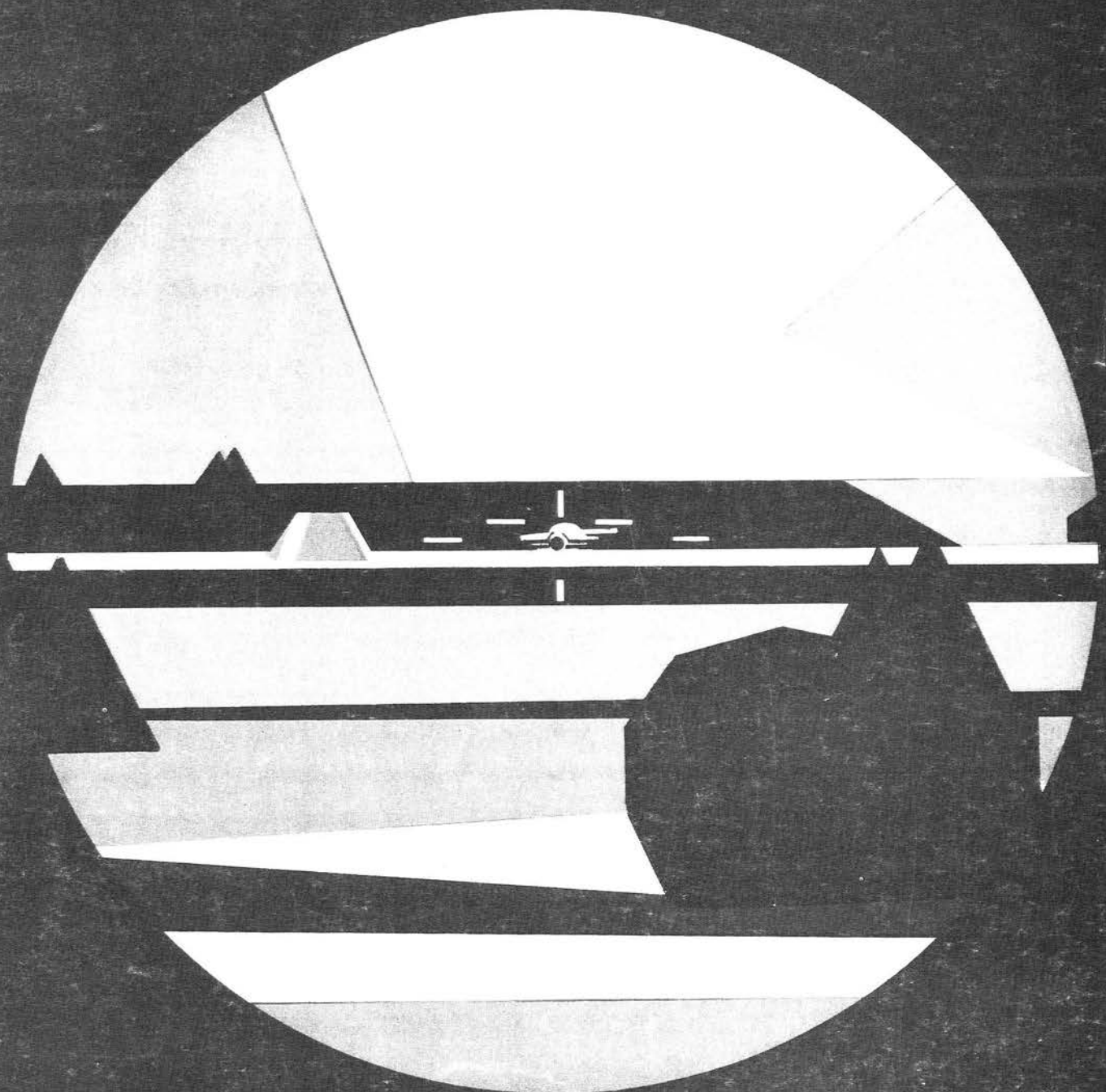
ARMOR

The Magazine of Mobile Warfare



May-June 1983

United States Army Armor School

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

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ARMOR The Magazine of Mobile Warfare

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FEATURES

DEPARTMENTS

COVER

Simulation in training plays an increasingly important role in today's sophisticated army. Realism is stressed in the newest simulators and the cost savings are of vital importance. Lieutenant Colonel J. Michael Weaver's and Richard A. Renfrow's article on page 14 details the latest in armor training simulators and provides a look into the future of this advanced training concept.

Letters

Promotion Criteria?

Dear Sir:

Only occasionally do I have an opportunity to read a copy of ARMOR, and it is usually an enjoyable and informative experience despite my being a former cannoneer rather than a tanker. I was appalled, however, on reading CSM John Gillis' "Driver's Seat" article in the January-February 1983 issue entitled "Meeting the Promotion Board".

Don't get me wrong—I am not condemning CSM Gillis. He appears to be a realist who is looking at a real-life situation and telling his men how to cope with it. Having risen through nine enlisted grades, he knows whereof he speaks and is happy to have others benefit from his experience.

After reading Gillis' piece, I sat back and wondered —"Good God! Was I ever part of such a system? Are my younger brothers in arms perpetuating such a thing?" Just think, a man can be awarded 60% of his promotion board points on sheer eye wash and steer manure!! CSM Gillis says so — "He can earn 150 out of the 250 total points possible without having to exhibit his knowledge on any specific subject.".

Personal appearance, and bearing, and self-confidence, and oral expression skill— all these have their place, I am sure. But, after a few days of sleeping in the mud, a dogface, or cannon shooter, or tanker, gets to looking a little rank; he might even smell a little; and his oral expression takes on a fair sprinkling of colorful adjectives. Somehow, he can get by despite all this. However, when he displays his deep self-confidence, and maintains full eye contact while he tells his troops the wrong thing, he ain't worth a damn! His troops will know it, and they are the ultimate promotion board.

I don't recall whether we used anything so formal as a DA Form 3356 in my day, but the enlisted promotion picture doesn't seem to have changed much—the glib, sharp-looking, superficial PFC became the glib, sharp-looking, superficial corporal, and sergeant, and staff sergeant, and technical sergeant, on up the chain. Few of that type acquired knowledge as they acquired stripes, but promotion seemed to come right on schedule. That was my fault; that was, and is, the fault of DA Form 3356; that is the fault of present-day promotion boards, if CSM Gillis tells it right.

