, the Type 87 wheeled armored reconnaissance vehicle was developed to take advantage of Japan's excellent road network. An 8-wheeled vehicle is also under development.

viously been quite capable, having produced such weapon systems as the battleship Yamato, once the world's largest, and the Zero fighter plane.

The Type 61 MBT

In the 1950s, the major military powers were developing "second generation" main battle tanks: AMX30 in France, Leopard 1 in Germany, Chieftain in the UK, M60 in the U.S., and T62 in the USSR. Sweden and Switzerland were also developing new tanks, respectively known as the S-tank and the Pz58 (ultimately produced as the Pz61).

The GSDF, though, was equipped with only the M4A3 and the M24. A few M47 tanks were supplied by the U.S. for test, but proved to be unsatisfactory. They were not designed with the smaller stature of GSDF crewmen in mind, and their bulk and weight made them unsuitable for transportation in many parts of Japan. A decision was made for the GSDF to develop and produce a national tank. The main object of the development was to produce a 90mm gun tank suitable for Japanese body size and topography. Development proceeded along the following lines:

- 90mm gun and its fire control system.
- 500HP class diesel engine and transmission
- Torsion bar suspension system
- Hydraulic gun control system
- Homogeneous armor and a welded hull

The diesel engine and the optics of the fire control system used technology developed during World War II. Other components were based on M4A3 and M24 technology and the know-how of Japanese industry. The first two prototypes were completed in 1957, and in 1961, the tank was type classified as the Type 61 MBT. Total production by Mitsubishi Heavy Industries was more than 500 tanks.

Although the Type 61 reestablished Japan as a tank developer and manufacturer, it was a first generation postwar tank and, by the time it was fielded, most major countries had fielded their second generation tanks and were already working on their third generation. The joint U.S.-German

MBT-70, the UK Challenger, French AMX40, and Soviet T72 programs were all underway. Thus, the GSDF felt that to establish a more credible and viable defense, it needed to initiate development of a second generation tank of its own that incorporated at least some third generation level features.

The Type 74 MBT

The GSDF and Mitsubishi Heavy Industries initiated concept studies in 1962 and test rigs were built and tested between 1964 and 1967. The first two prototypes were completed by Mitsubishi in early 1968.

The tank's main technical features were:

- A low silhouette and well-shaped hull to decrease vulnerability, somewhat similar to the T62
- 105mm gun
- 750HP multifuel engine capable of operating submerged
- Cross-drive type transmission
- Hydro-pneumatic suspension with hull attitude control
- Modern fire control system incorporating a laser rangefinder, electronic ballistic computer, gun stabilization system, and electric gun control system

The tank incorporated certain features of third generation tanks then in development in other countries, such as the hydro-pneumatic suspension similar to that of MBT-70. Although the laser rangefinder was procured from Nippon Electric and the computer from Mitsubishi Electric, continuing the trend of relying on Japanese industry, this was not exclusively the case. The 105mm gun was produced in Japan under license from the UK. German track from Diehl was tested at the production stage, but was ultimately not acceptable. In general, though, there was little technology exchange between Japan and other countries.

The first production contract was awarded in 1973 with the first tanks delivered in 1975. A total of about 870 were procured. Overall, the Type 74, even though it incorporated some very modern features, was a second generation equivalent, especially when considering the main armament. Thus, while making progress in its efforts to

draw even with other tank-producing countries, Japan was still behind.

Type 90 MBT

In the mid-1970s, the GSDF set about to correct the situation, laying out a program to develop a truly advanced MBT. The JDA soon encountered the same challenges other countries were facing in their tank development efforts. Among these were:

- The rapid progress in technology, particularly electronic technology, that tended to make components obsolete before development was complete
- Pressure from government management to achieve greater cost-effectiveness and reduce cost growth
- Pressure to focus on longer range operational performance as time delays occur in the program

As a result of these factors, actual development of the Type 90 MBT took approximately 14 years, the tank not being type classified until 1991. Nevertheless, the Type 90 incorporated a number of advanced features, some of them not found in contemporary models of the Abrams and Leopard 2. Some are found in the French Leclerc tank, developed generally in parallel with the Type 90.

With the exception of the 120mm main armament, licensed by Rheinmetall for production in Japan, Japanese industry developed all of the components. Main features of the Type 90 MBT are:

- 1500HP class compact diesel engine
- Electronic-controlled full-automatic transmission
- Hybrid suspension with independent hydropneumatic suspension
- All-weather fire control system, including automatic tracking
- Automatic loading system
- Composite armor

Several features in the tank are of particular interest. Although the turret is conventional in design, the automatic loader allowed reduction of the crew to three. The liquid-cooled engine is the first Japanese tank engine not to be air-cooled, a feature driven by size of the engine and consequent cooling requirement. The automatic tracking system is of unique design.

A major problem for the JDA has been the procurement cost of the tank, which has resulted in a low rate of production. Whereas the Type 74 was procured at a rate of about 60 per year, affordability has limited Type 90 production to about 20 per year. The result is that reequipping the GSDF with a modern tank is progressing slowly.

Other Armored Fighting Vehicles

Other than the MBT, Japanese AFVs fall into three categories: APCs, self-propelled artillery, and support tanks.

In general, APC development, procurement, and fielding has paralleled that of the tank. There have been three generations of APC:

- Type 60 APC: similar to the U.S. M75 APC
- Type 73 APC: similar to the U.S. M113 APC
- Type 89 APC: A vehicle similar in concept to the German Marder and U.S. Bradley Fighting Vehicle

Each of these vehicles has also been adapted for use as a family, including variants for mortars, observation, rocket launchers, chemical reconnaissance, etc.

Since the mid-1970s, the GSDF has considered that a wheeled armored vehicle might be more appropriate for Japanese use as an APC than a tracked vehicle, primarily because of the well-developed Japanese road network. Consequently, in 1975 the GSDF began development of a 6x6 wheeled armored vehicle. More recently, emphasis has been shifted to development of an 8x8 vehicle, as well.

The main self-propelled artillery of the GSDF includes the 155mm howitzer and the air-defense automatic weapon.

Initially, the 155mm SP howitzer was mounted on the 25-ton class AFV chassis and designated the Type 75 155mm Howitzer, SP. This weapon was essentially similar to the U.S. M109. In 1984, the GSDF began to introduce the U.S. M110 203mm SP Howitzer, built in Japan under license. Part of the reason for introducing the U.S. system was to help correct the Japanese-U.S. trade imbalance.

For an SP anti-aircraft system, the GSDF adapted the Type 74 tank chassis to mount dual Swiss Oerlikon L90

35mm automatic cannon. Except for the weapon, all components of the system were developed in Japan. The system is designated Type 87 2x35 AWSP.

The support tank category includes primarily the tank recovery vehicle and the armored bridgelayer. These vehicles have each used the concurrent tank chassis as the basis for development.

Future Development

As with the rest of the world, Japan finds herself today living with an unpredictable future. The major potential threats to Japan are, of course, China and North Korea, both of which could cause Japan considerable problems. Consequently, Japan has concluded that it must maintain a modern defense force while, at the same time, strengthening mutual defense arrangements with the U.S.

Maintaining a modern defense force requires both development and procurement efforts. For now, the Type 90 MBT is adequate, matching or surpassing other modern tanks in capability. Thus, for the near term, efforts in the tank area will highlight component development. Component R&D efforts for a future MBT will be conducted in the following areas:

- Concept research for a twenty-first century MBT, to include vetronics research and manufacture of a test bed vehicle
- High-power diesel engine, including the use of ceramics
- Gas turbine research, especially to improve thermal efficiency
- Electric drive system
- Stepless hydromechanical full-automatic tank transmission
- Advanced suspension system, particularly active suspension
- Advanced armor technology, including composite armors, protection against top attack, active and reactive armors, etc.
- Main gun, including improvement of AP ammunition performance, advanced proximity fuze, and liquid propellant, electromechanical, and electrothermal technology

For other armored vehicles, for the immediate future, the plan is to concentrate efforts on upgrading equipment. Two specific programs are underway to field a new 155mm howitzer by replacing the Type 75 with the

European FH70 mounted on the Type 89 chassis, and to replace the Type 73 APC with an 8x8 wheeled armored vehicle.

Economic factors demand that JDA efforts in the coming years use simulation extensively and that there be emphasis in the areas of cost effectiveness and generating savings in manpower and material. Environmental considerations will also require greater emphasis.

Armored Vehicle Manufacture in Japan

The nature of armored vehicle manufacture itself and the armament export restrictions of the Japanese constitution make the firms involved in the industry unique among Japanese companies. On the one hand, the particular expertise and equipment involved virtually eliminate competition within Japan, while, on the other hand, there is little prospect for expanding markets through export. Thus, the companies in the business have a strong relationship with the Japanese Government, but have little potential for expanding their armored vehicle production beyond GSDF needs.

There are essentially three armored vehicle manufacturers and one cannon manufacturer in Japan. Mitsubishi Heavy Industries (MHI) is the Japanese tank manufacturer and manufactures tracked APC families of vehicles, as well. Komatsu manufactures tracked and wheeled APC families. Hitachi manufactures small quantities of light armored vehicles. All of these companies can produce many of the components of various armored combat vehicles, such as hulls, turrets, tracks, engines, transmissions, suspension systems, and subcomponents. However, components such as armament, communications equipment, and optics are all procured from vendors.

Nippon Steel Manufacturer (NSM) is well-known in the world as a gun manufacturer and produces all of the cannons used on GSDF combat vehicles. Except for armament, components procured from vendors are manufactured by domestic companies whose main business is commercial.

In order to equip the GSDF more cost effectively, as well as to help overcome the balance of trade problem existing with many nations, the JDA has re-

cently begun giving more consideration to obtaining licenses for domestic manufacture of foreign-developed weapon systems and components, as well as the procurement of foreign weapon systems and components themselves. This tendency is further supported by the general world-wide trend of internationalization of military equipment.

Summary

After a post-war lapse of several years in the area of combat vehicle design and manufacture, the creation of the JDA led to a reemergence of a Japanese military industry for the purpose of supporting the GSDF. Technologically behind the major armored vehicle manufacturers of the world for a number of years, Japanese heavy industry has responded to GSDF requirements by steadily improving its combat vehicle design and manufacturing capability. Meanwhile, the quality of Japanese commercial electronic and optical products has been reflected in the production of superior combat vehicle components. The result is that the GSDF is now receiving equipment on a quality par with the major military countries of the world, although budgetary restrictions and the generally antimilitary feeling within Japan are restricting the rate of modernization.

Brigadier General Philip L. Bolté graduated from USMA in 1950 and retired in 1980 after a variety of Armor and R&D assignments, including combat service in Korea and Vietnam. He was Assistant Project Manager for Tank Main Armament, Abrams Tank System, and Program Manager, Bradley Fighting Vehicle Systems.

Iwao Hayashi graduated from Tokyo University in 1951 and worked as a tank designer at Mitsubishi Heavy Industries (MHI) until 1983. He participated in the design of almost all Japanese AFVs after World War II. He now works independently in this field.

Tank Warfare During the Rif Rebellion

1921-1927

by José E. Alvarez

“Armored cars and tanks are greatly suitable for this war. We shall see if time proves me right.”¹ Major Francisco Franco Bahamonde, commander of the 1st *Bandera* (battalion) of the Spanish Foreign Legion, wrote these words following the less than auspicious debut of Spanish armor during the battle of Ambar in northern Morocco. Fought on March 18, 1922, Ambar saw the first use of tanks by the Spanish Army, and their earliest deployment on the African continent.

In order to better understand the Spanish Army’s use of armor during the Rif Rebellion, a brief history of the conflict would be useful. Since 1909, Spanish forces in the eastern portion of the Spanish Protectorate in Morocco had pushed outwards from Melilla towards the heartland of the Rif, and by 1921 they had almost reached the shores of Alhucemas Bay. In a bid for national independence, Mohamed ben Abd-el-Krim, along with his younger brother Mhamed, had led fellow tribesmen against Spain.

Fighting was most intense in a region the Spanish Army called the *comandancia de Melilla*. In late July 1921, the Krim brothers led an *harka* (war party) of tribesmen against Annual, Spain’s main outpost in the area. This attracted the attention of Manuel Fernandez Silvestre, an audacious and impetuous cavalry general, commanding 20,000 men, who was pushing deep into rebel territory, hoping to reach Alhucemas Bay without securing his flank or rear. Krim counterattacked with roughly 3,000 warriors. Surrounded, and cutoff from reinforcements, one outpost after another fell to Krim’s men.² Instead of a fighting retreat, Silvestre’s army fell apart, as panic-stricken conscripts dropped their weapons and ran for their lives. The Riffians slaughtered those they caught, with soldiers and civilians alike being put to the knife. In the end, Spanish casualties numbered, at minimum, 12,000, with another 600 taken pris-

oner and held for ransom. Silvestre also perished at Annual, although it was never fully established if by the enemy, or his own hand. What had taken Spain twelve years of blood and treasure to conquer had been lost in only a few days. Spain’s ignominious rout at the hands of Riffian tribesmen was the greatest defeat suffered by a European power in an African colonial conflict in the twentieth century.

The Annual disaster had two serious consequences for Spanish officials: an army of 20,000 men had been rendered militarily ineffective, and the rebels — who up to that time had been armed solely with antiquated rifles and daggers — were now in possession of a variety of modern artillery, small arms, and thousands of rounds of ammunition. The herculean task of reconquering the Melillan Command was given to the battle-tested *Tercio de Extranjeros* (the Spanish Foreign Legion) and the *Regulares* (native Moroccan troops commanded by Spanish officers). Spain rushed these units from the Western Zone of the Protectorate to save the enclave of Melilla from succumbing to the Riffians. The going was tough, with hard-fought battles taking place nearly every day, and with the Legion and *Regulares* always comprising the vanguard of Spanish forces. The cost in men and materiel, along with the difficulty of the terrain and the tenacity of the rebels, led to rumblings within the Spanish government to abandon its Protectorate completely. Krim’s successes led to more and more tribes flocking to his side, which resulted in an open rebellion throughout the Protectorate.

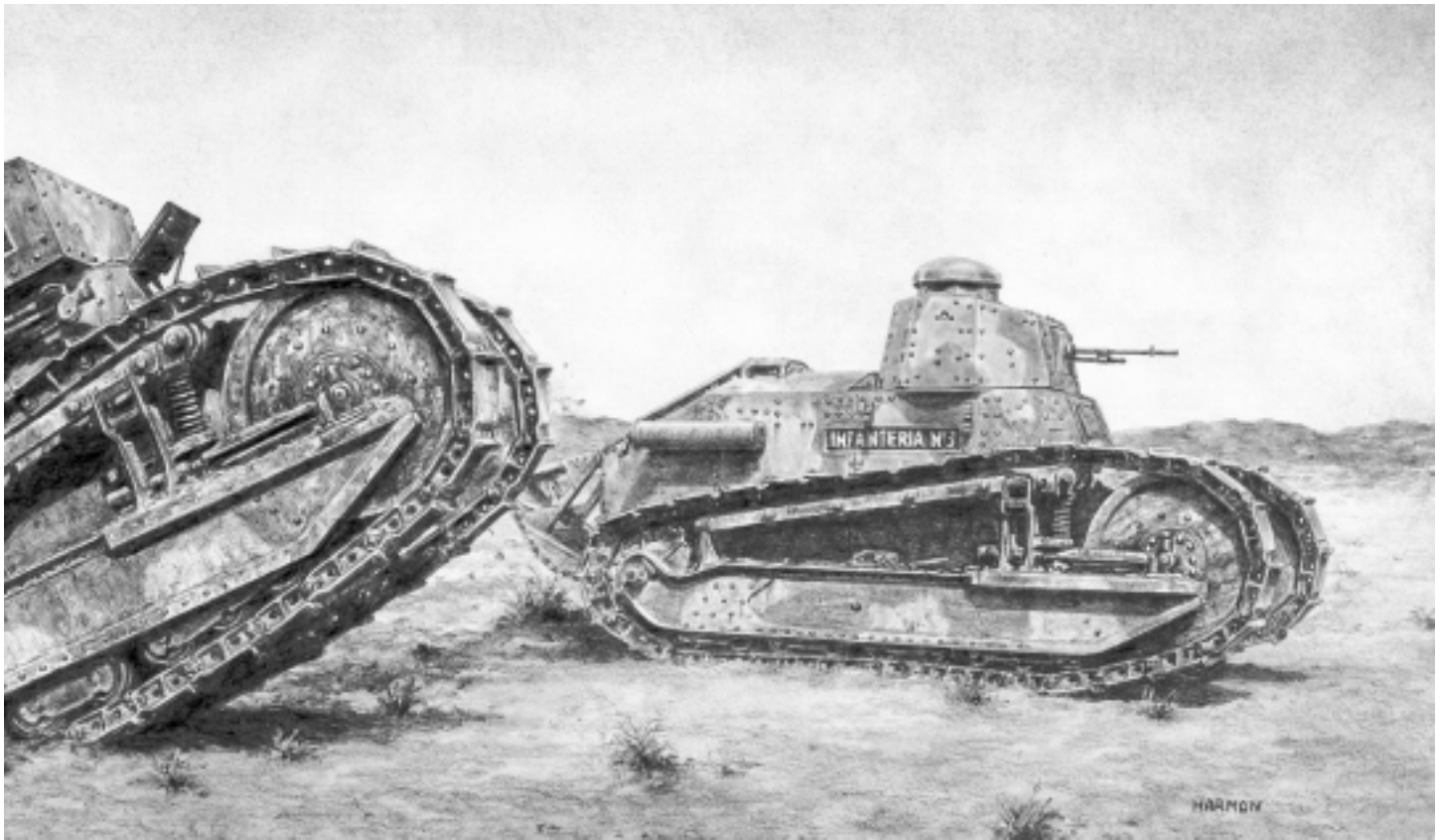
By early 1922, Spanish forces continued with their drive to recover the area Spain had lost the previous year. The major outposts of Nador, Tauima, and Monte Arruit were back in Spanish hands, while the push to cross the Kert River was next on the agenda. This was done on January 10 with the capture of Dar Drius. Dar Drius served as



the HQ for Spanish operations during the spring offensives in the region.

The major drive of the year, against the Beni Said and Beni Ulixech *kabyles* (tribes), began in March when the weather became more favorable for military offensive operations. Meanwhile, Lieutenant-Colonel Jose Millan-Astray, founder and commanding officer of the Spanish Foreign Legion, had returned to the front on February 14 after having been wounded for the second time during the campaign. General Federico Berenguer Fuste, brother of the High Commissioner, led the main column against the rebellious tribesmen. Millan-Astray led the 1st and 2nd *Banderas* of the Legion (commanded by Majors Franco Bahamonde and Rodriguez Fontanes, respectively) on the advance which was scheduled to commence on March 18. Ambar/Anvar was the objective of that day’s operation.³

By the standards of 1922, this offensive employed very modern equipment. Following the Annual disaster, the Spanish military realized the importance of utilizing the best weapons available to crush the rebellion. A commission, directed by the then Chief of Studies of the Infantry’s Testing Ground (*Escuela Central de Tiro*), visited several European countries in the hope of acquiring tanks. He considered the British Whippet, but financial and political reasons led him to pass on it



in favor of French equipment. France's geographic proximity to Spain, as well as its shared interest in Morocco, contributed to the deal being consummated between Paris and Madrid. Consequently, in August 1921, the French prime minister authorized the sale of tanks, artillery, and airplanes to the Spanish Army. The tanks, known as "*carros de combate/asalto*" in Spain, arrived in January of the following year.⁴

The initial delivery to the Army numbered twelve 6.5-ton Renault FT-17s; eleven were armed with a 7-mm Hotchkiss machine gun, one served as a command tank (FT-17TSH). These twelve tanks were delivered to the Escuela Central de Tiro. Six Schneider CA1 tanks were also purchased and placed at the disposal of the artillery branch of the Army.