One strong memory remains with me from my sleepless, double-timing OCS days of the early 1950's. A lecturer early in our course told 300 of us eager candidates sitting in the hot Kansas sun of the results of a survey conducted in Europe immediately following the Big War in 1945. Essentially, it was determined that men could, and did, overlook virtually any shortcoming in a leader except lack of technical knowledge. He could be sloppy, bigotted, unfair, a real cast-iron prince (usually spelled differently); but, so long as he knew his stuff, men would follow. He had to be able to show the way when the chips were down. That applied to noncoms as well as to officers.

Before I close, let me bore you a little with a short story of my quadruple cardiac bypass operation of a couple years back. The evening before the big event, I sat in my room, 54 years of a full life passing before my eyes, when my young surgeon arrived to pump up my courage. His hair was a bit disheveled, his suit didn't fit too well, and he had the command voice of a ballet dancer. But I knew that he had a record of more than 980 bypass operations over a 2-year period without a single loss. By golly, he got all 250 of my points on that fact alone!!

RAYMOND E. MESSIER
LTC, USA (Ret.)
Bellevue, WA

Motorcycles Easy to Hide

Dear Sir:

Captain Robert R. Sigl wrote a fine piece on the motorcycle (Sep-Oct 1982 *ARMOR*), however, there is one important virtue of this vehicle that I think we must bear in mind.

A cycle can be *hidden* in bushes, a barn, or even in a small building. Hiding a tracked combat vehicle or a truck is much harder. Further, the infrared and magnetic signature of a cycle will be more difficult for sensors to detect.

ROBERT P. FAIRCHILD
Major, Armor
NYARNG

Correction to 34th Armor History

Dear Sir:

I have been following the unit lineages in ARMOR magazine with interest and awaiting the appearance of the 34th Armor in which I served as a platoon leader and company XO in Vietnam in 1967-68.

Unfortunately, there appears to be a serious discrepancy in the decorations section of the article that should be corrected.

The 2d Battalion (less Company C) 34th Armor was awarded a Presidential Unit Citation (Army) as part of a larger force for action at Suoi Tre on 21 March 1967. This award was cited in DA GO 59, dated 21 October 1968.

DAVID A. VAN TESLAAR
Stockton, CA

Insignia Recalled

Dear Sir:

Anent the back cover, July-August issue of *ARMOR* magazine.

The distinctive insignia was designed by 1LT Oakley Sanders, 7th Cavalry, in 1923.

Sanders was living with several Gary Owens of a low rank, including the undersigned, in quarters known as Cliff House at Fort Bliss. The quarters were on the bluff above the polo field, which was put in grass by me.

Sanders was not popular with his squadron commander and left the Army soon after. He was a good officer and deserved better.

WESLEY W. YALE
Colonel, USA (Ret)
Pebble Beach, CA

History Evaluation Takes Time

Dear Sir:

I enjoyed the article on Kursk very much.

It is interesting to note that "as of 1968 virtually no significant Soviet documents relating to WW II have been made available." It wasn't until 1978 (?) that a lot of material on Allied efforts was made available. The Enigma War, American Magic, The Wizard War—I could go on and on.

As far as military history is concerned it is no better or worse than any other history of military operations. High level decisions are often based upon available information which may not be exactly what "really" happened. Read the comments by Captain Brown in "Lessons in Leadership; The Legacy of Kursk" (*ARMOR*, July-August 1981). He comments that Hitler, some 3,000 miles away, felt he had a better grasp of the situation at Kursk than his frontline commanders. I think Hitler had a better grasp of the *total war* than his frontline commanders! We seem to try to comprehend the German campaign in Russia in a vacuum! Let us not overlook the fact that Hitler and his staff were forced to consider the threat posed by Generals Clark, Patton, and Montgomery who were coming up fast via North Africa, Sicily, and Italy. In addition, there were the constant harassments of Allied bombers, French Resistance fighters, internal politics and many other factors.

I commanded the 11th Military History Detachment in 1966-67 and wrote one of the histories of the move out of France. I think I knew more about conditions in Orleans, France, than either LBJ or McNamara, but I did not have the foggiest

idea of what was going on in Vietnam. According to the book, *"The Making Of The President 1968,"* there were indications of a major offensive. General Westmoreland had requested additional troops, etc. Decisions were made that, at the time and location, seemed to be very poor and were recorded as such. However, given the total picture they made perfect sense.

Later, in Vietnam, I saw or heard about decisions that to me, at Corps level, seemed to be rather stupid, but I complied with them as best I could. Now, years later and with some information being made public, I begin to see that the "poor decisions" were in fact very sound decisions. Just ask any historian and he will tell you that it is at least 50 years before we begin to understand an era.

I also had the opportunity last year to read an Ordnance Report, dated 1977, about a German WW II experiment that I understand is the basis of a new Soviet anti-tank round.

I also enjoyed the September-October issue with the article on Soviet armor officer training. Keep up the good work.

WILLIAM L. HOWARD
Lieutenant Colonel, Armor, USAR
Spring Lake Heights, NJ

Armor Skills for the Armor Force Badge

Dear Sir:

I would like to make the following comments regarding First Lieutenant Prevou's "We Still Need an Armored Force Badge." (See "Professional Thoughts," January-February 1983 *ARMOR*. Ed.)

I agree with the lieutenant that the qualification standards for the Armored Force Badge (AFB) must be high. But his criteria are better suited for an IG inspection of training than for what is required to wear the symbol of armored professionalism.

Let's make the test tough, but let's also make it standardized, based on common-sense goals and as resource-dependent as possible. Most importantly, let's make it a test of armored skills.

A soldier desiring to be tested for the AFB should meet these prerequisites:

- Be a volunteer.
- Meet army physical fitness and weight standards.
- Have a 19 or 12-series MOS.

The hands-on component of the test should be the non-live-fire tasks of the Tank Gunnery Crew Skill Test outlined in FM 17-12. Tankers would be required to perform all 26 tasks correctly.

The hands-on component for the cavalry trooper, whose primary mission is reconnaissance, needs development. Once the *M3/CFV* becomes the primary fighting vehicle of cavalry units, the hands-on component of the AFB should emphasize both gunnery skills and reconnaissance tasks. Troopers would be required to complete all tasks.

The test criteria should be available to all battalions and squadrons. Test sites could be established by all battalions and squadrons. I agree with Lieutenant Prevou that the test should be available to volunteers only once a year.

An AFB will have a positive impact on the morale of the armored force. But let's ensure that the criteria for awarding the AFB are based upon performing *armor* skills.