The FT-17s were incorporated into a company ("*Compañía de Carros de Asalto*"), with a command staff using the TSH, two platoons of five tanks each, as well as a support and repair unit. The twelfth tank would remain at the Testing Ground to be used in training. The company equipment also included twelve Renault tank transport trucks, two Hispano-Suiza tanker trucks, and a Ford light truck to transport stores. In addition, a repair truck which remained in Segovia, was never delivered. The staff consisted of a cap-

tain, two lieutenants, one sergeant-major, eight sergeants who would serve as TCs, and forty enlisted men (eleven tank drivers, twenty truck drivers, and nine mechanics and service personnel).⁵

King Alfonso XIII saw a demonstration of the new tanks at a military camp outside Madrid soon after their arrival. After a brief period of instruction for the new unit, the General Staff ordered that the tank company be transferred by rail to the port of Malaga on March 8, and from there by ship to Melilla. Once there, the unit was immediately sent to the encampment at Dar Drius. However, suitable shelter for the tanks from the inclement weather, as well as repair facilities, had not been established. This led the company commander, Captain José de Alfaro, to pen a terse report to Army HQ in Melilla. As a result, all tanks needing major repairs had to be sent from Dar Drius to the artillery's machine shop in Melilla.⁶

No more than two months had gone by since the tanks had arrived in Spain and they would now be pressed into service against the Beni Said tribe. On March 17, the company joined General F. Berenguer Fuste's column at the forward outpost of Itihuen/Ichtiuen. The following morning, at 0600 hours, the tank company began its advance with the infantry of the Foreign Legion deployed behind the FT-17s. The opera-

tion, which called for the capture of Tuguntz, succeeded in reaching and occupying the houses of Ambar/Anvar. Once there, however, they began to take heavy fire from their left flank. The tanks had advanced, over broken terrain, faster than their infantry, and a distance of some 800 meters separated them. The Riffians, undaunted by the appearance of these new war machines, surrounded the unprotected tanks and began hurling stones at them. Finding the machine gun's blind spots, they thrust their daggers (*gumias*) through the vision slits, injuring one machine gunner's face. Many of the tank's machine guns, installed the day before, jammed during firing due to faulty ammunition.

The tanks had to withdraw to rejoin the Legionnaires, but during the withdrawal, fighting continued, forcing some of the tankers to abandon their disabled or disarmed vehicles. The outcome of this less than auspicious event in the history of Spanish armor left two sergeants and one enlisted driver wounded, and three tanks disabled. Lacking the necessary recovery equipment, two of the tanks had to be left on the battlefield where the Riffians blew them up with dynamite four days later.⁷

The Army's General Staff examined the lackluster performance of the tanks, and concluded that the determining factor in the fiasco was the lack of coop-

eration between the infantry and tanks. The gap which developed between the two elements, as well as the failure of the machine guns, were also important contributing factors. It was also noted that the tanks had been rushed to the front without the opportunity for coordinated training/exercises with the infantry.⁸

For the remainder of the campaign in the Protectorate, tanks were used on a smaller scale, to provide support during retreats, in punitive operations, in wheeled-vehicle recovery, and in reconnaissance operations with cavalry and infantry units. They would once again be used in a major operation during the amphibious landings at Alhucemas Bay in September, 1925, where the company of FT-17s were to disembark first in order to provide fire support for the infantry who followed them ashore. The landing craft, however, struck a shoal, forcing the infantry and artillery to disembark unassisted. The tanks were brought ashore the following day, where they provided support for the left flank of the beachhead and, with the collaboration of the VIth and VIIth *Banderas* of the Legion, advanced to take the strategic heights/line of Malmusi Alto, Malmusi Bajo, and Morro Viejo.⁹ With the successful landing at Alhucemas Bay by the Spanish Army, the defeat of Krim and his "Rif Republic" was assured. The war would continue, with less intensity, until peace was declared in mid-1927.

In conclusion, Spain's first use of armor during the Rif rebellion in Morocco resulted in a minor setback. Nevertheless, among the farsighted officers of the Army, the use of tanks in a colonial setting, where difficult terrain would be encountered, was a reality. In this type of campaign, it was of the utmost importance that armor and infantry provide mutual support. If not, either could be easily cut off and destroyed.

This not only happened to Spanish tanks at Ambar, but to Italian armor during the Italo-Ethiopian War of 1935-36. Greater mechanical reliability, along with better ammunition, improved the fighting capability of Spanish tanks during the rebellion, and even though they did not play a major role during the Alhucemas Bay landings, they were available to provide fire support if called upon to do so.

Within the Spanish Army, there was no turning back. Armor was here to stay.

Notes

¹Francisco Franco Bahamonde, *Marruecos: Diario De Una Bandera* (Madrid: 1922), p. 177. On pp. 177-179, Franco detailed his personal opinions on the employment of tanks in the Moroccan Campaign, as well as his numerous recommendations for improvement. While others in the military declared that 'The tanks have failed,' or 'Tanks are useless in Morocco; they are inappropriate in this terrain,' he (along with General Damaso Berenguer Fuste, High Commissioner of the Spanish Protectorate in Morocco) believed otherwise. He boldly stated that, "Los carros de asalto y tanques son de gran aplicacion en esta guerra. Veremos si el tiempo me da la razon."

²David S. Woolman, *Rebels in the Rif: Abd el Krim and the Rif Rebellion* (Stanford: Stanford University Press, 1968), p. 102.

³John Scurr, *The Spanish Foreign Legion*, Osprey Men-At-Arms Series, no. 161 (London: Osprey Publishing Ltd., 1985), pp. 11-12.

⁴*Defensa*, no. 144, April 1990, "Los Carros de Asalto Españoles en la Campaña de Marruecos," p. 62.

⁵*Ibid.*, p. 63. *TSH* is the Spanish translation of the French *TSF* (i.e., Telegraph without wire or radio-equipped). Javier de Mazarrasa, *Blindados En España, 1ª Parte: La Guerra Civil 1936-1939, Nº.2* (Valladolid: Quiron Ediciones, 1991), p. 18. This source recorded that only eleven FT-17s were purchased, including the TSH. For more on the FT-17 light tank, including specifications, see Kenneth Macksey and John H. Batchelor, *Tank: A History of the Armored Fighting Vehicle* (New York: Charles Scribner's Sons, 1970), pp. 38-39, and Christopher F. Foss, *The Illustrated Encyclopedia of the World's Tanks and Fighting Vehicles: A technical directory of major combat vehicles from World War I to the present day*, with a Foreword by Richard M. Ogorkiewicz (New York: Chartwell Books, Inc.), pp. 70-71.

⁶*Defensa*, p. 63.

⁷*Ibid.*, pp. 63-64. Franco, pp. 175-177. Woolman, p. 105. It is interesting to note that during the Italian-Ethiopian War of 1935-1936, the Ethiopians fought the Italian CV-33/5 light tanks in similar fashion. Major General J.F.C. Fuller, *The First of the League Wars, its lessons and omens* (London: Eyre and Spottiswoode, 1936), p. 68, (n. 1), described Ethiopian anti-tank methods thus:

They lay up for tanks when they attempt to cross difficult ground, rushed them from behind, scrambled on their backs, and then leaning over the roof of the cab smashed the muzzles of the [2] machine guns with a rock. I also heard that sometimes they poured petrol over a tank and set it alight.

For more on the role of the Legion, which suffered 86 casualties during this battle (one of them being Major Fontanes, CO of the IInd *Bandera*, who was KIA), see José E. Alvarez, "The Betrothed of Death: The Spanish Foreign Legion during the Rif Rebellion, 1920-1927" (Ph.D. diss., Florida State University, 1995), pp. 147-149.

⁸*Defensa*, p. 64. On page 9 of a manuscript provided to the writer by Colonel of Infantry (Legion) Ramón Moya Ruiz entitled "Los Medios Blindados y La Legion," the author noted the following causes for the failure of the tanks at the battle of Ambar and what needed to be done to rectify the situation:

- It was necessary to install two machine guns instead of the single one provided.
- Improve the quality of the ammunition to avoid interruptions [jamming].
- Better trained personnel with combat experience.
- Tanks, in this type of campaign, should be employed with mutual support from infantry.
- The threat to tanks will come from: artillery, antitank rifles [i.e., the 13-mm Mauser T-Gewehr of 1918] and machine guns.

⁹Moya Ruiz, pp. 11-12. *Defensa*, p. 64. Scurr, pp. 16-17.

Renault FT-17—Technical Data

Crew: 2.

Armament: One Hotchkiss 7mm machine gun.

Armor: 22mm (0.87in) maximum; 6mm (0.24in) minimum.

Dimensions: Length (with tail) 16ft 5in (5m); width 5ft 9in (1.74m); height 6ft 7in (2.14m).

Weight: Combat 15,432 lbs (7,000kg).

Ground Pressure: 8.5lb/in² (0.59kg/cm²).

Engine: Renault four-cylinder water-cooled gasoline engine developing 35bhp at 1,500 rpm.

Performance: Road speed 4.7mph (7.7km/h); road range 22 miles (35km); vertical obstacle 2ft (0.6m); trench crossing (with tail) 5ft 11in (1.8m), (without tail) 4ft 5in (1.35m); gradient 50 percent.

Adapted from Christopher F. Foss, *The Illustrated Encyclopedia of the World's Tanks and Fighting Vehicles*.

Dr. José E. Alvarez is an Assistant Professor of History at The University of Houston-Downtown, and an honorary member of the Brotherhood of Former Gentlemen Legionnaires of the Spanish Foreign Legion (Ceuta chapter).



Muslim civilians approach as C Troop, 1-4 CAV mans Checkpoint Charlie, in the Zone of Separation.

A Framework for Peace Operations

by Major Sean B. MacFarland

Square Pegs and Round Holes. Despite their recognition of a new era of peace operations, neither FM 100-5, *Operations*, nor FM 100-23, *Peace Operations*, provides us with a framework for conceptualizing this new form of military endeavor. This is an understandable omission, given the complexity and variety that characterize peace operations. To be sure, the authors of the newest FM 100-5 admitted that the venerable AirLand Battle (ALB) framework may no longer be the best choice for every situation, but they stopped short of proposing a new one. This gap in our doctrine has left many of us mentally genuflecting to the old “close, deep, and rear” trinity despite its growing irrelevance to some modern operations.

While preparing to deploy to Bosnia-Herzegovina for Operation Joint Endeavor, the leadership of the 3rd Squadron, 4th U.S. Cavalry gave up trying to pound the square peg of peace operations into the round hole of the ALB framework. Instead, we developed a peace operations framework (POF) that was tailored to implementing the Dayton Peace Accord in Bosnia in January 1996. Naturally, this framework won't work for every peace operation, but the thought process we used to develop it will.

The Right Tool for the Job. We wanted to have a framework. Frameworks focus our thoughts when we are developing operational concepts, saving time and helping to bring order out of the chaos of war or its aftermath. An inadequate or inappropriate framework can constrain our thinking, blinding us to both danger and opportunity. Our options were to use the ALB framework, some modification thereof, or to create our own framework from the ground up. We chose the last option.

Linearity vs. Non-Linearity: Linear areas of operations are characterized by relatively continuous lines of contact, separating well defined areas under either friendly or enemy control. Linear conditions arise where high force densities and/or low levels of mobility exist, even if only locally. Central Europe during the Cold War, the Korean Peninsula today, and Kuwait proper during DESERT STORM are examples of essentially linear battlefield conditions. The familiar “deep, close, and rear” areas are readily discernible in each of these cases, so the ALB framework fits them neatly. Of course, when we remove the “enemy” from the equation, we can no longer orient ourselves with these handy references to the line of contact. This makes Peace Operations almost automatically non-linear.

The Ole Gray Mare. During our planning for Operation Joint Endeavor, we quickly realized that the old ALB framework, which had been expressly developed to suit the conditions of a large scale, essentially linear, conflict in Central Europe, was probably not the appropriate framework for a non-linear environment like Bosnia. It would be like trying to use American football plays to win a soccer game under soccer rules. Although we entered Bosnia on a combat footing and were prepared for immediate combat operations, the ALB framework just didn't fit. First, we were neutral, so the conflict's final line of contact, the Agreed Cease Fire Line (ACFL) was not to be our limit of advance. We intended to operate freely on both sides of the ACFL. That had the effect of removing the basis of reference on the ground for close, deep, and rear areas. Secondly, we fully intended to dominate the Former Warring Factions command, control, communications, and information (C3I) systems had combat occurred. In

the early 1980s, the former Soviet General Staff predicted that new information technologies would cause “frontlines to disappear and terms such as ‘zones of combat’ will replace such outdated concepts as FEBA, FLOT, and FLET. No safe-havens or ‘deep rear’ will exist.”¹ Any combat operation in Bosnia would have most closely resembled the nearly simultaneous “take down” of the Panamanian Defense Forces in 1989. As one observer described that operation,

“Panama was not a neat linear battlefield. Although, at the operational level, boundaries were assigned during the initial operations, they were of little value. The battlefield more resembled a lethal mosaic of separate attacks conducted by land, sea, and air from the four points of the compass.”²

After discarding any FLOT-based framework, we began to look for other options. Regrettably, after acknowledging that new frameworks would be needed to cope with the emerging trends represented by those operations, the authors of FM 100-5 called it a day.³ They failed to provide any alternative framework for non-linear operations, in wars or in “other than wars.” So, we were on our own.

What's in a Name? We had the option of stretching the old ALB framework's definitions to fit a new situation. We could have redefined “rear” to mean support activities. “Close” could have meant current operations, or it could have referred to the zone of separation (ZOS). We might have used “deep” to describe future operations, or CA/PSYOPS activities, or operations outside of the ZOS. But then, why give new, less accurate names to things? It seemed that this would only confuse matters. After all, Task Force Eagle

demonstrated its neutrality by placing "rear" type activities on both sides of the ZOS. There were brigade headquarters and base camps on each side. "Deep" also lost much of its meaning in Bosnia. Long term threats to the force did not necessarily originate far from IFOR facilities; they were sometimes as "close" as the local nationals working inside our own perimeters. IFOR units roamed across the entire AOR, conducting vast numbers of simultaneous operations, linked by a command and control architecture vastly superior to those of the former warring factions (FWFs). The use of the old ALB terms under such conditions would have been at best sub-optimal, at worst, downright misleading. When we began to throw around terms like "close, deep, and rear" or another favorite, "center of gravity," in ways in which they were not originally intended, those terms began to mean too many things to too many people. As a result, these terms, coined as the language of our warfighting doctrine, became dangerously and potentially fatally, imprecise. We decided to avoid them when discussing non-combat operations.

The Peace Operations Framework: Because spatial references tend to obscure, rather than clarify, what is occurring under non-linear conditions, a more function-based reference system seemed to be what we needed for our POF. After conducting our mission analysis, it was clear that our mission essential task list (METL) could be reduced to two categories: operations in direct support of the Dayton General Framework Agreement for Peace (GFAP) and operations in support of ourselves. A task in either category might be designated the main effort under the appropriate conditions. The result of this simple thought process led us to design a framework based on *treaty operations*, *support operations*, and a designated *main effort* within one of these categories. These elements of the framework reside in the *operations space*, which is surrounded by an *influence space*.

Influence Space: The outermost region of the framework is the *influence space*, which is based on the new doctrinal term, "battlespace." Battlespace links operations within an AO to relevant events and places far beyond its boundaries, in the air, in space, at sea, and on land. It is three-dimensional, portable, and applicable at all levels of command.⁴ Clearly though, battles are

not fought throughout the battlespace. Ideally, in peace operations, they are not fought at all. This discrepancy can be rectified by blending "battlespace" with an older (1982) doctrinal term, "area of influence," yielding, "influence space." This term retains the multi-dimensional flavor of the 1993 doctrine, but is more precise because influence, not battle, exists throughout the space. Also, and on a more practical level, the abbreviation of influence space (IS) is less unfortunate than that of battlespace (BS). The IS is not assigned by a higher headquarters, so it has no boundary. It can extend back to the ports of embarkation or the home stations of forces that are deploying into the operations space. Our IS extended back from Bosnia, through Hungary, where we occasionally had to send helicopters for intermediate level aviation maintenance, to our rear detachment in Schweinfurt, Germany.

Operations Space: Within the IS, is the assigned *operations space* (OS). Unlike the IS, it has a defined boundary. The OS is merely a three-dimensional version of a traditional AO. For 3-4 Cav, our OS extended beyond our ground sector to include the entire 2BCT sector and the Russian brigade sector. This is because our ground troops were initially dispersed across the entire 2BCT sector until all task forces closed into their respective sectors. We also conducted joint patrols with the forces on our flanks, the Russians in the north, and TF 4-12 to our south. Finally, our 16 OH58Ds were responsible for conducting aerial patrols over both the 2BCT and Russian brigade sectors. It was within the OS that the squadron conducted its treaty and support operations.

Treaty Operations: We assessed the following tasks as directly supporting the GFAP. The assessment was, of course, subjective and as such, it is open to reinterpretation. In fact, the task list changed over the course of the squadron's deployment. The list was reanalyzed at each milestone of the GFAP timeline. I strongly recommend that METLs during any sort of peace operation be periodically reviewed. The presence of the peace operations force should and will affect the environment it enters, causing initial facts and assumptions to change.

- **Reconnaissance and Surveillance** to monitor GFAP compliance. This had a collateral benefit to force protection, and doubled as a force presence task.

- **Force Presence Operations** to secure areas of transfer and separate FWFs.

- **Freedom of Movement Operations** to enforce the right of IFOR and civilians to move freely in Bosnia. Observation posts, checkpoints, and patrols were the most visible method of conducting this task. PSYOPS teams talking to civilians and CA teams talking to police were just as important.

- **Information Operations** to explain GFAP provisions for area transfers and other issues. Our PSYOPS team was a source of two-way information flow. Their reports of how the latest IFOR information products were received were invaluable in calculating local moods and attitudes.

- **Mine Clearance Team Escort** to allow FWFs to clear mines in the ZOS. This task eventually petered out as the FWFs deactivated their engineers faster than they deactivated or cleared their old minefields.

- **Civil Affairs Operations** to ensure orderly area transfer and facilitate a return to normalcy. This also encompassed a wide range of other activities, to include assessments of various villages throughout the squadron sector. We also occasionally did CA assessments in the Russian sector because of the tight linkage some villages in the Sapna Thumb region to our north had with those in the Tuzla Valley in our sector.

- **FWF Assessments** to allow the squadron to influence faction compliance with GFAP provisions. Our counter-intelligence team, along with troop commanders, and others who had frequent contact with FWF officers, were our principal assets in this arena.

- **Humanitarian Assistance Operations** to coordinate NGO and PVO activity within the squadron sector. The CA team's area assessments often identified local needs that NGOs or PVOs could fill. The response of these organizations built credibility for the squadron among the local nationals. An occasional medevac also qualifies as humanitarian assistance. Engineer work to improve key routes can also assist the locals return to normalcy as a collateral benefit.

- **Support to International Criminal Tribunal, Yugoslavia (ICTY) Inspectors** grew as a mission as thaws in the spring of 1996 revealed more and more evidence of mass murders in the wake

of Srebrenica's fall in July 1995. This generally required the positioning of a quick reaction force (QRF) and artillery to support it. The QRF remained out of sight of the inspection team, but within radio range of a military liaison officer at the inspection site.

- **Support to International Police Task Force (IPTF)** increased along with the size of the IPTF. This included contingency plans to rescue IPTF members from hostage situations, co-operating in investigations, and other work with FWF police forces, and providing some quality of life support.

Support Operations: These operations enable the force to conduct its peace operations tasks. The line between peace operations and support operations is not always clear, but that isn't important. The key is to provide everyone with a common frame of reference to eliminate confusion during daily operations.

- **Force Protection** consisted of *lodgment area security, convoy operations, and the quick reaction force*, both aerial and ground.

- **Communications Support** was key to maintaining the ability to synchronize operations and to concentrate stabilizing assets at the decisive point quickly.

- **Route Clearance** to classify and clear key routes was essential to all other operations.

- **CSS Operations** included all the normal elements of sustainment plus a new one: *quality of life support*. As you can imagine, this grew in importance as the deployment progressed and was critical to maintaining high morale.

The Main Effort: When developing a new framework, it is best to begin with the fundamentals. As Jomini discovered, the "fundamental" principle of war is to concentrate and apply maximum combat power at the decisive point.⁵ We believed that this principle could be safely extended to peace operations. As a fundamental principle, it immediately establishes a useful frame of reference. Because the *main effort* is (or should be) at the decisive point, it was a logical choice for one of our framework's elements.

In combat operations, the main effort consists of whichever elements of combat power (leadership, firepower, maneuverability, and protection) are concentrated at the decisive point.⁶ The decisive point against which this combat

power is concentrated may not be a single place, but a dispersed function, like command and control or air defense.

In peace operations, we concentrate "stabilizing assets" instead of combat power at the decisive point. Certainly, combat power is a significant stabilizing asset, but it is just one of many. Stabilizing assets can include, among other things, civil affairs teams, PSYOPS teams, MPs, counter-intelligence teams, engineers, medics, transportation assets, interpreters, and key leaders. As in non-linear combat operations, the decisive point may be a dispersed function, such as public opinion or force protection.

The main effort can be either a treaty operations task or a support operations task. It depends on the decisive point, which will shift over time. When the squadron first entered Bosnia, the ACFL was the decisive point, and the separation of the FWFs was the main effort, clearly a treaty operations task. Once the FWFs had been moved out of the ZOS, the decisive point shifted to the area of transfer within the squadron's sector.

Civil affairs efforts in this area became the main effort as the squadron worked to ensure a smooth transfer of this politically sensitive area from the control of one FWF to another. Once the transfer was completed and the Inter-Entity Boundary Line (IEBL) was established, the decisive point shifted to the credibility of the GFAP outside of the ZOS. As a result, the main effort shifted to ensuring freedom of movement of both IFOR and civilians across the IEBL. After all FWF forces had moved to their cantonment areas, the security of IFOR elements in sector became the decisive point. A single casualty-producing incident against a vulnerable convoy or installation could undermine IFOR's credibility among the FWFs, leading to renewed hostilities and demands from some in Washington, D.C. to pull out of Bosnia. As a result, the main effort shifted to force protection, which is a support operation.

It's the Thought Process that Counts. The 3-4 Cav peace operations framework has worked well for the squadron's operations in Bosnia as a part of Task Force Eagle. It's probably far from perfect, but I don't think that matters. The important thing is that we found a system for organizing our plan-

ning under unique, and non-linear circumstances.

This framework will probably not work for other units in other types of peace operations for a host of reasons that I can't even imagine. But, by understanding the thought process we used to develop our framework, other units will be able to develop their own tailored framework whenever and wherever needed. That's why I don't advocate adding this framework to our doctrine. Instead, I would rather see our doctrine include a methodology for developing frameworks for non-linear, peace-oriented operations, and I believe that 3-4 Cav's methodology is a step in that direction.

Notes

¹Lester W. Grau, "Soviet Non-Linear Combat: The Challenge of the 90's," (Foreign Military Studies Office Study, September 1990), p. 2.

²William C. Bennett, "JUST CAUSE and the Principles of War," *Military Review*, 3 (March 1991), p. 11-12.

³U.S. Department of the Army, *Operations, Field Manual 100-5*, (Washington, D.C.: U.S. Government Printing Office, 1993), p. 6-12.

⁴Field Manual 100-5, pp. 6-12-13.

⁵Antoine-Henri de Jomini, "Summary of the Art of War," in *Roots of Strategy: Book 2*, ed. J. D. Hittle, (Harrisburg, Pa.: Stackpole, 1987), p. 461.

⁶Field Manual 100-5, pp. 2-10-11.

Major Sean B. MacFarland is the Deputy G3 of 11D. He served as S3 and then XO of 3-4 Cav in Schweinfurt, Germany and in Bosnia, where the squadron was reflagged to 1-4 Cav. He received a B.S. from the U.S. Military Academy and an M.S. from Georgia Tech. He is a graduate of both the Command and General Staff College and the School of Advanced Military Studies. He has served as a G3 plans officer in 3ID and has held a variety of command and staff assignments in armored cavalry units in CONUS, Germany, and South West Asia.

Training For Maneuver

by Captain Robert Bateman

Maneuver warfare: A controversial term, continually redefined and argued about, but generally agreed to be “a good thing.” Involves concepts like speed vs. synchronization and “ordinary” forces used in conjunction with “extraordinary” forces.¹ Generally cited, but rarely practiced in peacetime, paid some service in most U.S. Army doctrine, espouses the training of officers in “operational art,” but claims applicability to all echelons of warfare. Embraced by the United States Marine Corps as doctrine,² has components which are elements of U.S. Army doctrine.

This is a “Perfect World” article. Up front, it should be stated and acknowledged that the number one skill which our tactical echelons must perfect is how to DESTROY the enemy. Execution of violence is the enabling skill which frees forces to maneuver in most situations. It is the basic skill without which the author readily concedes that maneuver cannot happen. That said, given the time and money, the material and the men...

How do we train this generation of officers to execute maneuver warfare? Does the United States Army *de facto* embrace the concept of maneuver warfare as opposed to attrition warfare? Do we even acknowledge the possibility that the two might exist as separate entities, and should we? And what the heck is “maneuver warfare?” We all can infer what attrition warfare might be — images of the stagnation on the Western Front in WWI abound — but that’s not how **we** fight, is it? These are the questions that today’s senior leaders and doctrinal writers face, and which this essay plans to address.

Simply stated, “maneuver warfare” is the embodiment of Sun Tzu’s paraphrased maxim that the essence of generalship is not to win the war by winning a thousand battles, but to win the war having never had to fight a battle.³ Through movement and positioning, put your opponent into a position where he must cede what you desire, without firing a shot. This does not negate the role of the direct fire fight in **tactical** operations, but it does minimize the casualties taken by most tacti-

cal commanders and maximizes the options available to the **operational** level commander.

And so the question becomes, how do we train the current and successive generations of officers to conduct warfare that emphasizes avoidance of contact at any level in favor of positioning? And, at what level must we concentrate our efforts? Training second lieutenants in the planning and execution of the direct fire fight is, in all cases, a requirement. Training captains in the use of fire and movement to impose their will through an operation upon the enemy is also a necessary goal. But how do we train our staffs and the commanders that own staffs? These staffs start at the battalion and brigade, senior first lieutenants, captains and majors, as well as the lieutenant colonels and colonels in command. Where do they learn the beginnings of operational art, and the possibilities, as well as the risks, inherent in maneuver-style warfare? In what forum are their ideas validated?

Battalions and brigades participate in the Battle Command Training Program (BCTP), utilizing the Corps Battle Simulation (CBS) computer simulation, but at that level, they are more training aids than anything else. During training events of this size, battalion and brigade staffs generally do not even attend the training seminars or after-action review discussions. Where are lower echelon (tactical) headquarters trained for maneuver warfare and their creative and inspired innovations on the art of war tested? Sadly, for the United States Army, the answer would have to be that this last goal is not being met; it is not even being pursued. We are just not prepared, or currently equipped, to execute this type of training at the tactical level, and one could even argue that this is true for the operational level also, in light of the built-in limitations of the current generation of computer simulations.

We have thus far refused to train maneuver warfare-based tactics at our home stations or at the combat training centers. For maneuver training of tactical units, the question is, are we training tactical units to attack at unex-

pected times, using unexpected directions, or attacking dissimilar forces? No. These deficiencies might be corrected at our training centers in the future.

Our combat training centers (CTC), the Combat Maneuver Training Center (CMTC) at Hohenfels in Germany, the Joint Readiness Training Center (JRTC) at Fort Polk, La., and the National Training Center (NTC) at Fort Irwin, in the Mojave Desert of California, are not doctrinally or physically equipped to replicate anything but attrition warfare. Think back, those of you that have been to these training sites. When was the last time that you even heard of a battalion or brigade commander attacking 12 or 24 or 36 hours early and catching the Opposing Forces (OPFOR) before they were ready? “Never” will likely be your answer, and we’ve all served for commanders that we **knew** had the initiative to do so, were they not constrained by the system. Can anyone remember a mission, say for example a deliberate attack by a task force (TF), that had a no-later-than (NLT) time? In other words, where the commander was given the freedom to attack when he saw the conditions for success were set? “No,” again. Or, how about the objective? Invariably we set out to destroy the enemy’s main body. Why not attack his field trains and rear areas, his logistical underbelly? Or specifically target his air defense for ground attack from our infantry so that we might punch through with attack helicopters? Or attack his artillery with our infantry? The answer is because some elements of the OPFOR are not “in play.”

We have established training centers which do a terrific job of training second lieutenants to fight a platoon and live in the field, and captains how to command their companies in the swirling maelstrom of a TF fight. Our training centers, better than any other military in the world, replicate the “friction” and the “fog of war.”⁴ But, do they train initiative and audacity in commanders? Do they reward the innovative commander? We know that these centers reward the lethal commander, but can they be structured to create benefits for the commander that wins via another route? The commander who, through the use of maneuver, renders his opponent’s actions

irrelevant? The answers to these questions are unfortunately a resounding "No." OK, then, why are we not training as we say that we will fight? After all, ask any company grade or field grade officer, "Would you prefer to attack into the enemy flank or soft spot, or would you like to attack into the teeth of his defense?" The answer you will get is, "Into the flank, of course, you fool." Then ask, "OK, have you ever trained that? Would you recognize the opportunity? Have you ever attacked on your own initiative when you saw the enemy wasn't ready for you? Have you ever trained to pursue? Or do you regularly stop on the far side of the objective and wait for ENDEX?" You will not find many who can answer these questions in the affirmative. Pursuit, for example, is historically one of the most difficult missions to accomplish, yet it is never trained. What changes must be effected in these areas to correct our current training deficiencies?

How We Train

Among the three training areas noted above, the National Training Center at Fort Irwin is the largest and most complex CTC operated by the U.S. Army. Its state-of-the-art simulation devices, massive live-fire complex, and professional observer controller (O/C) teams train tens of thousands of soldiers every year. But what does it train those combat, combat support (CS), and combat service support (CSS) soldiers to do and expect, when and if they ever face true warfare?

To begin with, the NTC trains the combat soldiers and officers to seek the enemy, to destroy the enemy through direct and indirect fires, and to face the full brunt of his strength with all of our strength in a titanic struggle to determine the strongest and most efficient. The mission might be a meeting engagement, deliberate attack, or deliberate defense; in all cases, the rotational maneuver battalions are given orders that dictate when and where they might attack, and, in a few instances, even how they must structure their attack. Orders are deliberately sent, from the notional 52nd Infantry Division, that determine exactly why and when the rotational unit may cross restrictive phase lines and limits of advance (LOAs). Unit boundaries, for the battalions and brigades, are inviolate, and it's a rare occasion when one unit's request for an adjustment is granted by the 52nd Division. These are inevitably

due to notional division-level operations which the rotational unit supports. For example, the rotational units are locked into a 0600 attack on D-Day as the supporting effort to the divisional main effort. The main effort is an attack by the "other" brigade on their flank (notional). This occurs from the moment of their receipt of the OPORD on D-3 and is generally inviolate. In order to properly synchronize the division's notional maneuvers, the rota-

"All is sacrificed in the name of synchronization. The maneuver training centers currently exist solely to train tactical units in the synchronization of their available combat power...."

tional units must attack at the proper time in the proper place.

The "big picture" is used to restrict the rotational unit, never mind that a tactical breakthrough and attainment of the terrain desired might totally unhinge the OPFOR "division" and create greater opportunities for the 52nd Division. All is sacrificed in the name of synchronization. The maneuver training centers currently exist solely to train tactical units in the synchronization of their available combat power. The tactical unit that accomplishes this is more often successful in the firefights that occur at the preordained time. But no attention is given to other multipliers of combat force. For example, to borrow from LTC Robert Leonhard's book, *The Art of Maneuver*,⁵ a simple physics equation provides a convenient method of understanding the dynamic of time when applied to combat power, $F=MA$. That is, Force (Combat Power) = Mass (Raw numbers of combat systems/units) times Acceleration. Simply put, you can attack at H-Hour with four companies, and achieve less than if you had attacked at H-48 with two companies. This phenomena might be quantified as Mass of 2 (companies) x 48 (time factor, for this discussion 1=1) = relative combat power of 96, while 4x1 = relative combat power of 4.

This aspect of warfare requires training. Its component concepts are not inviolate doctrine. Yet the concept has been valid throughout the history of war. But we do not train units to recognize these situations when they arise. Instead, we wait, we mass, we synchronize. In the end, the result of this restriction is familiar and preordained:

the rotational unit attacks directly into the teeth of a prepared defense, or defends against the entire OPFOR regiment at 95% strength. This is the epitome of attritional warfare, facing strength with strength in a stand-up fair fight.

As for the logistics and supporting branches of the Brigade Combat Team (BCT), they have a separate fight of their own. No, this is not an analogy

referring to the "fight" to move assets, fix, fuel and arm the combat elements of the BCT. Though, were maneuver-based training instituted, this aspect of the training environment might take on an entirely new importance.

No, what is referred to here is that those soldiers and leaders in the brigade support areas and field trains of the BCT are often, quite literally, fighting an entirely different fight than those combat elements forward. They are daily shelled by long range artillery with devastating accuracy, hit with chemical attacks, and attacked from the air. All this despite the fact that there generally is not any OPFOR within kilometers of the BSA. They undergo these attacks to "validate" that they can in fact react to these challenges, no matter how well the combat units forward do in their destruction of the enemy infiltration efforts. Regardless of the tactical defeats which the OPFOR might suffer, and how well the BSA tenants might be dispersed and concealed, these continue. Why? Because these attacks are directed and initiated solely by the observer/controllers (O/Cs). They rarely have any relation whatsoever to the tactical play occurring between the combat units and the OPFOR at the FEBA. When a breakthrough of the main defensive belt does occur, the BSA is generally overrun, to be sure, but this is more of an afterthought by the OPFOR, and not their true tactical objective, as briefed by the S2s of the rotation, and the OPFOR themselves.

This occurs for two reasons; first, if the O/Cs don't do it, then the OPFOR likely will not commit assets to it

themselves; there is no payoff within the scenario. And second, to impose additional strain on the combat units forward as they lose logistic assets. Of the two, the first reason might seem the more puzzling. Why wouldn't the OPFOR attack the soft BSA units? For the same reason we are not allowed to attack their logistics: it would be too easy; it could destroy the rotation; and it's damned tough to do when the logistics assets do not have anything beyond individual MILES.

How does maneuver warfare get trained? At the current time, we do not train for this type of warfare. Maneuver, as defined by *FM 101-5-1, Operational Terms and Symbols* is, "The movement of forces supported by fire to achieve a position of advantage from which to destroy or threaten the destruction of the enemy."⁶ This alone is a step in the correct direction, but it does not give the reader a true grasp of what maneuver-based tactical and operational level training and doctrine might create.

To truly train and inculcate today's leaders in maneuver-based warfare, we must create a training environment where maneuver is rewarded, and this requires some restructuring at our training centers and our home stations. This training, following doctrinal precepts, must include both realistic field training as well as computer-based simulation training. But, to conduct this training and change how we currently train, we need to examine just how we train for war now, and the nature of the schism which has appeared between our doctrinal concepts and our training realities.

Methods of Defeat

In today's attrition-oriented training arena, defeat at the tactical level invariably equals destruction of the enemy within the confines of the order — in other words, destruction of the whole enemy attack, or destruction of the enemy forces at the point of penetration, etc.

Nobody denies that tactical formations must have the ability and skill to synchronize their combat power. Attrition (i.e. the destruction of enemy ground maneuver combat forces) at the tactical level is a required skill which all tactical echelons must possess; it is a prerequisite to operational-level maneuver. However, little attention is given by the staffs of the maneuver units during their military decision-

making process to interpretation of their basic mission. There is a mission (task and purpose), and a commander's intent (purpose, method, endstate), but the basic "why" of the whole operation is often forgotten in the mechanics of figuring out "how" to accomplish the task.

For training purposes, we are repeatedly given restrictive and specific missions. "Penetrate Obstacle X at PK 123456 and destroy all enemy direct-fire weapons which can influence the passage of lines of the follow-on forces through the breach." Or, "Defend in sector NLT 050600 DEC 95 from PL DOG to PL CAT allowing no penetration of PL PIG to support..." Darned little thought really goes into questioning that assigned mission to determine WHY we are defending here. Supposedly, we got that from the commander's intent, but the reality is somewhat different.

How do we defeat an enemy tactical formation? In three ways, by destruction, incapacitation, and irrelevance. First, if you manage to destroy the enemy, then obviously he cannot accomplish his mission and you win. It may well be a Pyrrhic victory ("One more such victory and we are lost."), and the massive casualties taken during the course of, and in the name of, training may dishearten your troops, but it will go in the training books as a "win."

Second, we may incapacitate the enemy so that he is unwilling or unable to execute a plan to force his will upon us. This incapacitation may be in the form of passive measures we take that would make an attack or defense by the enemy plainly a losing proposition. Or, it may be active measures, things like attacking the enemy's critical vulnerabilities which stop his current or projected operations. In mechanized warfare, fuel is the normal short-term show-stopper. No mechanized TF on earth can sustain heavy combat operations for better than 36 hours without resupply of fuel. For light forces, water or food are limiting factors, fuels for the human body.

Finally, we might make the enemy actions irrelevant. Abandon and target that hill mass dominating the main supply route (MSR) which we suspect is the objective of the forward detachment (FD) battalion. Pre-plan and open when required an alternate MSR which makes that previously critical portion of terrain just one more hill/pass/cut, etc. Allow the enemy to occupy the hill; keep him isolated and occupied in

position; cut *his* supplies; watch him wither on the vine. These last two methods of defeat represent movement as the key combat component to the success of the mission. Neither positively requires a direct-fire engagement, and neither is currently practiced or replicated anywhere in our training system.

Opponents of maneuver theory might balk at the idea of bypassing enemy combat units, regardless of their size. However, this has historically been the most successful method of defeating enemy units. An examination of the 37th Armor Battalion and its rampage across France under the command of then-Lieutenant Colonel Creighton Abrams operating in Combat Command "A" of the 4th Armored Division in WWII, finds that the tip of the spear in that most successful of divisions regularly bypassed any prepared defensive position.⁷ Attacking into the teeth of a prepared defense was anathema to their concept of maneuver. Yet their attacks unhinged entire German divisions during the summer of '44. Had Abrams waited to mass the combat power required, to synchronize to the degree expected at the National Training Center instead of using speed and terrain to bypass where possible, would Patton have been able to turn his Army northward, leading again with Abrams and the 37th, to relieve Bastogne that December? Our doctrine recognizes these forms of defeat in concept. Where we run into trouble is the reality of our training system, which does not accept "fear" or replicate logistics, or permit time to be the decisive factor for the "BLUEFOR."

One cannot inspire fear, or cause panic in surrounded units, during MILES training. Has anyone ever seen the OPFOR surrender in anything like the numbers that even the best of the Republican Guard Divisions surrendered? Of course not; the OPFOR (and our forces) cannot be scared, they will fight to the last man in training, and move until killed. If surrounded, they will attack; if isolated, they harass. Their sole (current) vulnerability is their logistics, for even the OPFOR cannot move without fuel. This is a greater vulnerability than we assign to the opponent forces in our computer simulations, who never suffer logistically and cannot run out of fuel, as fuel and ammunition are "magically" resupplied in all exercises, up to and including the CBS system used during BCTP. How then can we attack these softer targets, when they are not available to

attack? We must restructure the training system to replicate these aspects of warfare.

How We Might Train

Today, we are testing and validating the potential advantages of information-based warfare. Our force structure and weapons systems are coalescing around the concept of using information as a combat multiplier. Increased information availability and flow should allow our forces to maneuver more precisely and get inside the enemy's "Decision Cycle." These changes should amplify the potential effects of maneuver, as opposed to attrition, training. We will better "know" ourselves and our enemy, and be able to more accurately assess his strengths and the locations of his strength, as well as his weaknesses.

Near-perfect intelligence (a lofty goal, but one which we are striving to attain) may soon be available down to the battalion level. What will we do with that knowledge? What changes should we incorporate today in our training centers and computer simulations to take advantage of these newfound abilities? Or will we continue fighting in the same old style, only now knowing better the firestorm into which we are throwing our forces in the name of "training."