JOE B. LAMPKIN
Captain, Armor
Ft. Knox, KY

Filipino's Not Recognized

With regard to J.W. Woodall's article "26th Cavalry in the Philippines," (March-April 1983 *ARMOR* Magazine), it is disturbing that such an article can appear in print and have so little about the men who composed this outstanding unit. True, the cover illustration shows a Filipino with horse, and the opening paragraphs mention that the enlisted men were Filipinos.

However, the bulk of the article mentions Wainwright, Pierce, etc., and not a single name of a Filipino is included. Strange, indeed, for a unit that abounded in decorated enlisted men.

Woodall's concluding paragraph is a disappointing array of names of the glorious "American horse cavalry," not mentioning that these "intrepid horsemen", the guys who spilled blood and guts, were Filipinos, not Americans.

For sources, Woodall should have consulted the more than ten articles that have appeared in *Cavalry Journal*. And, no matter what Woodall or the editors of *ARMOR* think, the unit was known throughout its career as "26th Cavalry (PS)."

Donald Chaput
Curator of History
Natural History Museum,
Los Angeles County, CA

26th Cavalry Remembered

Dear Sir:

Having long been fascinated by the steep odds and great courage of the 26th Cavalry's fight on Luzon, I am very pleased to see the tale recounted again by Captain Jeffery W. Woodall in the January-February 1983 *ARMOR* Magazine. After the 7th, the 26th is—or at least deserves to be—the most famed of U.S. horsed cavalry regiments. Incidentally, speaking of the former unit, that 1941 Errol Flynn film on the Little Big Horn fight is correctly titled, *They Died With Their Boots On*. Hollywood has not been unaware of the 26th Cavalry either, as its horsemen are depicted in both *Bataan* and *Back To Bataan*, not to mention an entire troop in the fanciful and disappointing *Once Before I Die*.

While I agree with Captain Woodall that the cavalry delaying tactics were effective, I must point out that the replacement of Lieutenant General Masaharu Homma resulted from more than simply the unexpectedly long campaign on the Bataan peninsula. Following that, casualties during the invasion of Corregidor were much greater than anticipated—coast artillery and naval gunners manning the harbor defenses made a shambles of the landing barges, and the marine garrison on the island showed their customary elan in thinning out the Japanese survivors still further. The last straw in General Homma's career was what amounted to, in the eyes of the Army command, an excessive leniency toward the Filipino people.

For those otherwise dumbfounded, I can add some information on the presence of British carriers on Luzon. One or two British freighters carrying these vehicles to Singapore for the Malayan campaign were turned back because of the overwhelming Japanese command of the sea. So that someone would benefit from them, the carriers were offloaded in Manila, for all intents and purposes a reverse Lend-Lease.

Finally, a couple of questions: (1) Colonel Chandler's account in the pages of the *Armored Cavalry Journal* some 36 years ago, says the standand arm used by the 26th was the M1 rifle (despite the conventional fondness for seeing the old '03 Springfield). What is *veritas?* (2) What decorations were eventually given to the men and to the unit itself? Despite the resolution and bravery of this horsed regiment, the military awards have not been made terribly public (save the monument at Fort Riley).

NELSON H. LAWRY
Rochester, NY

The following information has been determined regarding the 26th Cavalry's unit awards. The unit received three American Presidential Unit Citations and one Philippine Presidential Unit Citation as follows:

PUC for 7 December 1941 to 10 May 1942; WD GO 22, 1942, amended by WD GO 46, 1948.

PUC for 23 December 1941; WD GO 14, 1942.

PUC for 21 January 1942; WD GO 14, 1942.

Philippine PUC for 7 December 1941 to 10 May 1942; WD GO 47, 1950.

Also, in the matter of personal arms carried by the 26th Cavalry members, so far as can be determined, they carried the M1 Garand rifle. *Ed.*

The Tanks Were There Too

Dear Sir:

"Having drunk from the same canteen," I was very engrossed with Captain Woodall's account in the January-February 1983 *ARMOR* Magazine of the 26th Cavalry (PS) and their heroic and indispensible role in the delaying action of the Northern Luzon Forces into Bataan during the early days of WW II in the Philippines.

However, I would like to correct the possible impression that it was the 26th Cavalry

alone that accomplished this successful delaying action. I feel it is time credit is *also* given to the efforts of the tankers and their *M3s* of the 192d and 194th Tank Battalions during the delaying operations and the defense of Bataan.

As a young sergeant in Company C, 192d Tank Battalion, I was actively involved in many of the various stages of the withdrawal. I would judge that it was only because of the separate but often combined actions of *both* horse cavalry and tanks, that the final withdrawal into Bataan was successful.

Admittedly, an unfortunate top echelon communication and coordination "snafu" between General Wainwright's headquarters, the various unit headquarters of the Northern Luzon Forces, and our provisional tank group headquarters, was detrimental and an unfortunate misunderstanding in the early days of the delaying action.

My eventual commissioning as an armored-cavalry officer was an emotional high in my service career that underscored my deep respect and admiration for both the cavalry troopers and tankers with which I am deeply proud to have served.

I am looking forward to the day that *ARMOR* Magazine carries an article on the role of the tankers (the other half of the armored-cavalry branch) in the Philippines during those first tragic months of WW II. I know material is being gathered for such an article by several persons.

ALBERT L. ALLEN
Lieutenant Colonel, Armor (Ret)
Mansfield, OH

(See July-August 1983 issue. Ed.)

Tank Gun Calibration Upheld

Dear Sir:

I read with interest "New Tank Gun Calibration Policy" by Major Brown and Captain Kloecker (July-August 1982 *ARMOR).* This policy was used, or rather, attempted, by the 2d Bn, 69th Armor, Fort Benning, GA, between December 1981 and January 1982.

Due to problems experienced by the first company to shoot, Captain Kloecker paid us a visit and discussed our results compared to those expected. The outcome of these discussions was that the policy requires the use of TPDS ammunition, even with the use of the Pye-Watson device, by units with range constraints comparable to those at Fort Benning. The round-to-round dispersion of ammunition other than TPDS is too great to perform calibration. If other errors are thrown in, such as a lack of a Pye-Watson device, or periscope and ballistic drive improvements not applied, you are back to his "Case 1" with rounds all over the target, and justification for individual zeroes. This is after having fired possibly seven rounds (two initial, two for a crew-error test, and three for a proof test), and being back at "square one."