Three changes in our system of training might start the ball rolling for a conceptual revolution in our methods of training for war.

The first change would be at our combat training centers, NTC, CMTC and JRTC. This would be the introduction of true "free play" in the maneuver box. One caveat to the observations listed below is that the recent move in NTC towards "brigade ops" is a great step forward. This brings greater flexibility, at least potentially, to the subordinate battalions. Brigade boundaries may still be imposed by the 52nd ID, but how the battalions maneuver within those limits is now open to much more interpretation. The forward thinkers at the NTC who implemented this change deserve congratulations.

However, true "free play" remains a goal. To implement this change would be costly, as it requires the OPFOR maneuver elements and their logistic support elements to enter and remain in the maneuver box at all times. One foreseen future critical vulnerability of the BLUEFOR will be the addition of

the M109A6 Paladin to the maneuver box as a maneuver element. Utilizing the greatly increased dispersion and movement abilities of the Paladin will likely mean that these systems will move in smaller groups, if not semi-autonomously. This greatly increases their survivability against indirect counterbattery fire, yet now makes them a high payoff target for the OPFOR in the direct fire fight. If we are going to place the BLUEFOR artillery into the maneuver box, we should do something similar to the OPFOR, creating a vulnerability of theirs that we might aim to exploit.

Ideas like this double, if not triple, the OPFOR PERSTEMPO, taking soldiers away from garrison and adding wear and tear to twice the number of vehicles as the current system. This implies either an increased budget and increased number of soldiers assigned to the OPFOR of the training centers, or a reduction in the number of rotations scheduled yearly. Painful choices indeed, which can be avoided, if we just keep training in the same old way. But the advantages might also be great. For the first time since inception, the OPFOR would have a critical vulnerability which it must protect. The OPFOR would also have to maintain contact, to guard against surprise attacks and build its intelligence picture. Their soldiers will become tired at night, opening the way for infiltrations which are nearly impossible against troops that rotate to the rear while contact is not imminent. They might be the ones paralyzed by deadlined vehicles and reduced fuel as it's their support elements attacked by our artillery. These are all realistic events not replicated today.

The second change should occur within our computer simulations, adding those same vulnerabilities and more. Commercially available computer simulations have been replicating logistics fatigue and the morale of units for over a decade. Yet, today our most sophisticated simulations allow friendly and enemy units to fight to the last pixel! Why, when we wargame against an enemy with a strong artillery force, must we focus on the destruction of the artillery systems themselves? We throw our deep attack assets against his artillery "center of gravity" and come away battered by the resultant losses to his air defense systems. Common sense tells us all that with huge artillery parks come even larger logistical tails feeding ammunition to the guns. These assets are rarely adequately defended by tacti-

cal air defense in our own Army, let alone in the other armies. Wouldn't silencing his guns be as effective as their destruction? Adding more realistic logistics simulation to the enemy forces in our wargames would acknowledge this, and create more opportunities for our planners.

Finally, we must reintroduce wargaming skills to our leaders. Often cited as

"The first change would be at our combat training centers, NTC, CMTC and JRTC. This would be the introduction of true "free play" in the maneuver box...."

"a lost art," wargaming skills are not emphasized to our junior leaders early enough. It is through constant wargaming, in a variety of environments and systems, that we might inculcate maneuver throughout our Army. There is no better teacher than experience, and wargaming at all echelons is a very cost-effective method of teaching. Wargaming means more than the deliberate process used during the military decision-making process to arrive at a recommended course of action for the commander; it should be trained constantly. Our lieutenants should train every week, using tactical decision games or commercial computer simulations on moving forces, comparing forces, creating deceptions, and exploiting weaknesses. The advantages of speed and intelligence to maneuver, as well as the technical aspects of creating an efficient engagement area can all be replicated in various commercially available computer simulations or board games. Through the constant use of these tools, the mental flexibility required by today's, and more especially tomorrow's, leaders might be increased and their personal information-processing speeds increased. We need fast, flexible leaders, and wargames are the most cost-efficient method to develop those leaders.

Endstate

Today we fight toe-to-toe with the enemy when we train at the tactical level. This builds competence in our junior leaders, our sergeants, lieutenants, and captains. Our tactical units must have

the ability to synchronize their available combat power to utterly destroy enemy units that face them. The problem is that we train exclusively for this ability. At no tactical echelon does the United States Army currently reward all three of the potential advantages of maneuver as a mechanism for defeat of the enemy. We all accept that attacking the enemy in the flank is a good idea, yet we rarely practice this. Attacking the enemy before he is ready is another agreed upon goal. But there are few combat leaders that have ever been given the chance to attack when they saw the opportunity, and fewer still that have consciously trained to recognize that window of opportunity. Finally, hitting his logistics is universally identified as a primary means of slowing, stopping, or at least changing the enemy's plan. Yet nowhere do we actually train to attack his, or adequately attempt to protect ours.

To train in as identical a manner as we say we are going to fight requires change, and in this decade of change for the United States Army, these changes can't come soon enough.

Notes

¹Sun Tzu, *The Art of War*.

²Fleet Marine Force Manual-1, March 1989.

³*Ibid.*, Sun Tzu.

⁴Clausewitz, *On War*, ed. and trans. M. Howard and P. Paret [Princeton, N.J.: Princeton University Press, 1976].

⁵Leonhard, Robert, *The Art of Maneuver*, Presidio Press, 1991.

⁶*FM 101-5-1*, June 1993.

⁷Baldwin, Hanson, *Tiger Jack, The Life of "P" Wood*, Old Army Press, 1979.

Captain Robert L. Bateman is currently attending graduate school en route to the History Department at USMA. He previously served as commander, HHC/2-7, 1st Cavalry Division. He has served as BMO, 2-7 Cav, S3 (Air), and platoon leader 4-87 Inf (L). He is a graduate of the Infantry Officer Basic Course, Airborne, Air Assault, and Ranger Courses as well as the Armor Officer Advanced Course.

SOFTWARE REVIEW: TACOPS

Play It for Fun Or to Enrich Training

TACOPS by Major I.L. Holdridge (Ret.), Arsenal Publishing, Reston, Virginia, 1996, IBM 3.5" version 1.0.3 for Windows. \$44.95.

TACOPS is a detailed and accurate simulation of contemporary ground combat. The player can assume the role of a U.S., Canadian, or "OPFOR" commander. There are 27 scenarios, including a "Basic Training" tutorial designed to familiarize you with game mechanics. Each scenario has up to a dozen computer opponent strategies. The *TACOPS* database includes 150 unit types and 100 weapons systems. You can access unit and weapon information, including effective ranges, armor penetration, and photos, via pull-down windows.

TACOPS is played in turns that represent one minute of real time. There is an Orders Phase and a Combat Phase in each turn. During the Orders Phase you use point-and-click windows to issue orders. The unit orders window is the heart of the game. Some possible orders include: establishing waypoints for movement, loading and unloading troops, firing smoke grenades, establishing unit SOPs for actions on contact, setting weapons engagement ranges, setting direct-fire TRPs, setting engagement priority by unit type, resupplying units, splitting or joining units of the same type, and naming units.

Orders can be copied from unit to unit for ease of play in larger scenarios. You can have the unit demonstrate its orders to see if it's going to do exactly what you intended.

After you issue orders to your units, click on "Begin Combat" to start the Combat Phase. Both sides carry out orders in four 15-second pulses. The graphics and sound effects during combat are realistic: ATGM launches provide signatures; artillery smoke lingers on the battlefield; and each weapon has its own unique sound, down to the M203 Grenade Launcher. The effects of combat are also realistic, ranging from suppression, infantry casualties by soldier, near-miss, hit but not damaged, mobility or weapons damage, to vehicle or infantry unit destroyed.

TACOPS can be played solitaire or against the computer (only as the U.S. or Canada), "hotseat," by e-mail, on a network, or by modem. Custom scenarios can be generated using the ten existing maps. Nine of the maps are in a woodland setting, and one is repre-

sentative of Germany. Future expansion releases will include terrain from the National Training Center, Bosnia, and other possible deployment areas.

Purely as a computer simulation, *TACOPS* is great game. The user interface is intimidating at first, but the tutorial provides a solid foundation of understanding for future games. The 226-page user's manual provides a wealth of information. Over 100 pages of the manual are devoted to designer's notes, frequently asked questions, tables of organization and equipment, and tactical hints. Arsenal Publishing has its own web site for product information, software help, and comments and questions. Responses are prompt, often answered by Major Holdridge himself. Also available on-line are maps, scenarios, and a *TACOPS* demo game.

As a military simulation, *TACOPS* has unlimited training potential. As an Advanced Course student, I have designed scenarios to support battalion staff exercises. Using only one computer, the company commanders are at the terminal, and the battalion commander and staff are in a nearby "TOC." The groups communicate via radios or land line. This separation promotes reporting by the companies and battle-tracking by the staff. A *TACOPS* scenario can be modified to accommodate whatever task organization you want to simulate. Using this method, the computer can play the OPFOR, or the game can be generated from scratch, which requires a human opponent to play the OPFOR. The complete tactical decision-making process can be exercised, and the staff gets to see how the plan fares in execution.

TACOPS is a realistic simulation that is an enjoyable game. If you purchase it and do nothing else but play it as a game, it will be money well spent. If you want to apply some creativity to your unit training program, *TACOPS* can easily help. If I bought only one computer game this year, it would be *TACOPS*. I have a feeling my microarmor will be gathering dust for a long time to come!

TACOPS is available direct from Arsenal Publishing (703-742-3801.) You can download the game demo from the Arsenal home page on America Online at Keyword: Arsenal, or on the World Wide Web at <http://www.arsenalpub.com>.

JERRY A. HALL
CPT, Armor
Ft. Knox, Ky.

MAKING KILLERS



Imperatives for Tank Lane Training

by Lieutenant Colonel James C. Crowley (Retired)

Winning or losing heavy force battles normally depends on the fighting proficiency of tank crews. You need “killers” to win. The fundamental standards are simple and direct — be able to kill and survive.

I have had the opportunity to observe many killer tank crews, but will cite one example — the crew of D-22 — in a defense of the Washboard at the NTC during 1986. The OPFOR had achieved what looked like a breakthrough with two reduced strength motorized rifle battalions (MRB), and I was working my way around to follow this penetration. The terrain was very broken, and it took a few minutes to move to a good position to observe and follow the closest MRB.

When I arrived, I found a graveyard of blinking lights. A call to the Tactical Analysis Facility at the Star Wars building revealed that one tank, D-22, had accomplished this destruction. I next saw a lone M60A3 moving quickly down a wadi, intermittently moving up to hull-down position for a quick look and then back to full cover for continued movement. D-22 was stalking the second MRB, a quest stopped short by a change of mission.

On the surface, this crew was not unusual. They had gone through the same training program as the rest of the battalion. Only the driver had been to the NTC previously. The tank commander had been in the battalion less than a

year, having had a previous recruiting tour. But this crew was special. They could shoot, use terrain, and had a tactical sense for the battlefield to a level that made them superstars.

Being a killer is far more than a matter of knowing and being able to do the tasks outlined in various Soldier's Manuals, gunnery manuals, MTPs, and drill books. Enemy acquisition, use of terrain, and target engagement must be done quickly and very well. “Well” means being better than your enemy. An analogy to boxing is appropriate here. To win, the boxer must not only have the basic skills, but he must be quicker, stronger, and have better technique than his opponent. He must be able to find and take advantage of any weakness in his opponent. Even after basic skills are second nature, endless hours of practice are spent conditioning and training to make minor improvements, because the difference between losing and winning is so small.

Based on observation and discussion with many successful tank crews at the NTC, I wrote an article for *ARMOR* outlining some of their tactics, techniques, and procedures.¹ While I feel that this article reasonably outlined many important tank fighting skills, it did not adequately address the equally important issue of training those skills. Since then, observation of numerous training events and discussions with leaders with far more experience than mine has only strengthened the hy-

pothesis that crew proficiency is fundamental to winning battles. They have also convinced me that, while there are natural superstars, good training can develop more of them, greatly improve the average, and eliminate the tank crews that are merely targets. The key ingredient is a direct focus on developing crew fighting skills that is frequently missing from training exercises.

This article outlines some insights as “imperatives” for training tank crews through effective platoon lanes training. None of the ideas in this article are original.² All are based on extensive observations of unit training, study, and discussions with many leaders about what works and what doesn't. Although all are being practiced in the Army today, they are often absent. Their absence marks the difference between truly effective training and training which looks and is somewhat effective, but which could be much better.

This discussion of lanes events does not mean that lanes are the only component of a program to train battle-competent tank crews. Certainly the tank gunnery tables and the gunnery programs outlined in the FM 17-12 series are essential. Another type of crew training with proven merit includes direct crew training events like “King of the Hill”-type exercises where individual crews or sections directly develop “dogfighting” skills in low cost, low preparation training events. Such

events are especially beneficial in that they allow a high number of repetitions in a limited amount of time with small OPTEMPO and preparation costs.

Lane Imperatives

Focus on training crews during platoon lanes. A central precept is that platoon lanes concentrate at least as much on training crews as the aggregate platoon. Although the concept of multi-echelon training is accepted, in practice most platoon lanes are aimed mainly at the platoon and tend to focus on platoon leader planning and platoon leader decisions. Platoon lanes should focus on full crew proficiency and a limited set of platoon tasks and skills needed for continued training in higher level events. Most platoon tasks can only be truly trained to standard during company-level training exercises that focus on training platoons in a more realistic environment.

This focus on crew training during platoon lanes makes a big difference in the way a lane is planned, resourced, and executed. The most obvious difference is in the trainer or O/C package. One O/C can track the platoon, but to observe effective use of terrain, maintenance of security, and other important crew actions requires at least a second O/C and assistance from the perspective of the OPFOR. The remainder of the imperatives in this article support achieving this central precept.

Design and conduct platoon lanes to train killing, surviving, reporting, and sustaining. This is a small expansion of "Move, Shoot, and Communicate." In the most basic terms, tank platoons contribute to larger organizations, winning battles and engagements by being at the right places on the battlefield at the right times. They exert their influence by killing the enemy and reporting critical information.

I use the word "killing" rather than "shooting" deliberately. To kill you must be able to shoot accurately and quickly, but shooting skills alone are not enough. Killing requires acquisition, which in turn requires constant surveillance, a sense for terrain, and the ability to anticipate enemy dispositions and actions to focus these efforts. It also requires that the platoon leader

have the skills to control and distribute fires.

Survival is as necessary as being able to kill; in fact, it is a prerequisite. A tank that can survive will do its share of killing, which is a reason to stress battle patience. Selection of routes and positions to provide for the best possible cover and concealment, use of appropriate rates of movement, earliest possible acquisition of the enemy, as well as killing him before he can kill you, all contribute to survival.

To survive, all-around security must be constant. While the concept of all-around security is easy to understand, developing the teamwork and crew skills to constantly maintain full battlefield surveillance and awareness requires structured practice, discipline, and tactical sense. A clear example is "target fixation," where the crew is so intent on an enemy target to the front that an offset enemy engaging them is unnoticed until too late.

We must stress survival because the objective of training is preparation for war. Soldiers must be confident of their ability to survive a conflict, and training events must create that confidence by building survival skills.

Sustainment activities, including maintenance, supply, and preventive medicine, are necessary to effectively enter and continue the fight. Moreover, training must develop the self-discipline to perform this function continuously and automatically, regardless of circumstance. Reporting refers to the requirement of continuously keeping the boss, subordinates, and other members of the team informed of the enemy situation, the platoon's status, necessary support requirements, and any other important information in a timely manner.

Like the battlefield operating system functions, these functions must be continuously performed during combat operations. Platoon training exercises should have developing this level of performance as a primary objective, regardless of the specific MTP tasks being trained. These functions are necessary complements of current MTP because they are critical but not sufficiently highlighted in its current set of tasks.

Every platoon AAR should concentrate on these functions and their im-

provement, as well as the specific ARTEP-MTP tasks and drills included in the exercise. Standards are not met with an absolute "GO" or "NO GO" criteria, but by being as good as possible.³ Each killed tank crew should be asked:

"Did the platoon accomplish its mission and meet the commander's intent?"

"Could we have done better?"

"How?"

"Why did you die?"

"What could have been done to avoid getting killed?"

The chain of command conducts lanes. There are several reasons why the most important imperative is active, direct conduct of lanes by the chain of command.⁴ First, effective training requires experienced, expert trainers. The most experienced platoon leader in the company is the company commander, and the most experienced soldier in the company is the first sergeant. Participation of the company commander and ISG also develops effective communications and operating procedures between the company commander and his platoons — from orders development through reorganization and consolidation actions following an engagement. Additionally, participation of the company team command group and trains (commander, ISG, XO, FSO, with medical and maintenance support elements) performing their C2 and sustainment roles during platoon lanes provides platoons realistic training on a full range of fighting, sustaining, and reporting tasks. Participation of the company command group and trains from a tactical configuration is excellent preparation for their company-level operations. For these reasons, tactical road marches, assembly area, and preparation for combat activities should be conducted at company-level during platoon lanes training periods.

However, the main reason why active participation by the battalion and company chain of command is important is that this is a clear signal that tactical proficiency is important.

Planning lanes training to allow commander participation requires effort. To be conducted correctly, lanes require extensive preparation and support, and

platoon lanes are normally planned, prepared, and conducted as a battalion- or even brigade-level effort. During a platoon lanes training period, several different lanes are normally conducted to train a complete set of tasks and drills, with platoons rotating between lanes. Planning the rotation of company commanders and first sergeants to be the primary trainers on each lane can be difficult. However, this is critically important, and should never be left out, even if it increases the time needed to conduct the set of lanes.

Use of the “lanes meister” concept can help overcome this scheduling issue. The “lanes meister” is a battalion officer with the responsibility to plan, set up, and conduct the lane. He controls the OPFOR, additional observer controllers, and support personnel. Close cooperation and preparation effort between the “lanes meister” and company commanders and first sergeants is required, given the different set of preparation and execution responsibilities. It’s important to hold a joint rehearsal of all trainers to finalize exact responsibilities and procedures.

The best example I have seen of this emphasis on chain of command involvement was the OPFOR “Spear Stakes,” conducted during 1995.⁵ The lanes were set up at brigade level and observed by the brigade commander and S3. The “lane meister” was the assistant battalion S3. These platoon-level AARs were conducted by the battalion commander or S3, and the company commander. The chain of command’s priority on developing the warfighting skills of subordinates was clear.

Plan and prepare to conduct and watch the exercise effectively. An effective training event requires the same type and level of planning and preparation as a deliberate tactical operation. The terrain on which the lane is set up, the tactical situation, and enemy positioning must force platoons to practice all-round acquisition and allow use of terrain for cover and concealment. You want to create a training situation where training weaknesses result in obvious performance shortfalls — dying, failing to kill the enemy, or not accomplishing assigned tasks. The battalion commander, staff, and CSM play a critical part in these preparations. Their breadth of tactical experience ensures adequate preparation. The effectiveness

of lane preparation is more a function of quality than quantity.

Trainer and OPFOR preparation includes reconnaissance of the terrain, detailed instructions to each trainer and the OPFOR, terrain walks, brief-backs, and rehearsals. Planning and preparation to watch the engagement and collect data for the AAR is particularly important. It is too late to put together the events for an AAR after the exercise is completed, if key pieces have not been collected beforehand. Similar to the tactical IPB process, needed information requirements should be identified, specific observation and collection responsibilities assigned, and recording procedures established. Often, it is better to use enemy OPs rather than have all O/Cs accompany platoons. As an example, during the occupation of a battle position, an OP viewing the battle position from the enemy’s direction could determine if the occupation was accomplished with minimum exposure far better than an O/C watching from the friendly side.⁶

Trainers must know the OPFOR plan and dispositions, as well as that of the platoon. During planning and rehearsals, trainers predict the exercise flow and identify specific observation requirements, with emphasis on survival, killing, and mission accomplishment. For example, the senior O/C should determine when the platoon should first be able to detect the OPFOR and make sure all the trainers, including the OPFOR controller, are looking to see how long detection and reaction actually take, which tanks should have been able to detect the OPFOR and, if not adequately accomplished, how this performance could be improved. During the event, the first trainer who sees that the platoon could detect the OPFOR should announce this over the controller net.

After the platoon’s OPORD and rehearsal, the trainers should do an internal debrief and refine the observation and control plan.

A net control station (NCS) should be set up to monitor company, platoon, OPFOR, and trainer control nets. The net control station plays the fire direction net, if the company SOP calls for platoons to call for fire over this type net. It also directs fire marker actions if they are included in the lane. The net

control station tracks the battle, monitors and records OPFOR and friendly events, the information exchanged within the platoon, and the platoon’s reports. If possible, the net control station should be set up on an OP to observe the lane, as well as monitor radio traffic. An experienced NCO running the NCS is invaluable in assisting the senior trainer prepare for the AAR.

Trainers, OPFOR, and the NCS must be sufficiently sized and prepared to record details of the battle for the AAR. Because emphasis will be on killing and survival, an annotated “killer-victim scoreboard” is important. This means being able to record each killing event with a killer, time, and locations of killer and victim. Although most of the times the crews will know this information, for the events over which there is confusion, it is particularly important to have this data.

Trainers and OPFOR controllers must ensure a fair fight. That requires a knowledge of how to check MILES to ensure it is operational and that sensors are cleaned and not covered by camouflage or improper use of fighting positions. Rules of engagement must be defined, understood, and enforced. Much effort has gone into the rules of engagement used at the CTCs, which should be the basis for those used during home station lanes.

After execution, the chief lane trainer prepares for the AAR with a debriefing of his training team, to reconstruct what happened and why, and to ensure he has identified the key points that should be brought out during the AAR. The focus should be on the bottom line — tasks and critical sub-task standards and the tactical functions, especially killing and survival. Who died and how could it have been avoided? Who didn’t engage, but could and should have? Who engaged but didn’t hit?⁷

Repeat execution until high skill levels — not just understanding — are obtained and ingrained. Although the need to “train to standard and not to time” is universally accepted, in practice there is a tendency to underestimate the impact of frictions that always accompany training and allocate too little time. This often means only one execution run. It is repetition of the execution phase that builds crew proficiency — again, this is like sparring for

the boxer. When planning lane timelines, three or four execution runs with an AAR should be the target. Although the amount of time required for lane varies by the unit's proficiency and specific tasks contained, two days per platoon per lane is a good starting point for planning. If the platoon reaches standards quickly, it is easy to increase lane difficulty; for example, adding a persistent agent event to the exercise.

When repeating execution, always put in a sufficient change in METT-T to provide for actual practice of tactical skills, rather than merely refighting the last engagement. The objective is not to learn to deal with a specific situation but to perform functions and tasks well in a variety of situations.

Train a tactical event — not an entire operation; but train all the tasks in that event. Too often, platoons are given company-type missions, particularly for offensive tasks. Platoons normally perform tasks, (overwatch, assault, breach, etc.) as a part of a company scheme of maneuver. Lanes should be set up to train a narrow set of tactical tasks and the functions of killing, surviving, reporting, and sustaining in a limited scope training event.

Even though the platoon lane should train a single tactical event, all the tasks required during combat should be identified by the trainer and included as training objectives. Timely reporting, complete pre-combat checks, crosstalk with other platoons, casualty evacuation and reporting, reaction to indirect fires, and the full range of reorganization and consolidation activities are often left out of training events. This results in negative training, in that the platoon is practicing without performing to the real combat standard. This does not properly prepare the platoon because, when forced to perform realistically with the full set of requirements, something drops. When all required tasks are consistently practiced during training, they become automatic.

Crawl and walk to prepare for running. To focus on platoon collective tasks and crew proficiency, leader and soldier training must be done first. A review of principles, tactics, and procedures, including a detailed discussion of the tactics of execution — such as use of terrain, likely enemy disposi-

tions and actions, appropriate reactions, and the benefits of alternative actions — should be a part of this preparation.

The platoon leader validates his order before giving it to the platoon. Incompleteness in the order, a flawed concept, or other planning mistakes that would preclude success, should be addressed before the platoon leader issues the order. While the platoon leader may learn by seeing his flawed plan fail during execution, the platoon will not learn.⁸

Likewise, critical soldier tasks and training, such as operation of a mine plow before a breach exercise, should be trained and validated beforehand. An item that must be validated is MILES maintenance and proficiency. This type of preparation training can be successfully done, either in garrison just prior to the lane, or as a part of the field lane. However, activities that should be normal preparations for combat operations, such as briefbacks, PMCS, pre-fire checks, rehearsals, and pre-combat inspections should be part of the field lane. These are structured training events with the same emphasis as tactical tasks. These are not done just to make the run phase successful, but to train time management, how to do these events properly, and to reinforce that these are routinely done during combat. As with the order, leaders are checked before conducting these activities and these events may have their own AAR and retraining if not done to standard.

We must stress platoon rehearsals. Failing to rehearse when it is possible and appropriate is a common problem. The OPORD can specify activities to be rehearsed. One example could be rehearsing going to MOPP4 if the enemy situation is one where use of chemical agents is expected. At the same time, reconnaissance and rehearsal activities should be tactically realistic. Rehearsals on the actual terrain on which the lane will be executed defeats the training goal, because this teaches a solution to a specific piece of terrain, rather than training how to apply tactical skills. Reduced scale rehearsals, or rehearsals on similar terrain, are appropriate, just as they would be in an actual tactical situation.

Ensure a competent OPFOR. An OPFOR that cannot destroy exposed

BLUEFOR vehicles, that does not use terrain effectively, or that attacks by rote, using the obvious scheme, will not stress the BLUEFOR to truly learn fighting skills. This means negative learning and false confidence. The OPFOR at the NTC has been criticized by some for being too good, but the competency of the OPFOR, more than any other factor, was the reason for the revolutionary improvement in heavy force tactical competence in the 1980s. In the same way, OPFOR proficiency is critical to effective platoon training exercises.

While the OPFOR element can receive valuable training, its purpose is to train the BLUEFOR. The "lanemeister" must ensure that the OPFOR is thoroughly prepared, that their tactical dispositions are sound, and that OPFOR mistakes do not compromise the training. This includes backbriefs, rehearsals, and pre-combat inspections.

An experienced controller should be assigned to the OPFOR to work with the senior trainer to ensure an effective plan and preparation, to enforce rules of engagement, and to observe and record the events in the exercise. He should have specific observation tasks and responsibilities. The OPFOR and their controller take part in trainer rehearsals, and he and the OPFOR are debriefed to prepare for the AAR.

Make the OPFOR an active participant in AARs. Unfortunately, the majority of platoon AARs I have observed do not include the OPFOR. This is unfortunate because the best AARs I have seen included extensive discussions between the OPFOR and BLUEFOR about what each did right and wrong, and what the effect was for both. For example, "Your tank came right around the one I hit first, and it was an easy shot. You should have moved along a different route." Such interactions allow leaders and soldiers to put themselves in the enemy's position and to think of the problem as one of beating an intelligent enemy, rather than fighting against an unthinking template.

Final Thoughts

The reason for this article is a belief that planning, preparing, and executing training events need better coverage in current training doctrine.⁹ Conducting

effective, efficient training events is difficult but critical in today's turbulent, constrained training environment. There is a constant requirement to develop leaders and maintain ready units. Most platoon training events I have observed have been generally effective, but most could have been better. Maximum benefit must be made out of each field training event, and a more standardized approach emphasizing killing and surviving, the essential fighting skills at crew and platoon level, is necessary to support this objective.

This article does not present a complete discussion of lanes training. It does present some ideas, based on a reasonably extensive set of observations, about how training can be made more effective. Coupled with other discussion and dialogue, I hope that these ideas can add to the process of improving an important training area.

Moreover, I believe that this approach is important in training all echelons. While some leaders have an instinct for fighting, a direct focus on protecting the force and on beating your opponent during training can develop a greater tactical sense in all leaders, one which will stand them in good stead regardless of future METT-T, echelon, or grade. Training can too easily focus at the form and procedures level (checklists) rather than on the winning and developing winners level. Future conflicts will occur, and each engagement will be unique. While procedures and even specific tactics needed to win change with METT-T, the leader's tactical sense, instincts, and passion to win transcend METT-T. Effective training can develop these skills and traits.

Notes

¹"Killer Tank Crews," *ARMOR*, September-October 1984.

²The ideas included in this article have been borrowed from many such leaders. They include but are not limited to: Lieutenant Generals F.J. Brown and Wes Clark; Brigadier General Rusty Casey; Colonels Bill Janes, Tom Graine, Larry Word, Mac Johnson, Fred Dibella, Pat Lamar, Terry Tucker and the late Will Densberger; Lieutenant Colonels Tony Carrie, Chris Bagget, and Tom Wilson; Captains Brad Booth, Wil Grimsley, and Tom Kelley; and Tom Lippiatt. Providing direct input to this article were General Edwin Burba; Colonels Don



Appler, Bob Jordan, and Lee Barnes; Lieutenant Colonel Joe Moore; and Dr. Marty Goldsmith.

³For example, the task of "Assault an Enemy Position" in the tank platoon's ARTEP 17-237-10-MTP has a task standard of losing no more than one tank. While a useful beginning benchmark, depending on METT-T, this may or may not mark a desirable level of survival proficiency. If that one tank was killed because of an avoidable mistake, improvement is necessary.

⁴"Make commanders the primary trainers" is also a principle of training in FM 25-100 and 25-101. However, the battalion and squad exercise examples in Chapter 4 of FM 25-101 dilute this principle. They show counterpart and self-training rather than the chain of command setting up and conducting training for their subordinates. Training an organization requires active effort of the chain of command. The platoon leader is responsible for training his platoon, but the company and battalion commander are also responsible. If anything, the primary responsibility is with the higher commander to train his subordinate organizations and leaders.

⁵These platoon lanes were actually Reinforced Motorized Rifle Company (MRC(+)) lanes. An OPFOR MRC(+) is composed of a tank platoon and a mech infantry platoon (3 BMPs), with one platoon leader acting as MRC commander and the other as his deputy. For clarity, I have called these platoon lanes.

⁶This is also an example of MTPs not always directly emphasizing survival skills. The task "Conduct Hasty Occupation of a Battle Position" does not have direct standards of avoiding exposure during the occupation. Yet the conditions are of likely enemy contact.

⁷These and the other AAR techniques outlined in TC 25-20, "A Leader's Guide To After-Action Reviews," are sound but not always fully applied.

⁸For an excellent discussion of this point and others, see "Training in a Low Budget Environment" by Majors Armor D. Brown, Clarence E. Taylor, and Robert R. Leonard in *ARMOR*, July-August 1995. Incidentally, a key point that these authors brought out was that the training program they described did not, but should have, included platoon lanes.

⁹Based on review of FM 25-101, "Battle-Focused Training;" ARTEP 17-237-10-MTP, "Mission Training Plan for the Tank Platoon;" and TC 25-20, "A Leader's Guide to After-Action Reviews."

Lieutenant Colonel James C. Crowley (Retired) was commissioned in Armor in 1967 from the United States Military Academy and holds a masters degree from Georgia State University. While on active duty, he served in a variety of assignments in cavalry and tank units in CONUS, USAEUR, and Vietnam, as well as positions as chief of the NTC Observation Division, in the Directorate of Training and Doctrine at the United States Army Infantry School, and on the BOLD SHIFT Task Force at FORSCOM. He is presently employed as a researcher with RAND in Santa Monica, Calif.

TALIK: Steel Division-Six

Patton Museum Ceremony Honors Major General Israel Tal (Ret.) Mounted Leader of the Israeli Defence Forces

by Major General Stan R. Sheridan (Retired)

On the 10th of December 1996, the Patton Museum Development Fund-Cavalry/Armor Foundation and the United States Armor Association together held a recognition ceremony in the Patton Museum to honor Major General (Ret.) Israel Tal, the premier living Israeli tanker and mounted force leader of the Israeli Defence Forces.

It was fitting that General Tal be honored at the home of U.S. Armor, within the Patton Museum, a building erected in honor of one of the U.S. Army's greatest leaders, General George S. Patton, Jr., and in an auditorium named for General Creighton W. Abrams, the premier U.S. mounted force leader and visionary of the U.S. Army's recent past. Among the many dignitaries present in the audience were Major General Yoram Yair, Israeli Defense Attache; Major General George H. Harmeyer, CG, USAARMC; General (Ret.) Donn A. Starry, former CG, USA TRADOC and CINC RECDCOM; Mr. Hudson Drake, Corporate VP, Teledyne, Inc.; and Mr. Roger Tetrault, President, General Dynamics Land Systems, along with many of General Tal's friends and admirers from both the United States and Israel.

General (Ret.) Donn A. Starry, representing the U.S. Armor Association and accompanied by the artist, Mr. Jody Harmon, presented General Tal with an original portrait, entitled *TALIK*, as General Tal is affectionately known in Israel, depicting him as the Commander of the Steel Division during the Six-Day War. Included with the portrait is the scene of a tank-vs-tank battle typical of actions of the Steel Division. The presentation of the portrait, and the recognition it represents, was the culmination of the efforts of many of General Tal's friends and admirers in the United States, past and present, in and out of uniform, from both the U.S. Army and U.S. industry. Following the presentation of the portrait, the first of 250 prints of the portrait, *TALIK*, was

unveiled on the "COMMANDERS' WALL" in the Patton Museum by the museum's director, Mr. John Purdy. The singular nature of this honor to General Tal rests in the fact that his portrait finds itself in the company of Generals Patton and Rommel as the only other mounted warfare leaders whose portraits are now displayed on the Commanders' Wall. Other portraits by Mr. Harmon, including one of General Abrams, are planned for future display. The remaining numbered prints of *TALIK*, all signed by the artist and some signed by General Tal, will be sold by the Patton Museum in its fund-raising efforts.

General Tal, a native Israeli Sabra, began his military service in the British Army during World War II, rising to the rank of sergeant in the Jewish Brigade. He saw combat in every one of the Arab-Israeli Wars, first as an infantry commander, and later an armor and mounted force commander.

As an armored brigade commander, as an armored division commander in the Six-Day War, as the commander of the Israeli Armour Corps, as the Vice Chief of the General Staff, and as the Commander of the Southern Front, General Tal was a key figure in developing and applying modern armor battle tactics and techniques. In later years, he was the designer, developer, and producer of Israel's world class MERKAVA Main Battle Tank. And if these were not enough for a lifetime of accomplishments and service to his country, he found time to be a confidant and advisor to all of Israel's Prime Ministers from Ben Gurion and Meir in Israel's early days to Rabin, Peres, and Netanyahu in more recent times.

A true measure and spirit of the man that has carried him so successfully through the years, both as a mounted force commander and as one of his country's foremost government leaders, comes from his words to his troops just

before the Six-Day War, and quoted in part:

"Now that the plan is clear to us all, and, with it, all the moves nicely drawn on our maps, — combat never develops quite in accordance with the arrows on the map. However, one thing must be executed exactly as planned: (that is,) the principle and concept lying behind these map markings. All will charge forward to the assault and will penetrate as deeply as possible without paying concern to flanks and the rear. Whoever loses contact with our forces must continue to battle forward, knowing that the rest of his comrades are doing the same. — The one who wins the first battle will harbor the offensive spirit, the one who loses will feel retreat in his soul. Thus the fate of the State is bound up with what we do now, how we act and how we fare. — There will be no halt and no retreat. There will be only assault and advance."

Had General Patton heard these words, surely he would have said — "L'audace, L'audace, L'audace!!"

Recently, on speaking of General Tal, General (Ret.) Donn Starry noted that:

"It need only be said in this regard that it would be difficult, if not impossible, to find, in any armed force of any country in this century, a single officer who has had the dramatic influence on his country's armed forces doctrine, equipment, training and organization, that General Tal has had on Israel's Army and on that Army's dramatic success in battle."

And if these words were not enough, General (Ret.) Glenn Otis said it equally well when he said:

"TALIK is the only person I know in any country — including our own — of whom it can be said, he is the father of his nation's tank. TALIK is to the Israeli tank what Admiral Rickover was to the U.S. nuclear submarine. He is truly a man of his time."



He is also a tough taskmaster whose mind, once made up, is difficult to change. I remember accompanying him, over 25 years ago, on a visit to one of our tank fire control contractors in California. This particular contractor was pushing a wind sensor for our tanks at the time and was looking for the general's endorsement of the concept. General Tal would have none of it because, in his mind, a wind sensor only measured the wind and its direction **at the tank**, and not at the target or in between. When we went outside, we could see that the wind was blowing in one direction on the hillside about 1000 meters away. General Tal picked up some grass and threw it in the air and it blew in the opposite direction. "See, I told you," he said.

The U.S. Army, and in particular its armored forces, owe General Tal a special debt. He and his commanders, for more than 30 years have opened their hearts and lessons learned to the U.S. Army and, in particular, to its armor officers. Candid, forthcoming, honest, holding no secrets, TALIK shared with our army his and his commanders' lifetime experience in battle, and from their experience, their sober, considered judgments about everything from combat vehicle design to strategy, tactics, training, and organization. Where in their judgment, they had made mis-

takes, what those mistakes had cost them in succeeding battles, and how they had changed quickly, adapting to early recognition of where they had gone wrong, they openly and freely shared. What they shared brought revision to M1 Tank and M2/M3 Infantry and Cavalry Fighting Vehicle requirements, along with key design changes.

The technical and operational help and advice given by TALIK and his colleagues after the 1973 Yom Kippur War was an invaluable assist in ensuring that the M1 and the M2/M3 would indeed be the best possible answer to their roles in meeting the threat of the future. Desert Storm is our proof of success.

At the Armor Center, their suggestions became the baseline for development of the U.S. Army's heavy force doctrine, including tactics and operational concepts, and other equipment requirements, organization, and training. As General Starry is quick to point out, it was his visits to Israel in the '70s and '80s, his walks on the Golan Heights, and his open and freewheeling exchanges with General Tal and his colleagues that gave birth to the Air-Land Battle concept and the winning doctrine of Desert Storm.

In these professional exchanges, and in the personal relationships that have

ARMOR artist Jody Harmon presented General Tal with an original portrait, entitled *TALIK*, as General Tal is affectionately known in Israel, depicting him as the Commander of the Steel Division during the Six-Day War.

grown over the years between the U.S. and Israeli armies, General Tal and his colleagues were always more forthcoming and supportive than were we. Inevitably what could be agreed upon became entangled by some element of the massive U.S. bureaucracy. But the important parts survived: doctrine, equipment performance requirements, organizational needs, training and education requirements, all drawn from the crucible of the Arab-Israeli Wars and from the dedication of the remarkable Armor leaders of the Israeli Defence Forces, headed by Israel Tal.

Our Israeli friends have provided a large and lasting contribution to the U.S. Army and its mounted force. The portrait entitled *TALIK*, and presented to General Tal by the Patton Museum Development Fund-Cavalry Armor Foundation and the U.S. Armor Association, is a recognition and "Thank You" for the many contributions he and Israel have made to our soldiers, their equipment, and their ability to fight and win as evidenced in Desert Storm.

Fielding the Armor Force of Tomorrow:

Soldierization in the 1st Armor Training Brigade at Fort Knox

by Lieutenant Colonel Eugene J. Palka and Colonel Fred A. Treyz III

“Soldierization” is the tough, comprehensive process that transforms civilians into soldiers (TRADOC Reg 350-6). But soldierization is far more than a transition; it is a remarkable transformation that has no parallel in the larger society. Most impressive is the significant physical and mental development that occurs in a relatively short period of time. Proud parents attending initial entry training (IET) graduation ceremonies at Fort Knox frequently proclaim, “You drill sergeants have done more for my son in eight weeks than we could in 18 years!” Although such a claim is difficult to substantiate, there can be little doubt that the soldierization process does have a profound and enduring impact on new soldiers in training. From the time they arrive at the reception station, until their graduation from IET, trainees are challenged mentally and physically, and are inspired to adopt the Army’s core values. The process is at the heart of the 1st Armor Training Brigade’s mission, and it enables the brigade to fill Armor units around the world with highly motivated, disciplined, and physically fit soldiers who are trained in basic and military occupational specialty (MOS) skills and prepared to join their first units.