Additionally, it is critical that the leadership on the range, starting with the battalion commander and master gunner, and including the firing company commander and range/tower OIC, understand whichever system is being used. They must have the knowledge and experience to analyze the results and determine the probable cause of errors. The zero/calibration policy must be enforced. It should be explained as many times as needed to ensure that "Old Sarge" doesn't continue to count on zeroing to compensate for crew or system error ("This is how we did it in XY Armor in Germany, and I fired distinguished,")

It will be interesting to see if this new calibration policy becomes the wave of the future, or is cast aside by "years of tradition, unhampered by progress."

KEITH A. BREEDLOVE
Captain, Armor
EUDAC, USEUCOM

Motor Sergeant's Course

Dear Sir:

In the September-October 1982 ARMOR Magazine, Lieutenant Colonel Fletcher's article stated that the U.S. Army Ordnance Center and School (OC&S) Aberdeen Proving Ground, Maryland, had initiated the Organizational Maintenance Supervisor's (Motor Sergeant's) Course. (See Professional Thoughts, "The Motor Sergeant." Ed.) This is not quite so. We have initiated the 63B30, 63N30, 63D30, and 63E30 courses, which include many common subject items that are needed by an NCO to be a motor sergeant, but the courses are not designed as Motor Sergeant Courses, *per se.* However, a soldier who completed one of the above courses would more effectively fill the motor sergeant's position than someone with another MOS.

The OC&S also has a Training Extension Course (TEC) program consisting of 21 lessons for MOS 63B titled, "Motor Sergeant's Course." The TEC program can be obtained from the Commander, US Army Training Support Center, ATTN: ATIC-AET-TP, Fort Eustis, VA, 23604. A combined curriculum of the resident courses discussed above plus participation in certain TEC program lessons would fully qualify an NCO as a motor sergeant.

Interested NCOs may obtain additional information by writing:

Commander Ordnance Center & School
ATTN: ATSL-TD-PMQ (Mr. Lane)
Aberdeen Proving Ground, MD 21005

WILLIAM C. BALL
Director of Training Developments
OC&S, Aberdeen Proving Ground, MD

Soviet Tank Gunnery Addendum

Dear Sir:

"Soviet Tank Gunnery Training" by Captain Matthew S. Williams in the January-February 1983 *ARMOR* Magazine does not quite bring this important subject up to date. The author's basic reference, "Soviet Tank Crew Training," Vol. II, has an intelligence cutoff date of 1 August 1975. An abbreviated version was published by the Army's Intelligence Threat and Analysis Center (ITAC) in 1981.

Perhaps a few specifics would be useful. First, the specialist school for tank gunners is 4 months, not 4 weeks. Additionally, the ranging methods referred to are still used and the TSh 2B-22 ballistic reticule, as illustrated, is still available in the *T54B/T-55* tanks. This does not portray the electro-optical ranging associated with the *T-64A* and *T-72M,* nor the laser rangerfinder associated with the recent mid-life improvements to those tanks. The ranging method has a direct bearing on the first round probability of hit. The probabilities given were actually for the *T-54.* The 50-percent probability range for the *T-72M* is 500 meters greater than the 1,500 meters of the *T-54.* If given the choice, Soviet gunners do not fire until the probability of a first-round hit is 50 percent, or greater, with any given number of tanks firing. When conditions warrant, they will fire from the halt or short halt to increase the 50-percent probability range; however, current gunnery qualification is conducted on the move (5-30 kmph) against both moving and stationary targets, using full stabilization.

Specialist training includes extensive classroom study preceeding field training. Manuals, regulations and teaching aids are used for basic tactical training. Hands-on drills follow, using either simulators or real equipment. After specialist training, replacements are assigned to units where tactical training of the crew is taught. The gunner will normally remain in the same unit for his entire period of service and repeat the unit's training each 6 months. Motivation of seasoned crewmen becomes a problem with the repetition experienced every 6 months.

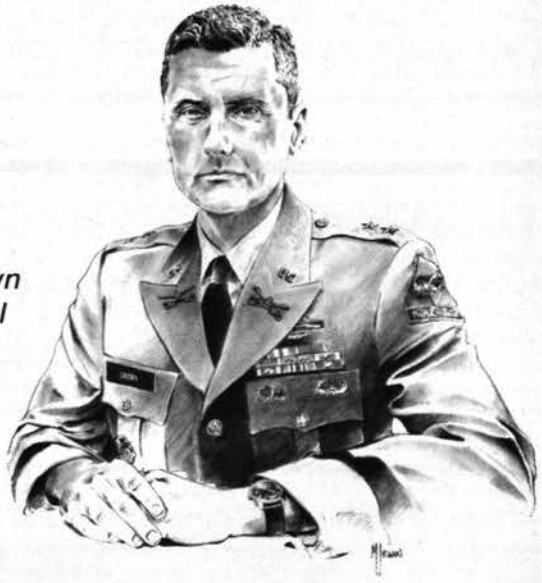
Many older training devices are still used although both technology and usage have increased in recent years. The newest tank trainer is designed for improvement of the skills using all methods and all types of rounds under conditions very similar to combat.

The author seems to disparage the KOP-R Optical Control Instrument, while ITAC assessed it as "an excellent device for teaching firing from a tank." Nevertheless, the device has been replaced with an improved version known as KOP-RM. Both devices can be mounted on a rocking platform, of which there are two types of individual mounts and two types of full vehicle mounts.

Currently, the USAARMC Threat Office finds no reason to conclude that the Soviet tank gunner is anymore less capable than his American counterpart. Yes, the training techniques differ in almost every category, but the end product results are about even. Fostering the impression that the current Soviet system is antiquated does not enhance training of our tank gunners.

JAMES M. SPRAYBERRY
Major, Armor
Threat Branch, DCD, Ft. Knox, KY

COMMANDER'S HATCH



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

Armor Force Leadership

In my first Commander's Hatch, I stated, "We need to capitalize better on our inherent strengths as Americans—knowing our mission, soldiers, and equipment, then giving our subordinates the running room to execute. We must, by our actions, encourage the initiative and innovation of our subordinates as they master the basics of moving, shooting, communicating, maintaining, and caring for our soldiers."

Know the Basics

First and foremost, we must *know* the basics of our trade. In the Armor Force, this tends to be associated primarily with the *capabilities* and *limitations* of *friendly and enemy* weapons and combat systems. In terms of capabilities I mean, for example, that a leader must be aware of the differences between and the capabilities of the *M735* and *M774* APFSDS main gun rounds. Regarding the threat, the leader must possess a detailed knowledge of the capabilities and limitations of the *T-62, T-72,* and now the *T-80* main battle tank, including their points of vulnerability and the capabilities and limitations of complementary weapons, such as the Soviet *AGS-17* 30-mm automatic grenade launcher; and equipment such as the *BMP-2* and how we can best target and kill it.

The basics, however, do not solely relate to our tank force, but include similar knowledge of the combined arms—detailed knowledge of infantry, for example—not only their weapon's capabilities but also the capabilities and limitations of their equipment and techniques when fighting at night and under other limited visibility situations; the detailed knowledge of what mounted infantry can and cannot do in various circumstances; the knowledge of the challenge faced by mechanized infantry of becoming overly-wedded to their tracks when dismounted maneuver actions are called for; the knowledge needed to draw upon the great complementary firepower of *Bradley* infantry fighting vehicles to enhance the effectiveness of the tank-infantry team, while minimizing the effects on the *Bradley* of its lower level of armor protection. It means thoroughly knowing procedures such as those for stand-to, the detailed requirement of troop leading procedures, combat loading of vehicles, and the rigors of properly executing the prepare-to-fire check.

Perhaps most basic of all is the necessity to care for our soldiers well—to know them, to understand them, to keep them informed, and to ensure that these soldiers are properly cared for by a chain of command that is deeply concerned about their welfare.

The basics also include the knowledge of the rules of combat—moving, shooting, communicating, securing, and sustaining. These are basically the drills and exercises that constitute the plays within the company and platoon. There is nothing exotic about moving a tank platoon in a column or cross-country in a combat wedge, or in communicating

briefly and concisely under radio silence by hand and arm signals, or in properly conducting a Table IX. The basics require a great deal of practice under different circumstances to hone the individual proficiency of the officer and NCO leader, but each is a very basic element of overall unit proficiency as well.

The last aspect of the basics is knowing your own capabilities, and those of your organization under situations of great stress and fatigue. How do you react to the effects of fatigue; to the pressure in peacetime of having your performance tested and evaluated, or to the pressure of depending on your subordinates to check everything when you are too exhausted to do so yourself? Self knowledge includes your capability to take over the job of your senior leaders, once or even twice removed, if necessary. As a platoon leader, you should be able to take over the company, or under certain circumstances, multiple companies or even the battalion. Developing leadership depth is a serious training responsibility in an organization.

Practice the Basics

Once you have developed the basics, then you must practice them in the context of the mission-type order. That, to me, is the application of those basics to the factors of METT-T, i.e., tying the basic plays to the situation expressed in terms of mission, enemy, troops, terrain and time each situation requiring different variations of the basic plays. This enhances your ability to react quickly to unforeseen risks and opportunities. That ability is acquired by training one's self and one's organization to literally crawl before walking. It means using basic battle drills together in different combinations to respond to varying situations. It is important that you practice your drills over a wide range of situations so that you and your subordinates understand each other and can respond very quickly with minimal communication. In effect, you and your subordinates must be operating on the same "wave length".

Some of this practice can be done on a sand table, as well as in the field; so that the mutual discussion of the "what ifs"—how to employ your force—encourages your subordinate's understanding of your operational methods. Really, what you are doing is developing a *collective sense* for the battlefield and how to employ the combined arms that are available to you. You are accomplishing a major part of the deliberate planning that must precede the violent execution of a combat operation.

It is also necessary to anticipate and practice for different leadership situations involving officer and NCO responsibilities. For example, practice in-depth so that you can absorb losses, so that a tank commander can take over preparing the platoon to fight should the platoon sergeant become a casualty. It involves practicing procedures so that they become second nature.

Apply the Basics to the Situation

Once we have practiced the basics and their various combinations, then we need to tie them together based on the factors of METT-T to construct defeat mechanisms that will thwart the Threat's operations. These defeat mechanisms can be likened to "walls", and like "walls", they can take many forms and are based on building blocks. We need standardized building blocks across the Armor Force while at the same time encouraging our commanders to apply their innovation and initiative in how they put the blocks together. Each configuration will be different depending upon the commander's assessment of the Threat and what needs to be done to respond to it.

The essence of Armor Force leadership, then, is ensuring that we have the standardized building blocks while developing the knowledge required to construct "walls" in the configuration which will beat the Threat. Of course, as we discuss the "walls", we are no longer discussing solely the tank unit, or the cavalry unit. We are talking the application of the Combined Arms.

Train Your Subordinates

The last element of Armor Force leadership is the fundamental obligation of leaders to personally train their subordinates and to do so in a manner to reinforce the chain of command. Consequently, it is the brigade commander's responsibility to instruct his battalion commanders in detail. Each level must thoroughly train the next lower level—battalion trains company, company trains platoon, and platoon trains the tank commander. It goes without saying that we expect a continually higher level of tactical and technical competence as we ascend the chain of command. As this "chain training" occurs, it is incumbent upon the chain of command to use the doctrinal publications. Standardization must apply across the board in the use of basic operational terms and their meaning. This is not an area in which to demonstrate your abilities to be different; rather, commonality of terms and definitions is absolutely essential. As leaders, we all need to read and re-read the basics—the how-to-fight manuals, the gunnery manuals, the operator's manuals. For example, the Soldier's Manual teaches the specifics—and in so doing provides the soldiers the opportunity to demonstrate their abilities as you demand and test their proficiency. As these basics are mastered, you must encourage innovation, the better way, and develop rapid responses to the new and unanticipated situations based upon the common understanding which exists between you and your chain of command. Encourage your leaders to develop innovative ways to accomplish the mission in consonance with your conceptual guidance.

There is a vital parallel to sports that is applicable to our Armor Force. As Americans, we tend to think of drills and plays as related to football. This is true to a point. The coach puts in plays in football to respond to generally recognized set situations. But, our battlefield will be much more like a soccer game, consisting of rapidly changing situations across the entire depth of the playing field, with both sides rapidly converging, then dispersing in continuous action for an extended period. The basic plays have to be understood well in advance so that the team can rapidly apply those basics to new and unanticipated situations. We need to train our subordinates to operate in that sort of fluid environment and to capitalize on each fleeting opportunity as it occurs. That is how we can "capitalize better on our inherent strengths as Americans, knowing our mission, soldiers, and equipment, then giving our subordinates the running room to execute."

DRIVER'S SEAT

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

Two Memorable Dates

Following is an address given by CSM John W. Gillis at a basic training graduation ceremony on 27 May 1983.