Soldierization is not a series of tasks, but the result of *total immersion* in a positive environment. The environment is the IET arena, and includes the reception station and, either one-station unit training (OSUT), or the combination of basic combat training (BCT) and advanced individual training (AIT). High standards, discipline, teamwork, quality training, ethics, and values are all contributing features of the positive environment. Active and involved leaders serve as role models for the soldiers in training, administer the training in accordance with the program of instruction (POI), and implement the soldierization process.

Aspects of Soldierization

Critical aspects of soldierization include teamwork, attitude building, tough training, good health habits, and physical fitness. Capable leaders develop these aspects using a variety of strategies at the company level.

Teamwork is an absolute necessity for any type of unit to successfully accomplish its mission. To foster bonding and increase levels of performance, team building commences at the outset of IET and sets the stage for the integration of the IET graduate into his first unit. In one respect, teamwork develops during specific training events within the POI. A challenging physical fitness program can facilitate team building and enhance cohesion, as well as improve stamina and muscular development. Assignment to details also provide an excellent means to develop teamwork. Regardless of whether the task is to clean the platoon bay or latrine, cut the grass, or maintain a vehicle, soldiers are detailed in teams (buddy team, fire teams, or squad) in order to promote cooperation, communication, and working toward a common goal. Each detail is a team-building opportunity.

Attitude building develops via effective leadership from positive role models. Drill sergeants and company cadre lead by example and seek to inspire soldiers in training to develop a winning spirit and to adopt Army core values. There is an emphasis on ethical standards, good order and discipline, initiative, and commitment. Individual counseling occurs often, and formal classes within the POI address topics such as: The Code of Conduct, equal opportunity, standards of conduct, etc., in order to develop healthy attitudes.

Tough training is inherent in BCT, AIT, or OSUT and is the “keystone” of soldierization. Trainees develop self-

confidence, the warrior mentality, and physical and technical competence through successful completion of professional and challenging training. Units ensure tough, quality, and realistic training by complying with the POI, conducting effective planning and coordination, and implementing a trainer certification program. The latter is a quality control measure that ensures competency among the drill sergeants and enables the trainers to maintain the “cutting edge.”

Good health habits are a necessity throughout the soldier’s career, yet for many soldiers in training, the development of good health habits represents a significant change in lifestyle. Trainees must be taught to value protective health measures. A combination of caring leadership, quality medical and dental services, and formal classes from the POI educates and convinces the trainees of the necessity to maintain their bodies, uniforms, and living areas. To ensure compliance, inspections are frequent.

Physical fitness in the IET arena equates to far more than passing the Army Physical Fitness Test (APFT). The IET goal is to develop the soldier’s “total” fitness through a progressive physical training (PT) program and formal classes on nutrition and injury prevention. In many cases, behavior modification is necessary to rid the soldier in training of personal habits which may hinder his physical development. Tobacco cessation, and alcohol and drug abuse prevention are integral parts of the IET total physical fitness program.

All of the above aspects are interwoven into all phases of IET. Cadre members take advantage of every available opportunity to reinforce the above aspects, since these are essential for the trainee’s personal and professional development.

Implementation Strategy

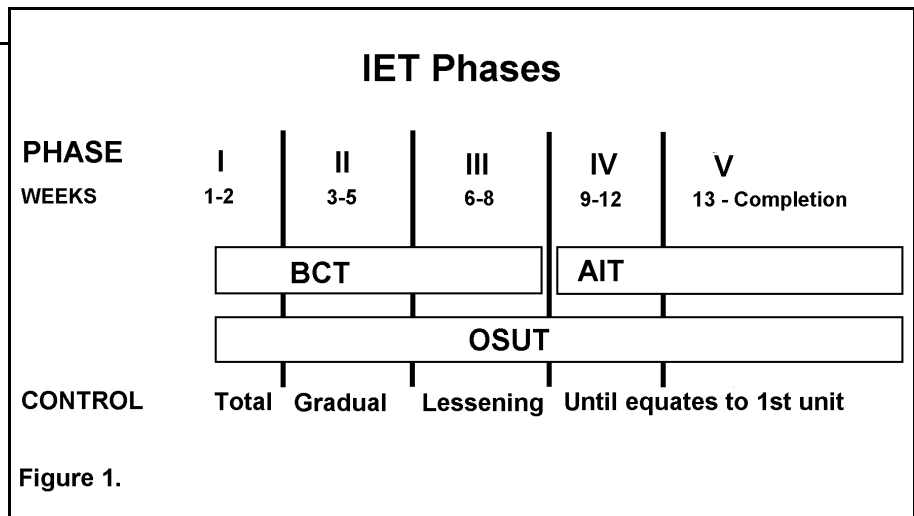
Soldierization is designed to help the soldier in training understand the Army way of life and *willingly* adhere to the rules and regulations which govern behavior. The “soldierization design” is also geared toward helping individuals develop values and beliefs consistent with those expected of the military professional. Moreover, the design instills loyalty and commitment to the unit and to the Army.

There are several interrelated components which comprise the underlying soldierization implementation strategy. These components form pillars which support the entire process.

- The IET cadre employ an **insist/assist philosophy** to develop soldiers in training. The cadre “insist” that the trainees achieve established standards in the areas of training, physical fitness, and personal conduct. Yet, simultaneously, the cadre employ effective coaching, mentoring, and reinforcement training to “assist” the trainees in achieving the standards. Assisting trainees with goal-setting, and providing performance counseling are fundamental requirements to successfully implement the philosophy.

- A **positive leadership climate** is essential throughout the IET arena. The practice of “tearing a trainee down and building him back up again” has long been abandoned. Instead, the goal is to inspire the soldiers in training through competency and leadership by example. All trainees are treated with respect and dignity. Moreover, the cadre recognizes the different backgrounds and learning abilities of the trainees, and is willing and able to communicate at different levels during the training process for a given subject.

- **Management of stress** is a fundamental concern throughout the duration of IET. Stress should occur between the trainee and the task, not between the trainee and drill sergeant. In this way, stress provides the motivation to learn, and therefore serves as a positive influence. Every private is assigned a “battle-buddy” to facilitate teamwork, to enhance learning, and to assist each other in handling stress. Drill sergeants must look out for each other in a similar fashion. They must continually keep an eye out for fatigue, frustration, and anger among their colleagues, and provide reinforcement or relief as necessary. Specific “stressors” identified during internal after-action reviews enable



cadre members to anticipate these leadership challenges.

- **After-Action Reviews (AARs)** occur at each cycle’s end. Because each training cycle has a different personality, frequent, informal AARs are important throughout the cycle, “adjusting fire” as necessary. AARs must focus not only on the soldiers in training, but on the cadre. In fact, the end-of-cycle formal AAR should focus largely on the cadre in order to capture and subsequently apply the lessons learned, thereby improving the training’s overall quality.

- **Phased training** is the formal structure applied in the IET arena to organize and facilitate soldierization. There are five phases of IET; a soldier progresses through phases I through III in BCT, and through phases IV and V in AIT. OSUT includes all five phases, but in some OSUT courses, phases III and IV may be combined. Additionally, the authorization to determine actual phase lengths rests with the installation commander. No matter which route the trainee proceeds along, BCT/AIT or OSUT, drill sergeants have total control over the soldiers during phase I. From First Call until Taps, trainees are under constant supervision and scrutiny. Control gradually lessens during phase II, and continues decreasing until the amount of control near the end of phase V is equal to the amount of control the soldier will experience in his first unit.

Phase Objectives (Soldierization Milestones)

TRADOC Reg 350-6 outlines specific objectives for each of the five phases (Fig. 1). Movement between phases is viewed as a “gate,” or rite of

passage, for the soldiers in training. Specific phase objectives serve as “soldierization milestones” and enable the unit to focus efforts and to gauge the progress of every trainee at any point in the cycle.

Phase I objectives include enabling the trainee to pay attention to detail, conform to platoon standards, master basic skills, maintain self and platoon areas, and develop physical fitness. Trainees feel the greatest impact of the soldierization process during phase I because of the drastic change in lifestyle and environment. The emphasis during phase I is on gaining the soldier’s attention, getting the soldier to conform, and developing teamwork. The trainee’s focus is on his immediate platoon.

Training events during phase I provide a solid foundation for all soldiers, regardless of MOS. Classes on soldier responsibilities, customs and courtesies, equal opportunity, military justice, and the Code of Conduct are reinforced by extensive counseling. The intent is to educate trainees and inspire them to adopt the Army’s core values. Other blocks of time are for communications and first aid training, which include several of the basic skills that all soldiers must master. The warrior ethos is also developed during phase I via hand-to-hand combat, rifle bayonet and pugil stick training, foot marches, the conditioning obstacle course, and PT.

Phase II objectives challenge the soldier to conform to company standards, display self-discipline, qualify (or familiarize in OSUT) with the M16A2, and develop physical fitness. Whereas discipline was imposed during phase I, the cadre begin to orient on developing the trainees’ self-discipline during phase II. The soldiers’ perspectives

broaden as they look beyond their platoons and begin to conform to company standards.

Phase II training looks toward basic warrior skills while supporting specific phase objectives. Basic rifle marksmanship is the focus of phase II training. BCT soldiers qualify with the M16A2, whereas 19K and 19D OSUT trainees familiarize with the rifle and qualify with the 9mm pistol. Other warfighter training includes: hand grenades, foot marches, NBC equipment, individual tactical training (fire and maneuver), the bayonet assault course, and familiarization with a variety of U.S. weapons, including the M60 machine gun, the M203 grenade launcher, the AT-4, and the claymore mine.

During **phase III**, soldiers must conform to Army standards, by passing the APFT (meet BCT standards), passing the End of Cycle Test (EOCT), completing all BCT POI requirements, and thinking, looking, and acting like soldiers without detailed supervision. By the end of phase III, soldiers begin to notice an increase in privileges. The phase III graduate is trained in the basic skills, has passed the basic training PT test and qualified with his rifle or pistol, and has participated in several capstone exercises which effectively integrate the individual tasks taught earlier in the cycle.

Specific training highlights for BCT units during phase III include a number of live-fire exercises at the buddy team and squad level, an end-of-cycle test comprised of twenty "hands-on" tasks, a field training exercise, the confidence course, and additional foot marches.

Phase III during 19D OSUT is eight weeks long and contains the majority of the MOS-specific training. Training highlights include driving, demolitions, mine training, Bradley gunnery, an FTX, a scout skills test, MK19 training, HMMWV familiarization, and a cavalry focus exercise.

Phase III for 19K OSUT is three weeks long, the same as for BCT, but the training is MOS-intensive. Training consists of advanced communications, inspecting and stowing ammunition, the .50 caliber machine gun, mines, an armor crewman test, and maintaining the 120mm main gun.

Phase IV objectives are to conform to Army standards, master common skills learned in BCT (or phases I-III in OSUT) and continue to develop physical fitness. Phase IV represents the first exposure to MOS training if the soldier

has progressed along the BCT/AIT track. Along the OSUT route, the soldier may have already encountered MOS training, but it becomes the focus in phase IV.

Training highlights which occur in phase IV of 19K OSUT include tank maintenance, driving, the M1 tank gunner's station, stowing ammo on an M1, and maintaining the main gun. Tank gunnery, an armor crewman test, and a situational training exercise are the capstone exercises.

Phase V requires the soldier to pass the APFT (meet DA standards), pass the EOCT, complete all POI requirements, and think, look, and act like a soldier. The difference between the last objective in phase V, versus phase III, is that the soldier is now expected to personally take full responsibility for his actions at all times. Ethics, Army core values, self-discipline, maturity, and a concept of duty are expected to guide the soldier, rather than an overwatching cadre member.

Throughout each of the five phases, soldiers in training are evaluated against standards. Failure to meet the standards may warrant remedial training, a new start, a rehabilitative transfer, or, in the worst case, an entry level separation (ELS). The key to producing quality soldiers while combating attrition rests with the drill sergeants. They place emphasis on the trainee completing every task to standard, and they provide motivation, clearly defined objectives, and constant feedback.

The training events contained within the respective POIs provide the necessary grounding in basic soldier skills for all trainees during phases I through

III, and produce specific MOS-qualifying skills in AIT or OSUT battalions during phases IV and V. Competent leaders, however, must also employ the training events as vehicles to help develop the trainee's mental fitness and character, in addition to the tactical, technical, and basic soldier skills.

Soldier Evolution in 1ATB

Civilian recruits who arrive at Fort Knox for IET evolve along two basic routes (Fig. 2). All receptees initially report to the reception battalion and begin the soldierization process. After 3 or 4 days of intense soldier indoctrination and in-processing, trainees move along one of the two routes. They either proceed to basic combat training with the 1-46th or 2-46th Infantry, and subsequently to AIT with 1-81 AR, or to other installations for AIT; or, they proceed along the OSUT route, with 19D trainees proceeding to 5-15 CAV, and 19K soldiers reporting to 2-81 AR. From the Fort Knox perspective, the soldierization process start point commences upon arrival at the reception station. Graduation from either AIT or OSUT completes the formal soldierization. When the graduate arrives at his first unit, the process is subsequently validated. We submit, however, that soldierization is *not* complete until the soldier retires or leaves the Army. There can be no doubt that professional military schooling, progressive duty positions, and reassignments contribute immensely to any soldier's personal and professional growth.

Soldierization amounts to much more than skills training. Whereas the civilian job may provide a "way of work,"

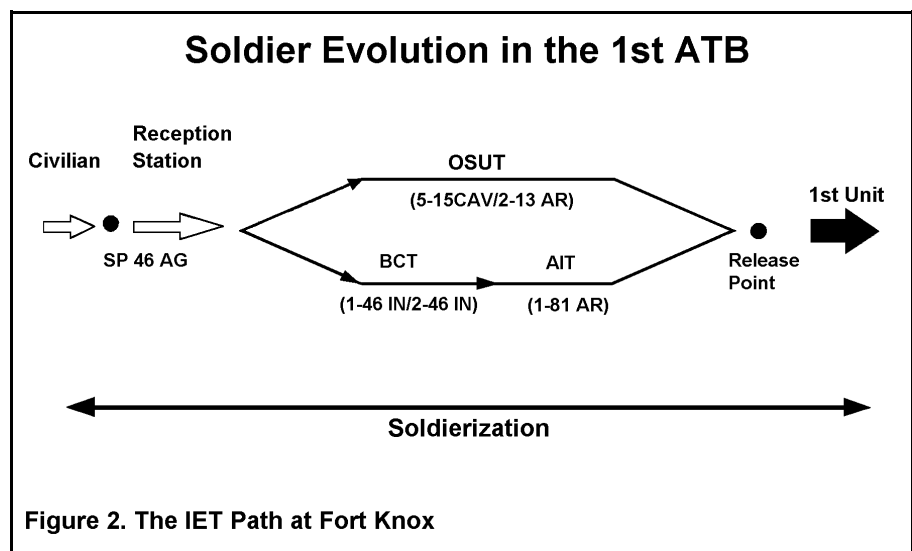


Figure 2. The IET Path at Fort Knox

1st Armor Training Brigade Interactive Web Site

by the 1st Armor Training Public Affairs Office

The 1st Armor Training Brigade is forging into the 21st Century with a new interactive web site that furthers its Total Army Quality program initiative to capture customer satisfaction.

Designed by the 1st ATB Information Management Office and Entelechy Inc., of Radcliff, the web site fosters feedback from the Armor Force with an interactive home page.

The home page will be a key link by which the 1st ATB communicates with leaders and soldiers in the Armor Force, according to 1st ATB leaders. The home page is currently active on the world-wide computer web and is accessible by anyone.

It also features a "Hot Loop," which allows for interactive discussion for selected respondents. There is also one all-users response page where anyone can respond to comments entered by the commander on the Commander's Bulletin Board. Responses are edited and then posted on the web site. The home page also allows selected access to the latest 1st ATB POIs.

The 1st ATB Home Page address is <http://www.entelechy-inc.com/docs/1atb/>

For more information on the 1st ATB Home Page, contact SFC Randy Jenkins at (502) 624-6275.

successful soldierization engenders service to nation, commitment, pride in belonging, loyalty, teamwork, and family indoctrination, to prepare the professional soldier for "a way of life."

Tankers and scouts can take heart in knowing that soldierization is alive and well within the 1st Armor Training Brigade at Fort Knox. The cadre's commitment to filling Armor, Cavalry, and Mechanized Infantry units around the world with quality soldiers is evident in the 1st ATB's Training Creed.

"I am a Soldier of Steel. My hallmarks are Pride, Motivation, Self-discipline, and Courage. My country depends on me to provide Army units around the world with trained soldiers. These soldiers must be physically fit, mentally and morally tough, tactically and technically proficient, and highly motivated. I accomplish this mission by setting high standards, respecting human dignity, and continually emphasizing the values of Duty, Honor, Country.

I am the inspirational leader and trainer upon which my country and the United States Army depend. I never ask of another that which I will not do myself. I train to standard and fight to win. No one else can do what I do as well as I can. My reputation is renowned throughout the world, and is championed by the soldiers I have trained, led, and inspired.

I will never lose sight of my mission, and I will always go the extra mile, seizing every opportunity to train leaders for the

21st century. My legacy can be found in Army units around the globe. I am a Soldier of Steel. My legacy will endure."

More than just a mechanism to develop unit pride and cohesion, the creed is our pledge to produce IET graduates who are highly motivated, disciplined, physically fit, trained in basic and MOS skills, and prepared to join the ranks. The 1st ATB will continue to aggressively pursue our soldierization mission, and we take pride in conducting successful battle handovers with units in the field as our IET graduates arrive in unit areas to validate and continue their soldierization.

Conclusion

Soldierization is not a by-product of IET. Rather, it is inherent in the purpose of initial entry training. The process is carefully designed for, and implemented by, competent leaders and instructors within the IET arena to produce soldiers who can fight and win. The cadre themselves are products of the process, and yet continue to grow and mature as professionals as they perform their duties.

In the 1st Armor Training Brigade, one of the largest and most diverse brigades in the Army, soldierization represents the thread of continuity which links each of the seven battalions to the brigade's fundamental goal of transforming civilians into soldiers. Soldierization is at the heart of every IET unit's mission, regardless of whether the unit conducts basic combat training, advanced individual training, or one

Lieutenant Colonel Gene Palka received a BS from the U.S. Military Academy and was commissioned as a lieutenant in the Infantry. He also holds an MA from Ohio University, and a Ph.D. from the University of North Carolina. He spent nearly six years with the 101st Airborne Division at Fort Campbell, serving in successive positions as a platoon leader, aide de camp, company executive officer, company commander, and battalion S3. He has also been assigned to the 6th ID (Light), Fort Wainwright, Alaska, serving as the G3 Chief of Operations, and as Executive Officer for the 5th of the 9th Infantry. He is currently serving as the battalion commander of 1st Battalion, 46th Infantry Regiment at Fort Knox.

Colonel Fred A. Treyz III graduated from Arizona State University with a BS and received his commission in Armor as an ROTC distinguished military graduate. He also earned an MS from Troy State University and attended Harvard University on a National Security Fellowship. He commanded the 7th Sqdn, 7th Cav at Ft. Carson; and also served as the Executive Officer of the 4th AVN Bde and the 1st Sqdn, 10th Cav. He has also served as the Armor Branch Chief at PERSCOM, as the Deputy Chief of Congressional Activities Division for the CSA, and as the Director of the Armor School. Currently, he is the commander of the 1st Armor Training Brigade at Fort Knox.

station unit training. The process must be continually assessed in order to keep pace with changes in society, and to ensure we in the 1st Armor Training Brigade meet the needs of Armor units in the field, now and in the 21st century.

LETTERS

(Continued from Page 3)

wimpy replacement by the AGS, and too bad for the Armor community that we gave away our seat on a planeload of warriors.

LTC JOHN L. BARKER
CDR, 2-63rd AR
Formerly Bn S3 and XO, 3-73 AR

Why Not Adopt Piranha As Sheridan Replacement?

Dear Sir:

Having read in the *Army Times* of the scheduled demise of the 82d Airborne Division's 3/73 Armor on 1 July 1997, I can't help but wonder what will replace that unit in the airborne role. The Armored Gun System (AGS) was canceled this past summer, so there is nothing in the pipeline or on the horizon as a potential replacement. I also read in the same article that the 3d Infantry Division (M) is being considered to supply a package of M1A1s and Bradleys, as needed, to the 82d, but I have grave doubts about the efficacy of that solution. If you have a secure airfield to land heavy armor, why send the 82d? It would be more efficient to insert a mech-heavy team from 3d Mech, providing speed, shock, and firepower in a more impressive package than the 82d's paratroopers and Humvees.

If it was merely a matter of firepower, the Army could equip a battalion of armored Humvees with recoilless rifles, MK-19 HVGLs, and 7.62mm mini-guns. But an armored presence is not a matter of appliqué armor and weapons. It's the vehicle itself and what its presence means. As you stated about Bosnia, the 1st Armored is there to make a serious statement about resolve and what the price of public stupidity will be.

What might be a solution to the needs of the 82d? Why not a 105mm-armed MOWAG Piranha? The vehicle exists, the Marines use the LAV variant now, and the firepower is the same as the AGS. It has the plus of being amphibious and air-portable/droppable, but the minus of not being tracked and not having heavy armor. But, an appliqué package could be developed quickly and the system could be phasing in by early summer, replacing the Sheridans while converting their crews to the new system. Of course, if you get a little carried away, why not make this new battalion a combined arms unit by putting two LAVs with two Piranhas in each platoon?

The need for airborne armor isn't going to disappear because a program is canceled, as MAJ Frank Sherman's article on the Sheridan's during Operation Just Cause graphically showed. It's incumbent on the Army to get a replacement in the hands of

those troops who can use, and who need, what Armor brings to the battlefield.

SSG Steven A. Krivitsky's fuel chart is a brilliant, simple solution to the "do we need fuel?" problem. My congratulations to him for a job well done.

LARRY A. ALTERSITZ
LTC, FA, USAR
Commander, Det B (Marksmanship)
1182d R.T.U., USAR

Kuwait Training Ain't Broke, So Let's Not Fix It!

Dear Sir:

I guess this has stewed within me long enough, and I will now try to express myself on a "General Officer Good Idea" which is definitely not a good idea.

Intrinsic Action is a superb training opportunity for a task force commander. Kuwait is the only place an LTC can bring his outfit and train, as opposed to taking part in a graded event. If we are honest with ourselves, we all realize that our Army no longer trains, we "leverage opportunities and maximize potential by evaluating and providing feedback." As I said, a graded event. This is not true in Kuwait.

Over here, an LTC and his CSM can train, really train to standard, without a 365-day experienced major telling them how fouled up they are. The TFs here now (Oct-Nov 96) have the opportunity to send platoons out and practice bounding overwatch, companies to train breaching techniques, all under the watchful eyes of their own commanders. The higher (bde/div) command group is so far away it must announce its visit. This is a great opportunity for training.

Recently, TF-Kuwait had a visit by a senior flag officer. This worthy was so excited about the potential here, he wants to "NTC-ize" the Intrinsic Action exercise. By God, we'll have O/C packages come over here and really "evaluate" the TF commander and his companies. This would really leverage the potential of the Intrinsic Action experience. (I sometimes wonder how Archimedes feels about how we turned his noun into a verb?)

My take is that adding a graded event to what is an already really tough experience would detract rather than add to the Intrinsic Action experience. Right now, three TF commanders a year get to move, shoot, and communicate like we could in the early '80s. No O/C package will make this training better. We select LTCs and CSMs for battalions who are supposed to have an idea how to train and lead. In this cavalryman's view, Kuwait is the only place in the Army right now where this can happen. The LTC can train his outfit. Intrinsic Action is not broken, so let's not fix it with O/Cs and graded events. Sixty-five kilometers north of Udairi Range is a whole Iraqi mech

division; someday there will be enough of a graded event.

KEVIN C.M. BENSON
LTC, Cavalry
G3 Plans
TF-Kuwait

If M113s Don't Work in Snow, Let's Find Out Why

Dear Sir:

CPT Morton's article (Jul-Aug 96) calling for wheeled LAV-APCs seems to use selective examples to justify his wish: a new toy wheeled vehicle. What about the three U.S. ambassadors who died when their wheeled APC slid off a Yugoslav road and burned?

When trashing the 11-ton M113A3, the author lumps it together with 33-ton M2s and 70-ton M1s. The question is, does the M113 acting *alone* destroy roads? If so, then that very same gripping action makes it ideal in terms of traction compared to a wheeled vehicle... You can't complain about tearing up roads and not having traction at the same time. In snow and ice, both wheeled and tracked vehicles slip – is he saying a wheel with snow chains can go down roads that a tracked M113A3 cannot, or that because of *the desire to avoid destroying the roads*, the M113A3 wasn't allowed to go down them? How then is it that the Russian BMD, at 8 tons, is doing wonderfully in Bosnia when his wheeled APCs falter and he turns to tracked SUVs to get through deep snow? Perhaps the M113A3 needs wider tracks for a lower ground pressure, or those driving the M113A3s were not motivated or experienced with the vehicle in deep snow or ice. Regardless, in warmer weather, tracks can go where wheels can't – if caught in an ambush, do you want to be a dead duck, sitting on the road with shredded tires, or be able to go off-road or press on even if small arms fire hits your tracks?

Wheeled LAVs are fine so long as nobody starts shooting at you. I've said this before: if we're going to "do wheels," they need to be **SOLID** like the French AMX-10RC, so the pneumatic tire "mobility" kill followed by "catastrophic" kill doesn't happen. Why not add BRDM-type "belly wheels" to fix the HMMWV's weaknesses exposed in Bosnia? Basically, that's what his 6- or 8-wheeled LAV is doing – lowering ground pressure for an armored box with a sexy weapons turret. But the LAV has a huge fuel tank in one side of the troop compartment. This is why the Israelis created the external rear fuel cells for the M113. Wheeled LAVs do **not**, repeat not, have the same level of protection as an M113A3.

I'm not trying to be pig-headed here – if roads are destroyed by tracked LAVs and this is intolerable, we then must go to wheels. But I believe much of the enthusi-

asm for wheeled LAVs comes from training in peacetime where the allure of big sweeping movements and operational maneuvers offer the big pay-off of ego-gratifying, maneuver team commander victory. If we can harden the wheels, go for it – if not, we are sure to come to grief in the first real shooting war. Get the fuel cell(s) out of the LAVs and add the appliqué armor the USMC has been promising for almost a decade, and ensure an assault gun variant with XM-35 105mm low-recoil force gun is fielded to give our airborne/air assault/light infantry divisions/cav troops needed shock action, and I'd support the wheeled APC concept – I'm not a killjoy.

The M113A3 is paid for; if it's bad in snow, let's find out why and fix it. If we cannot afford M8 AGS (I don't believe this), then let's put 106mm recoilless rifles (surplus or new manufactured Israeli models) on M113A3s and HMMWVs (needs belly wheels, armor, solid tires) and get us an assault gun capability **NOW** before it's too late. We need the big gun more than to spend money on yet another automotive chassis. We can live with what we've got if we can get a big gun on an air-deployable vehicle.

MIKE SPARKS
Ft. Bragg, N.C.

The Digitization Revolution: Remember the Pluses

Dear Sir:

Over the past year, *ARMOR* Magazine has run a series of articles and letters addressing how digitization will impact future Army operation. It appears that company grade officers are concerned with how digitization will affect initiative at the point of the spear. Will higher command reduce the company commanders into glorified platoon leaders?¹ The view is that battalion and brigade commanders, with their superior information, will micromanage company commanders in an effort to increase speed. While digitization could have this end result, I believe it is an over-pessimistic view.

In a mid-intensity conflict with armor heavy forces, digitization and information technologies will enhance the situational awareness of the CINC to the divisional commander. Enhanced situational awareness will allow the senior commanders to mass ground maneuver forces at the decisive time and location. Long-range precision fires will paralyze and disrupt the enemy's attempt to react to the surprise insertion of ground forces.

With the flood of information pouring into the various command posts, a commander will have a real-time accurate picture of his units. By looking at his screen, a division commander will know at a glance the status of his combat, combat support, and

combat service support battalions. The enemy situation will also be clearer than ever before, based on the real-time intelligence information received from lower and higher headquarters. He could display the individual locations of his individual weapons and vehicles, but why would he do so? If he used the actual location of all of his individual systems to make his operational and tactical decisions, he would overload his *human* brain. The vast amount of information flooding into the command post will not, as company grade officers fear, create a scenario for over-supervision. It will create a situation where *mission*-type orders will dominate.

The enhanced situational awareness will allow the commander to determine whether to continue his battle plan, commit his reserve, or shift his main effort. The time required for the tactical decision process will be compressed. During an operation, a company commander will get a change of mission and graphics over the radio/computer net. The combination of shifting directions of attack, based upon current enhanced situational awareness, will eventually short circuit the enemy decision cycle. Ground maneuver will be tied to air-sea continuous operations. Depth and simultaneous attacks will enable the CINC to directly influence the enemy throughout the width, height, and depth of his battlespace. The enemy's attempt to redeploy his forces to counter the U.S. ground force will be paralyzed.

Enhanced situational awareness may allow CINCs and major ground maneuver commanders to operate in a more dispersed manner. Brigade and battalion commanders will still be operating on more traditional frontages. Digitization may allow individual platoons and companies to operate on extended frontages during an Abrams-style tank raid into an enemy rear area. However, direct fire battle math will not change. While information age technologies may give us enhanced situational awareness, it will still be mounted on 1990s tanks and infantry fighting vehicles. Battalions armed with tanks with effective ranges of 3000 meters and ATGMs of 3700 meters (supported by DS artillery) will still require tactical massing of weapons and soldiers. A formation of 1 kilometer wide attracts fire from a frontage of 3 kilometers. A formation of 4 kilometers wide attracts fire from a frontage of 8 kilometers. The wider the friendly formation, the harder it will be to mass combat power.

Terrain will also have a major effect on a battalion's formation and frontage. Very few areas of the world have direct-fire opportunities found at the NTC, Fort Hood, or Southwest Asia. DS artillery fire support is important in the open desert. It is critical in all other terrain and environmental conditions. The combined arms team will still be required for successful combat operations. Enhanced situational awareness will allow the combined arms team to strike the enemy where he is the weakest.

While a mid-intensity conflict is the worst case, the most likely scenarios for military operations in the next ten years are Operations Other Than War.² OOTW operations, by their very nature, require more initiative and maturity of company grade officers than a mid-intensity conflict. They will be required to make decisions that may have major strategic consequences, while under the scrutiny of the international media. OOTW operations are manpower-intensive. Information age technology will not be as effective in determining who or where the enemy is located. The enhanced situational awareness will allow isolated outposts to be constantly monitored. An attack on an isolated outpost or convoy will be immediately known and the appropriate counteraction quickly implemented.

In summation, the only way that digitization or information technologies will turn company commanders into glorified platoon leaders is if today's company commanders allow it to happen. The brigade and battalion commanders of 2005 are company commanders today. If they train their junior officers in the same manner they were trained, the situation will never develop. The task of incorporating digitization and information technology into the American system of battle command for the future is on the shoulders of the company grade officers of today.

¹Bateman, Robert L. CPT, letter: "Force XXI and the Death of Auftragstakik," *ARMOR*, January-February 1996.

²TRADOC PAMPHLET 525-5, *A Concept for the Evolution of Full-Dimensional Operations for the Strategic Army of the Early Twenty-First Century*, August 1994.

JOHN S. HARREL
LTC, AR, CA ARNG
USAWC Fellowship
Ohio State University

Fond Memories of "The Bat Man," Ready, But Never Called to Lead

Dear Sir:

A March-April 1996 article, BG Khoi's "Fighting to the Finish" included a Foreword by my former squadron commander, COL Raymond R. Battreall. Ah! The memories came flooding back. "Lieutenant, come with me," as I felt a tug on my fatigue collar. Newly assigned and in the Baumholder O-Club for my first time, I dutifully followed this pipe-smoking, scowling lieutenant colonel until we stopped in front of the 52nd Colonel of the 3rd Cavalry Regiment. Yes, he is yours, I overheard, and we proceeded to the bar to seal it with a drink.

Gin and tonic, I ordered, only to be admonished with, "Lieutenant, in this squadron we drink our whiskey neat." Having just returned from Vietnam, where we drank G&Ts to prevent malaria (or so we

thought), this newly commissioned, former WO-1 aviator, just graduated Armor Officer Basic Course second lieutenant, rolled his eyes and wondered, what have I gotten myself into? The Bat Man, as we fondly called him, influenced, for the good, so many of us lieutenants, and I shall never forget him.

While COL B told me right up front that I would never have a platoon, he would teach me what he could while flying together during training, as I had the squadron aviation support section, which consisted of a crew chief, 49 Charlie (fuel tanker) and the H-13 helicopter.

Some of those memories include pushing the ladies of the squadron and their bus up Baumholder hill in a snow storm to attend the regiment's New Year's Officers Call. Was there a lesson here? You bet, I tried never to miss a commitment in battle or peacetime during my military career. Or the time just COL B and myself walked out of Camp Alfa, a Fulda Border camp with then East Germany, and relieved ourselves into East Germany as binocular lenses glinted from the tower directly in front of us. The lesson here was, be bold in the face of your enemy.

We were the Bat Man's lieutenants, all with stories of our own, Dave, Teddy, Kerch, Rusty, et al. I don't believe any of us made general, but we were infused with a fine example of honesty, integrity, and professionalism that hopefully we passed on to those we served with. I remember asking COL B why he stayed in the Army, then a turbulent, lowly profession, and his answer stayed with me all these years. He said he prepared himself professionally to

step into a leadership role if the Army needed him, and when another student of warfare, General Franks, got to execute every cavalryman's dream on the field of battle, I finally understood what he really meant. COL Battreall was ready during his watch, he just never got the call; it went to another great cavalryman...

BILL DILLON
via E-mail

Author Seeks Contributions On WWII Tank Experiences

Dear Sir:

I have been invited by Constable Publishers of London to compile an illustrated book about tank warfare in World War II. The book will form part of their Oral History series, which currently contains three other books, viz: *War at Sea*, *War in the Air*, and *War on the Ground*.

I want to cover all aspects of the wartime life of tank crewmen both in and out of action, including training. I also need to cover all combatant nations, hence this letter. Could you please give the project as wide a coverage as possible and invite anyone who would like to help me to write for full details to the address below.

I should explain that I served for 32 years as a regular officer in the Royal Tank Regiment from 1945-77, ran the world famous Tank Museum from 1981-83, and have written many military books over the past 25 years.

The book must be completed by October 1997, for publication in June 1998, so I must start to collect material as soon as possible.

Any help you can give me will be much appreciated.

LTC (RET.) GEORGE FORTY, OBE, FMA
Barn Cottage
Bryantspuddle
Dorchester
DORSET DT2 7HS
UNITED KINGDOM

Back Cover Correction

The article on the back cover of the November-December issue, "The Firing Pin Assembly — An Inside Look," contained one error. It stated that "disassembly of the firing pin is 20 level."

This is incorrect. Page 3-189 of TM 9-2350-264-10-2 directs the crew to disassemble the firing pin assembly. Thanks to SFC Stroh, an instructor at AOB, for pointing out this misinformation.

— Ed.

SEAT (Cont. from Page 5)

These statistics bear out the fact that members of promotion boards do consider EIA membership a discriminator for promotion selection, all other factors being equal.

Like any other program, EIA cannot survive and flourish without command involvement. The master gunner of the organization can be an integral part of

that involvement. He can administer the program for the unit, and is in an ideal position to advise the commander about soldiers who demonstrate the leadership potential, motivation, and technical expertise necessary to be an EIA soldier. Follow these guidelines to establish and maintain a successful program:

- Identify and challenge incoming soldiers
- Establish and support a unit EIA program
- Accelerate SPC/SGT/SSG promotions and attendance at service schools for EIA members
- Maintain quality soldiers within the program

The EIA program is an effective way to identify outstanding performers and at the same time enhance their chances for promotion. Properly administered, it will demonstrate that good performance will be rewarded, which can only lead to increased morale and unit effectiveness. The long-term effect is the retention of quality NCOs within the Armor Force.

If you have any questions about the program, please feel free to contact the Office of the Chief of Armor at the following address:

Commander
U.S. Army Armor Center
ATTN: ATZK-ARP
Fort Knox, KY 40121-5000

Phone: DSN 464-1439/5155 or commercial (502) 624-1439/5155

Board/Year	Considered	Selected	EIA Members
SFC/96			
19D	496	11	2 (18.1%)
19K	808	111	62 (55.8%)
MSG/96	532	48	13 (28.3%)
SGM/95	155	64	4 (6.3%)

Figure 1

COMBINED ARMS...

Continued from Page 13

⁵Nenninger, "The Development of American Armor 1917-1940. The Experimental Mechanized Force," *ARMOR* (May-June 1969), pp. 34-5.

⁶Dr. John T. Broom suggests Wilson's operations in Alabama and Georgia in 1865 formed the basis of Chaffee's vision. See Broom, "The Commander's Vision in Blue and Gray. The Roles of Adna R. Chaffee, Jr., James H. Wilson and the American Civil War in the Development of American Armor Doctrine," (Ph.D. dissertation, Union Institute, Cincinnati, Ohio, 1993), and Chaffee, "James Harrison Wilson," *Cavalry Journal* (June 1925), p. 200. Also see Schneider, "Theoretical Implications of Operational Art," pp. 18-9.

⁷Fuller, *Decisive Battles of the U.S.A.* (New York: Thomas Yoseloff, Inc., 1942), p. 398 fn 6; *Tanks in the Great War* (London: John Murray, 1920), p. 277-8; and *Memoirs of an Unconventional Soldier* (London: Ivor Nicholson and Watson, Ltd., 1936), p. 158. For additional comments on Parker's observation on the use of French and British tanks during World War I, see Report on Tanks, "Classes," AEF GHQ, 17 July 1917, G-3 Reports, RG 120, NA, pp. 1-7.

⁸Parker, "A Mechanized Force," 20 March 1928, AG 537-3 (3-20-28), Records of the Adjutant General's Office, RG 407, NA, pp. 1-4. (Hereinafter cited by RG 407) The study was vague on air support. It noted: "Appropriate squadrons of air corps may assist in overcoming enemy resistance, both ground and aerial." See p. 8.

During the interwar period, ground support attack aviation did not develop as realized late in World War I. This was due to neglect, technical problems, and the controversy over mission and air tactics. By 1933, attack aviation emphasis give way to high-speed, long range heavy bombers. Earlier, Brigadier General William Mitchell had questioned the future application of attack aircraft because he believed air power should focus on deep strategic operations against the enemy's supply concentrations and manufacturing areas. See Mitchell, *Winged Defense. The Development and Possibilities of Modern Air Power—Economic and Military* (New York: G.P. Putnam's Sons, 1925), pp. 188-9, and Thomas H. Greer, *The Development of Air Doctrine in the Army Air Arm 1917-1941* (1955 reprint, Washington: GPO, 1985), pp. 12, 66-7.

⁹Wiley Howell, for the Chief of Infantry, Memorandum for the Assistant Chief of Staff, G-3, 26 March 1928, RG 407, NA, p. 3.

¹⁰"Report of Superior Board on Organization and Tactics," General Orders 68, AEF-GHQ, Chaumont, France, 19 April 1919, Command and General Staff College Library, Fort Leavenworth, Kansas, pp. 64-77. Two other boards were also established to deal with the lesson of the war. The AEF Lewis Board was convened also at Chaumont to study infantry tactical lessons. Rejecting position warfare, it

noted that "the training of our infantry [for the future] should be by all means in open warfare and designed to foster the offensive spirit. It is the infantry which gives an army its character. Infantry normally requires strong support in the form of tanks, artillery, air services, supplies..." See "Proceedings of the Lewis Board 1919," Special Order 98, AEF-GHQ, Chaumont, 18 April 1919, *Ibid.*, pp. 3-7.