Because you graduate at this particular time of year, I will focus my remarks on two dates in our immediate future that are important to every American—two dates that are set aside each year for celebration and rememberance; two dates that are particularly important; two dates that are special to American soldiers, both past and present.

The first of these important dates is 14 June 1983. It is on this day that our Army will celebrate its 208th Birthday. It was at Independence Hall in Philadelphia, on a Wednesday, 14 June 1775, that the Second Continental Congress resolved the following: "That six companies of expert riflemen be immediately raised in Pennsylvania, two in Maryland, and two in Virginia." The following day, George Washington was appointed the first Commander-in-Chief.

Our Army is one year older than our nation and has maintained the freedom of our country for 207 years. It has paid the price for our freedom, our dreams, and our liberty, by spending 50 of its 208 years involved in mortal combat. The battlefields of the Revolutionary War, the Mexican War, the Civil War, the Indian Wars, the Spanish-American War, WW I, and WW II, Korea and Vietnam tell the history of how our Army has determined the destiny of our country.

There are many reasons for the success of our Army: A strong industrial base; dedicated civilians giving their time and efforts towards establishing and maintaining a strong Army; our proven military leaders; our combat heroes that we all remember, Generals MacArthur, Eisenhower, Patton, and Abrams, and Sergeants York and Murphy; as well as all those whose heroic efforts earned for them our country's highest award for valor—the Medal of Honor. But for all the reasons I have mentioned and, for the many others that I have not, the success of our Army would not have been realized had it not been for the soldier. For 208 years—from the "shot heard around the world" on Lexington Green, to the last shot fired in Vietnam—it has been the soldier who has been held responsible as our guarantee of freedom. Whether it be in the Active Army, National Guard, or Reserve, whether it be for one enlistment, or two, or for a full career, from the individual soldiers' willingness to serve was born our proud Army heritage.

Many of you graduating today know of these soldiers of whom I speak. Some are here today. They are your fathers, grandfathers, uncles, brothers, cousins, and other relatives. They were not heroes as we know heroes, but simply average citizens of our country who, during a time in their lives, were called upon to serve our nation. There was a need for their service, and they did what had to be done. They served with pride. It is these soldiers who won the wars. It is these soldiers who kept us at peace during the times we were not at war. It is these soldiers who lay the rightful claim to our Army's heritage.

All of you graduating today have mastered those basic skills necessary to perform some of the duties and tasks of a soldier in today's Army. You will take that knowledge with you to your next unit as you march off this parade field; but you also take something else with you. It is now your responsibility to perpetuate the honor and glory of our Army. It is now your turn to walk as sentries on the walls of freedom. Do so with the same fierce pride as those who came before you.

There is another important date in the more immediate future that causes my thoughts to turn to the glorious history of our Army. It, too, is a day of great importance to all Americans—but even more so to the soldier. It is a day set aside to honor our comrades in arms who gave their lives serving our country. In a few short days, on the 31st of May, Memorial Day, our nation will honor these soldiers; and we will honor our own.

Soldiers may participate in or observe a parade. They may participate in or observe one of the ceremonies conducted in our national cemeteries. A soldier may put on his uniform and attend a ceremony held in the park in his hometown; or he may simply visit the cemetery in his hometown by himself, for there is a soldier buried there. However soldiers remember on this day, what is important is that they do. In our national cemeteries, there are rows upon rows of white crosses where these soldiers rest for eternity. On many of these white crosses is the inscription "Here rests in honored glory a comrade in arms, known but to God." While it is true that their names are not known to us, we know them—for they are soldiers, one of us. Those who have marched, fought, and died in the ranks before us have earned their right not to be forgotten; and it is your turn to see that they are not. Do so with the same quiet pride of those who came before you.

You pass in review today, in front of your families and friends and in front of our fellow soldiers, as the future protectors of our country and as soldiers who have been entrusted with the safekeeping of the glorious heritage of the United States Army. I speak for many throughout our nation when I say that I have the greatest confidence in your ability to do both.

MASTER GUNNER'S CORNER

Captain Jeffrey D. Hawkins
Chief, Advanced Gunnery Branch
USAARMS, Fort Knox, KY

Selecting a Master Gunner Candidate

Since the graduation of the first Master Gunner class in May 1976, Master Gunners have established themselves as a key element in the success of unit tank gunnery training programs. Achievements by Master Gunners have earned them respect and praise from all levels of command. The Master Gunner Course is fast-paced, technically oriented, and is the most challenging course an armor NCO will ever take.

Standards of the course are very high and only the most qualified NCOs are returned to the field as Master Gunners. Because of the difficulties of the course and the additional duties and responsibilities an NCO will assume when becoming a Master Gunner, it is essential that selection of an NCO to attend the course be undertaken with deliberation and thought. By following a few simple steps, a commander can ensure that the NCO selected is the best qualified man in his unit to attend the Master Gunner Course.

The first step in the selection process should be the formation of a battalion-level board that will recommend to the commander which NCO should attend the course. This board should be comprised of the unit's Master Gunners or senior NCOs. The board will recommend an NCO to go, but the final decision is the commander's.

During the second step, the board makes a list of the NCOs that meet the course prerequisites. These are outlined in DA PAM 351-4 and their importance cannot be overemphasized. An NCO who meets the course prerequisites is 50 percent more likely to graduate than an NCO who does not meet them. There are several common areas in which NCOs fail to meet these prerequisites:

- NCOs are selected who have never qualified a tank or have failed to qualify one within the preceding 12 months (24 months for National Guard).
- NCOs are selected who have not taken a TCGST within 6 months of course attendance and are not prepared to take the diagnostic TCGST given the first day of the course.
- Individuals do not volunteer to attend the course but are sent by the unit to fill a quota.
- NCOs from *M60A1* units are sent to the *M60A3* or *M1* track of the Master Gunner Course with no baseline training on the newer systems.

In the third step, the board should ask several questions about each NCO on the list. First, does he have the confidence and respect of other members of the chain of command? An NCO who doesn't have this respect and trust will not be able to function as a Master Gunner, regardless of how well he does in the Course. Next, does the NCO get things done with minimal guidance and supervision? A Master Gunner is a planner, evaluator and troubleshooter. An NCO who requires constant guidance and supervision will not be able to advise and assist the commander as effectively as a Master Gunner should. Finally, does the NCO have the desire to become a Master Gunner? This can best be determined by interviewing each candidate. The board should question each NCO about his qualifications and desire to become a Master Gunner and then explain to him what will be expected of him as a unit Master Gunner. An NCO without the desire or motivation to be a Master Gunner should not be selected as he will have difficulty completing the course. When all NCOs have been interviewed, the board selects a primary and an alternate candidate to attend the course. The names of the recommended NCOs are then given to the commander who must interview both men to ensure that they are the best his unit has to offer.

The final step is to give both selectees time to prepare themselves for the course. The best way to do this is to have another Master Gunner work with them. He should be required to administer a TCGST and provide both men with assistance in weak areas. The Master Gunner can also brief them on what to expect at the course, can suggest how to take notes and what kind of study habits must be developed to get the most from the course. Knowing what to expect when he arrives at Fort Knox will take some of the pressure off the NCO when he begins the formal instruction. By allowing the alternate NCO to prepare for the course, the unit has someone prepared to go if something unexpected happens to the primary candidate.

This selection process is by no means the only way to select an NCO for the course. Boards can also be established at company level or a commander can make his own selections. No matter which process is used, it is important that the selected NCO meets the course prerequisites to increase his chances for completing the course. The commander that makes a careful selection will be rewarded when his NCO returns to the unit as a Master Gunner.

Commanders or units having questions on how to select or prepare an NCO for the course can contact the **Advance Gunnery Branch, Weapons Department, USAARMS** by phoning **AUTOVON 464-8530,** or writing to **HQ, USAARMC, ATTN: ATZK-WP, Fort Knox, KY 40121.**

The Battle of El Firdan

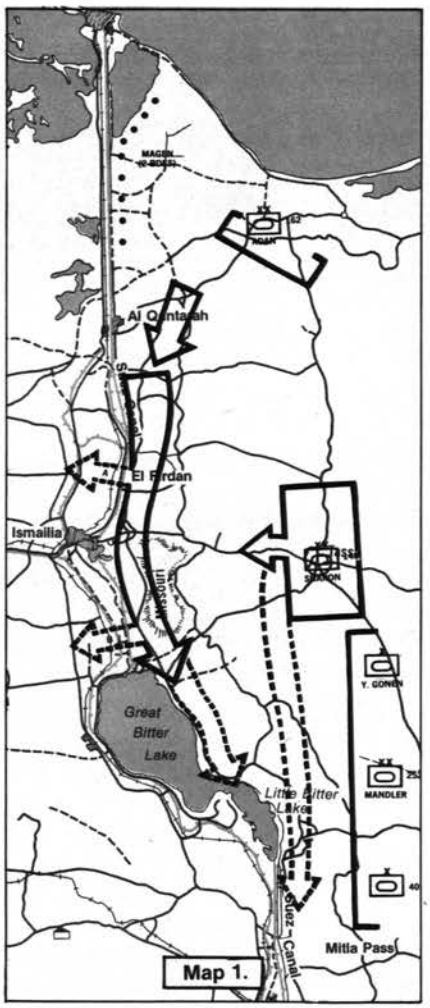
by First Lieutenant John J. McGrath

Armored warfare is essentially offensive in nature. And, with the dominance of armored forces on the modern battlefield, the defeat of an armored attack by a basically static infantry force is historically important.

At 1845, Sunday, 7 October 1973, an important conference was taking place at Israeli Southern Command headquarters in the Sinai. Present was the commander of Southern Command, Major General Shmuel Gonen and two of his three subordinate division commanders: Major Generals Avraham Adan and Albert Mandler. The third division commander, Major General Ariel Sharon, arrived later. Also present was Lieutenant General David Elazar, chief of staff of the Israeli Defense Force (IDF). The fourth Arab-Israeli war was 30-hours old and the IDF still found itself in an unfamiliar defensive posture. Elements of Sharon's and Adan's reserve armored divisions were still enroute to the battlefront. By the next morning, the IDF would be up to strength.

The Egyptian assault had caught Israeli Southern Command by surprise, not only by its suddenness, but also by the thoroughness of the Egyptian planning and execution. The Israeli defense was predicated on stopping local crossings of the Suez Canal, but the Egyptians crossed in strength along its entire length. The Israeli Bar Lev line was designed to provide early warning and to slow down the Egyptians until the armored forces of Major General Mandler's 252d Armored Division could arrive and counterattack. Instead, the Egyptians bypassed the Bar Lev positions and set up ambush positions inland to destroy the counterattacking forces. Not only were these small-scale Israeli thrusts blunted on the first 2 days of the war, but the Bar Lev positions that were still holding out became the focus of IDF attempts at relief. On 6 and 7 October, while his division alone held the entire Suez front, Mandler lost three-quarters of his tank strength in futile counterattacks, but by late afternoon on 7 October, reserve units were arriving. Adan's 162d Armored Division assembled in the north and Sharon's 143d Armored Division formed up in the center (map 1). Upon receiving additional troops from Sharon, Mandler transferred a brigade to each of these divisions and assumed responsibility for the southern sector. With the arrival of the reserves, the Israelis assumed a temporary defensive posture, and the commanders went to the meeting at Gonen's headquarters.

The Israeli command structure was muddled from the onset. Gonen had under his command two subordinates who were senior to him: Sharon and Adan. Six months earlier Sharon had commanded Southern Command and Gonen was his subordinate. But the Israeli system selected senior commanders for major formations from retired regular officers serving in non-tactical capabilities. The abrupt initiation of hostilities further weakened Gonen's position. Both the chief of staff and the Defense Minister Mosha Dayan would appear on the scene and interfere with Gonen's instructions. The command situation was to have a drastic effect on operations on 8 October and would lead to Gonen's downfall.