The Westervelt or Caliber Board was established by the War Department to study and make recommendations for future use of artillery. Of the three boards, it was the most foresighted. It declared that "mechanical transport is the prime mover of the future." The board recommended a self-propelled field artillery vehicle "capable of operating as a caterpillar over cross country terrain [and], at a moments notice, capable of conversion..." to a wheel mode. This idea of a tracked self-propelled artillery vehicle was the forerunner of the World War II M 7 105mm Howitzer Gun Motor Carriage, which served in the combined arms role with the armored divisions. However, in late 1922 and 1923, the Field Artillery Board that tested the Christie convertible and Holt gun carriages concluded they were "devoid of tactical usefulness for light guns and howitzers." See "Report of Board of Special Officers," Special Orders 289, War Department, 5 May 1918, Ordnance Technical Intelligence Files 334.3/1.17, Records of the Chief of Ordnance, RG 156, NA, pp. 24, 48. (Hereinafter cited by RG 156) Also see William I. Westervelt, "A Challenge to American Engineers," *Army Ordnance*, 1 (1920), pp. 59-64, and "Horses, Tractors and Self-Propelled Mounts," *Field Artillery Journal* (November-December 1923), pp. 491-2.

¹¹*Historical Documents Relating to the Reorganization Plans of the War Department and to the Present National Defense Act*, 1 (Washington: GPO, 1927), pp. 365, 366, 404-5.

¹²Parker, "A Mechanized Unit," 2 April 1928, RG 407, NA, pp. 3-4.

¹³Proceedings of a Board of Officers, Subject: A Mechanized Force, 1 October 1928, AG 537.3/7884-B, Records of the Chief of Arms, RG 177, NA, pp. 4, 7-10, 15-6, 18, 35. (Hereinafter cited by RG 177) Unfortunately the Proceedings and the G-3 study paid no attention to tactical air other than observation and reconnaissance missions in support of a mechanized force.

¹⁴Chaffee, "The Status of the Mechanized Combat Organization," Lecture, Army War College, 19 September 1929, USAMHI, pp. 2, 10.

¹⁵*Ibid.*, p. 3.

¹⁶*Ibid.*, p. 10.

¹⁷Denison, *A History of Cavalry From the Earliest Times with Lessons for the Future* (2nd ed., London: Macmillan and Co., 1913), p. 447. The Cavalry School's bible, R.M.P. Preston, *The Desert Mounted Corps: An Account of Cavalry Operations in Palestine and Syria* (London: Constable and Company, Ltd., 1921) was rejected by Chaffee and Grow because it stated that the horse soldier would be more valuable in a future war.

¹⁸Memorandum for General Mosely, Subject: Organization—Mechanized Force, 27 April 1931, RG 177, NA, pp. 2-3, and Summerall, "New Developments in Warfare," *Infantry Journal* (February 1931), pp. 91-2.

¹⁹For a history on Christie's relationship with the army, see George F. Hofmann, "The Troubled History of the Christie Tank," *ARMY* (May 1986), pp. 54-65.

²⁰Fuqua, "An analysis on the chronological history of progress toward the formation of a Mechanized Force in the United States Army and the purpose of the organization," 24 March 1931, RG 177, NA, pp. 4-5.

²¹John W. Killigrew, "The Impact of the Great Depression on the Army, 1929-1936," (Ph.D. dissertation, Indiana University, Bloomington, Ind., 1960), pp. IV: 13-9.

²²U.S. Army, *1923 Field Service Regulations: Operations*, 1 (Washington: GPO, 1924), pp. 11, 13, 88-9. The *FSR* directed that one of the missions of aviation units was to attack hostile ground forces and their supporting units, including supply columns. No direction was given regarding a tactical effort against enemy tanks or in support of an infantry assault with breakthrough and accompanying tanks. See pp. 21-3.

²³Chaffee, "Mechanized Cavalry," Lecture, Army War College, 19 September 1939, USAMHI, p. 1.

²⁴Van Voorhis quoted in "Prelude to Armor" in *Armored Force Command and Center*, Study No. 27, Historical Section, Army Ground Forces, 1946, RG 407, NA, p. 5.

²⁵Grow, "Ten Lean Years. From the Mechanized Force (1930) to the Armored Force (1940)," (Manuscript, Falls Church, Va., 1969), pp. 55-6. Copy on file at the Patton Museum of Cavalry and Armor, Fort Knox, Ky. An edited version of "Ten Lean Years" appeared in four series in *ARMOR* during 1987.

²⁶U.S. Department of State, *Foreign Relations of the United States, 1932*, 1 (Washington: GPO, 1948), pp. 65-7, 70, 180-2.

²⁷*Ibid.*, p. 65.

²⁸Directive for the Future Development of Combat Cars and Tanks, 29 April 1933, Ordnance Office, O. O. 451.24/622, RG 156, NA, p. 1.

²⁹Chaffee, "Report of Maneuvers," The Cavalry School, Fort Riley, Kan., 1 October 1934, RG 407, NA, p. 419.

³⁰Report of Technical Committee, 24 March, and Proceedings of Board of Officers, 25 March 1934, HQ, 1st Cavalry. (Mechanized), Ordnance Office, O. O. 451.24/1789, RG 156, NA, pp. 1-5 and 1-4.

³¹Daniel Chase, "The Developmental Record in Combat Vehicles" in "History of the Ordnance Department in World War II. Research and Development," II (Unpublished manuscript, Aberdeen Proving Grounds, Md., 1947), Icks Collection, Patton Museum, pp. 12-21.

³²George F. Hofmann, "More on Christie's Battles with Ordnance," *ARMOR* (September-October 1990), pp. 3, 44.

³³Academic Division, "Report on Maneuvers," The Cavalry School, Fort Riley, Kan., 1 October 1934, RG 407, p. 419.

³⁴Kromer, "The Cavalry Maneuvers, Fort Riley, Kan., May 1934," Lecture, Army War College, 22 June 1934, USAMHI, p. 27.

³⁵Grow, "Ten Lean Years," p. 93.

³⁶Jesse A. Ladd, "Report of Observations of Fort Riley Maneuvers (May 14 to May 26 1936)," RG 407, NA, pp. 1, 10.

³⁷*Tables of Organization Mechanized Division (Tentative)* (Fort Leavenworth: The Command and General Staff School Press, 1936, pp. 3-24; *Tactical Employment of the Mechanized Division* (*ibid.*, 1937), pp. 3-4, 6, 23-4, 31; and Krueger Memo quoted in Grow, "Ten Lean Years," p. 88.

³⁸A. Ryzhakov, "K voprosy o stroitel'stve brone-tankovykh voisk Krasnoi Armii v 30-e gody" [Concerning the formation of the Red Army Armored Forces in the 1930s], 8 *Voennno-Istoricheskii Zhurnal* [Military History Journal] (August 1968), p. 107; E. A. Kosyrev, E. Orekhov and N.N. Fomin, *TANKI* [Tanks] (Moscow: Voenizdat [Military Publishing House], 1973), pp. 30-41; Fritz Heigl, *Taschenbuch der Tanks*, 2 (Munich: J.F. Lehmanns Verlag, 1935), p. 456; Subject: Armament and Equipment — organization (Mechanization); and Soviet Combat Vehicles, From: MA Riga, Latvia, 20 November 1935, Report No. 7915, File No. MID 2281-D-85, Records of the Military Intelligence Division, G-2, RG 165, NA, pp. 1-2. (Hereinafter cited by RG 165)

³⁹"Horse-Drawn Artillery," *Army and Navy Register*, 9 October 1937, p. 4.

⁴⁰Upton Birnie, Jr., "Obsolescence of Horse-Drawn Artillery," 16 May 1937, *ibid.*, p. 11.

⁴¹"Report of Chief of Staff," *ibid.*, 11 December 1937, pp. 1, 21.

⁴²Craig, "Mechanization and Tanks," Special Statement in "General Craig's Hearing," *Ibid.*, 26 March 1938, p. 4. Earlier the *Register* predicted "the horse may come back." See 5 March 1938, p. 9.

⁴³"Fuqua, U.S. Mainstay in Spain, is Returning," *New York Times*, 20 February 1938, p. 15; Subject: Employment of Troops in Domestic Disturbances. The Spanish Civil War, From: MA London, 25 January 1937, Report No. 38512, RG 165, NA, p. 1; Subject: Foreign Intervention in Spain, From: MA Valencia, 15 April 1937, Report No. 6519, *Ibid.*, pp. 2-3; Subject: Armament and Equipment — General. New Weapons in Spain — Value of Bombers and Tanks, From: MA London, 24 May 1937, Report No. 38776, *Ibid.*, p. 1; and Cavalry in the Foreign Press, "Lessons from the Spanish Civil War," *Cavalry Journal* (January-February 1938), p. 79.

⁴⁴Subject: Polices governing mechanization, and tactical employment of mechanized units, 6 April 1938, AG 537.3 (4-6-38), RG 407, NA, pp. 1-4.

⁴⁵"Tank Tactics," *Army and Navy Journal*, 4 June 1938, p. 884.

⁴⁶Henry J. Reilly, "Proving Ground in Spain. Armament Trends as Revealed by the Spanish War," *Army Ordnance* (May-June 1939), pp. 333-6.

⁴⁷"Prelude to Armor," p. 5.

⁴⁸Grow, "Ten Lean Years," pp. 94, 113, 116.

⁴⁹Herr, "The Cavalry," Lecture, Army War College, 19 September 1939, USAMHI, p. 13.

⁵⁰Grow, "Ten Lean Years," p. 116.

⁵¹"Redesignation of the Armored Force" in *Armored Command and Center*, p. 108.

⁵²*Ibid.*, and Herr, "Editorial Comment," *Cavalry Journal* (May-June 1946), p. 38.

⁵³Herr and Edward S. Wallace, *The Story of the U.S. Cavalry* (Boston: Little, Brown and Company, 1953), pp. 248-61.

⁵⁴Chaffee, "Statement of..." *Military Establishment Appropriations Bill, 1942*, 14 May 1941 (Washington: GPO, 1941), pp. 552-5.

⁵⁵For an excellent study on the flawed anti-tank doctrine, see Christopher R. Gabel, *Seek, Strike, and Destroy: U.S. Army Tank Destroyer Doctrine in World War II, Leavenworth Paper No. 12* (Washington: GPO, September 1985).

Dr. George F. Hofmann is an adjunct professor of history at the University of Cincinnati who served in the U.S. Army (Armor). He specializes in United States and European military history and military law and justice. His most recent publications include "Doctrine, Tank Technology, and Execution: I. A. Khalepskii and the Red Army's Fulfillment of Deep Offensive Operations," *Journal of Slavic Military Studies* (June 1996). Currently he is co-editing an anthology on the history of U.S. Armor with General Donn Stary.

Comments Sought on Revisions to 71-1 FM and ARTEP

As a result of the end of the Cold War and various other factors, there have been many changes in Army doctrine, to include the revision of significant Army publications such as *FM 100-5 Operations*, *FM 71-1*, *The Tank and Mechanized Infantry Company Team* is under revision at this time, necessitating corresponding changes with *ARTEP 71-1-MTP Mission Training Plan for the Tank and Mechanized Infantry Company and Company Team*. The new editions of *FM 71-1* and *ARTEP 71-1-MTP* will incorporate the many lessons learned since 1988 at the Combat Training Centers (CTCs) and during recent conflicts.

Copies of the *FM 71-1* initial draft were sent out to all divisions and bri-

gades, branch schools, and CTCs in December, and are available on the Internet on the Armor Center's Home Page. *ARTEP 71-1-MTP* will begin revision soon at the Armor Center. The Armor Center shares proponentcy with the Infantry School for these manuals, but has primary writing responsibility. We are looking for specific comments on the content of the *FM 71-1* (Initial Draft) and the 3 October 1988 edition of *ARTEP 71-1-MTP*, or suggestions for the future edition.

Send your comments by e-mail/PROFS or regular mail to this headquarters. Please include the name and telephone number of your POC with the comments.

The mailing address is:

Director, DTDD
ATTN: ATZK-TDD-P
U.S. Army Armor Center
Fort Knox, KY 40121-5000

The e-mail address is:

washburj@knox-emh1.army.mil

The PROFS ID is:

WASHBURJ at KNO1

For further information, or if you did not receive your copy, call CPT Washburn at DSN 464-3228 or commercial (502) 624-3228.

BOOKS

Time: War's New Strategic Frontier

Fighting By Minutes: Time and the Art of War by LTC Robert Leonhard, Praeger Publishers, Westport, Conn. 179 pp. \$47.

First, the bad news... this book costs \$47 at AAFES. This is unfortunate; it means that there will be a lot of money flowing out of professionals' pockets because this is THE premier theoretical work of the past 40 years and is destined to become a classic.

The author, LTC Robert Leonhard, is the U.S. Army's most prolific and outspoken theoretician. His first book, *The Art of Maneuver*, established his reputation as an original thinker. It did, however, begin by following in some rather well-established footprints. This book introduces not only an entirely new perspective about how we should think about war — it also provides us with the conceptual tools we will need to do this.

The premise is deceptively simple: "The most effective way to perceive, interpret, and plan military operations is in terms of time, rather than space." This, in and of itself, is not a difficult concept for the average professional to grasp. Yet, it is in his rigorous analysis of the implications of this shift, from a spatial to a temporal outlook, and how it might affect the conduct of war, that LTC Leonhard truly breaks new ground.

Introducing concepts such as "Leveraging Temporal Asymmetry" and using terms borrowed from physics (e.g. operations within war have a "frequency" and an "amplitude"), this is not a "light read." After almost every page, the reader finds himself setting the book down, digesting what he has read, deciding whether he agrees or disagrees, and actually THINKING about the finer nuances of our profession. This alone justifies the cost.

Despite his newly coined terminology — or perhaps because he uses "borrowed" concepts from other disciplines — LTC Leonhard's book allows the reader to open his mind to the potential new methods of executing war which he proposes. In the past, LTC Leonhard has been accused of using history out of context as a justification for his theories. Yet in this book (which is NOT a history) his use of historical examples in support of his thesis rings true and helps greatly in his explanation of a new method of understanding warfare.

Fighting By Minutes is expensive, no doubt about that. But is *IS* important. To

read this book is to think *HARD* about our profession. Casual soldiers and leaders should leave this on the shelf; professional warriors should go out and buy a copy today. Read it. Argue about it. Make notes in the margins.

ROBERT L. BATEMAN
Captain, Infantry
Westerville, Ohio

Books in Brief

Jane's Armour and Artillery Upgrades 1996-1997 (Ninth Edition), Edited by Tony Cullen and Christopher Foss. Jane's Information Group, Alexandria, Va., 665 pp., \$290 (\$795 on CD-ROM).

While few officers are well heeled enough to afford these expensive directories for their personal libraries, the information in them could be invaluable to the combat developer or when deploying to a new theater to face a force that may be an unknown quantity.

Given the astronomical cost of new tanks, many nations have opted for upgrades of earlier equipment that bring capabilities close to, if not equal to, newly developed weapons. More than 300 firms compete in this field, the directory tells us, supplying upgraded armament, ammunition, new engine packages, track and suspension upgrades, drop-in turrets, improved fire controls, and a host of devices to improve protection.

In the tradition of the more familiar *Jane's Armour and Artillery*, this encyclopedic directory includes the development history, production status, manufacturer, and capabilities of each system. All of this is arranged alphabetically by country of origin.

Useful and expensive, this directory is probably more likely to find its way to library shelves than private libraries, but it is good to know it's available.

Jane's Tank Recognition Guide by Christopher F. Foss. Harper Collins Publishers, Glasgow. 510 pp. \$19.95.

The title here says "tanks," but the content covers all types of AFVs, from tanks to

APCs to self-propelled artillery to wheeled armor. This is a useful armored vehicle reference. The author sought to design a text that helped in vehicle identification and provided key recognition points, as well as useful information, about each type of vehicle. He was successful. It is all in here, logically arranged and succinctly explained. If you ever wanted a copy of *Jane's Armour and Artillery*, but were scared off by the \$250 price, this is the book you wish they had designed for working guys. I see a place for this book in every S2 shop and on the bookshelf of every armor aficionado. Its design allows it to fit inside a pants cargo pocket, although carrying it there would produce a noticeable limp. Of course, it doesn't contain all of the data found in its hardcover big brother, nor the sheer volume of pictures in the larger volume, but the information it does contain should satisfy those who need it.

Tank Killing: Antitank Warfare by Men and Machines by Ian Hogg. Sarpedon Publishers, New York, 288 pp. \$22.95.

The author, an authority on small arms and the current editor of *Jane's Infantry Weapons* and other similar directories, focuses here on the history of tank killing, making this book a useful addition to the armor soldier's bookshelf.

The chapters are arranged to cover families of weapons — infantry tank killers, anti-tank guns, tank destroyers, tanks themselves, air weapons directed at tanks, smart weapons, and the desperate measures some defenders employed at the low end of the technology curve, in a chapter entitled "Mines, Traps, and Bare Hands."

Hogg provides a short and very readable history of the development of each approach, explains clearly how each method works, and includes numerous statistics and specifications, so that a reader can compare the effectiveness of the method versus others. Statistics are in metric and English measurements, and include useful facts like ranges, muzzle velocity, and penetration potential. Almost as interesting as the success stories are the fascinating failures, which point up the difficulty of the job.

An interesting, useful book at a reasonable price.

ARMOR STAFF

Mounted Water Ration Heater on the Way For Tanks, Bradleys, M113s, and Howitzers

by Larry T. Hasty

In the near future, tank crews will be able to provide hot water and to heat rations on board combat and combat support platforms.

Desert Storm established the unmistakable need for this capability. In response, the Directorate of Force Development developed the necessary requirement documentation and managed a program that led to the successful fielding of the Mounted Water Ration Heater (MWRH).

The MWRH will heat five Meals Ready to Eat (MREs) and two pints of water at the same time. If the insert that rations are heated in is removed, you can heat one gallon of water for coffee, hot chocolate, or hygiene purposes. This heater has two heat settings, low (150°F to 160°F) and high (180°F to 190°F). Because of its low power rating (15 amps), this heater can be left on for several hours in silent watch without starting the engine to recharge batteries. The MWRH is equipped with a low power monitor that monitors vehicle battery power and automatically shuts the heater off to prevent drawing battery power below required starting level.

The program managers for Abrams, Paladin/FAASV, Bradley, and M113 have taken the lead with their integration kit development, and their systems will be the first platforms equipped. PM-Abrams expects the M1A1 MWRH fielding to start during the second quarter of FY97 and to continue until approximately 1,440 tanks



receive the MWRH at no cost to the receiving units. M1A2 MWRH integration will be done as a Pre-Planned Product Improvement.

PM-Bradley recently started fielding the MWRH and will continue to FY01. A total of 5,248 MWRHs will be fielded during this time to M2A2s, M3A2s, M2A3s, M3A3s, and C2Vs.

PM-Paladin and FAASV currently has fielded 180 MWRHs (57 Paladins and 123 FAASVs) through a retrofit program. The plan is to continue this program until approximately 1,604 MWRHs have been fielded (824 Paladins and 780 FAASVs) by FY98.

PM-113 plans to start fielding the MWRH during the second quarter of FY97 and will continue through 2003. Approximately 2,156 MWRHs should be fielded during this

time to M113A3s, M577s, M1064s, and M1068s.

If you have any additional questions or need any other information on the MWRH, call Mr. Larry T. Hasty at the Directorate of Force Development, DSN 464-3662, or commercial (502) 624-3662.

Larry Hasty is a Soldier Support Project Officer assigned to the Directorate of Force Development, U.S. Army Armor Center, Ft. Knox, Ky. His area of responsibility includes Organizational Clothing and Individual Equipment (OCIE), life support, and communication equipment programs for the combat vehicle crewman. He received the Colonel Rohland A. Isker Award for his work in fielding the Mounted Water Ration Heater.