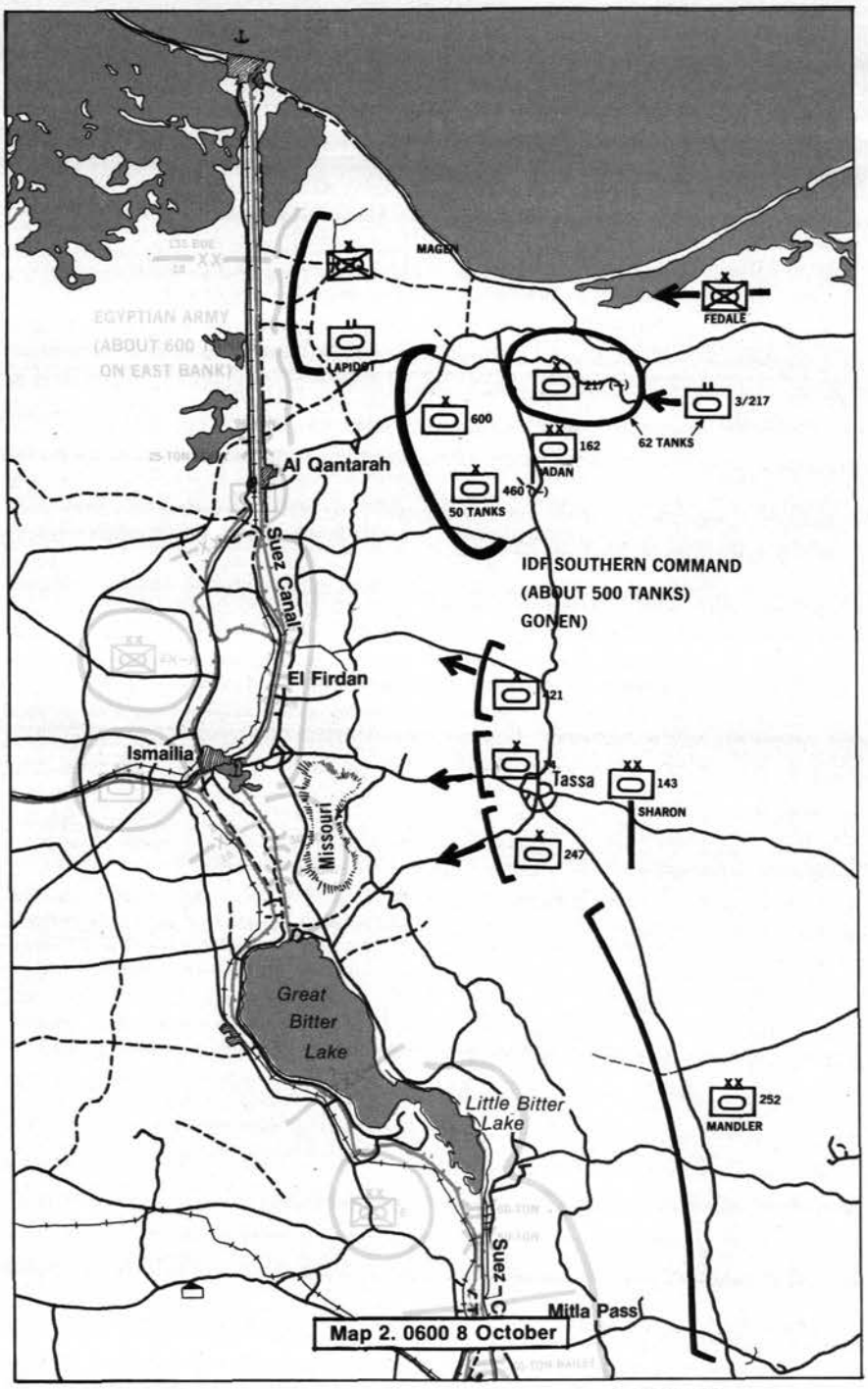
Map 1.

The Israeli Plan

The plan drawn up at the 1845 meeting assumed that the Egyptians would be easily routed and then mopped up. This had happened before because the Israeli always had surprise on their side. The plan (map 1) called for Sharon's division to hold the Egyptians in place frontally from its positions near Tassa. At the same time, Adan would advance from his positions in the north, with three armored brigades, to the canal in the vicinity of Al Qantarah. From there, they would wheel south and roll up the Egyptian flank. Adan was to be prepared to seize any Egyptian bridges, then cross the canal and advance south to the Great Bitter Lake.

Adan was to play the major role in the attack. He was the peacetime commander of the IDF armored corps and was the senior tanker in Israel. The first 2 days of the war had been frustrating for Adan. Most of his tanks had to go to the front on their own tracks. Those on transporters were caught up in a massive traffic jam along the Al Arish Coastal road. Furthermore, Egyptian commando elements sniped at his forces before they were even assembled. These situations weakened his division even before it went into battle. Adan had to detach his organic mechanized infantry brigade and a tank battalion under his deputy, Brigadier General Kalman Magen, to cover the marshy northern end of the Suez Canal, where the Egyptian 135th Independent Brigade and the 18th Infantry Division threatened the Israeli right flank (map 1). A mechanized brigade under direct control of Southern Command was then sent to Adan, but he had to funnel the unit off to Magen, who was having difficulty holding off the Egyptians. The loss of this infantry force was later to be a critical factor. The forces Adan had available for the attack included:

- 460th Armored Brigade, Colonel Gavriel "Gabi" Amir, commanding, had fought the first 2 days as a part of Mandler's division, and was down to 50 tanks.
- 600th Armored Brigade, Colonel Nathan "Natke" Nir, commanding, was a reserve formation with 71 tanks.
- 217th Armored Brigade, Colonel Arieh Karen, commanding, was a reserve formation with 62 tanks, but was strung out along the Al Arish road. Karen's third battalion would not even



Map 2. 0600 8 October

arrive in Adan's assembly area until after the attack had begun (map 2).

Because of the delay in the arrival of the 217th Brigade, Adan decided to launch the attack with the other two brigades and have Karen bring up the rear. The 600th Brigade, on the right, was to advance to the canal near Al Qantarah. The 460th Brigade would be on the left. Upon reaching the canal, both brigades would wheel south and advance parallel to the canal down to the Great Bitter Lake (map 1).

Sharon's division, in the center, consisted of three armored brigades—the 14th, 421st, and 247th. Sharon, a paratrooper turned tanker, had been a brigade commander in 1956 and a division commander in 1967. He was, perhaps, Israel's most famous and colorful soldier. As a commander, Sharon was competent, aggressive, vigorous, and extremely confident in his own abilities. As a subordinate, the very qualities that made him a good commander, hindered his relations with his superiors. His late arrival at the 7 October conference was typical of his behavior. Sharon's division was screening the center of the front from Ismailia to the Great Bitter Lake. As part of the counterattack, he was to press forward and push the Egyptians back toward the canal and make them easy prey for Adan's movement from the north.

The Egyptian Forces

At dawn, 8 October, the Egyptians had been across the canal for 40 hours, and had fended off all Israeli attempts to dislodge them (map 2). The 15th Armored Brigade, equipped with *T-62* tanks, was employed in the ruins of Al Qantarah opposite Adan's division, and elements of the 18th Infantry division were dug in around the town. South of Al Qantarah, the 2d Infantry Division held the sector centered on a 60-ton pierced metal plank bridge at El Firdan, and behind it the 23d Mechanized Division was poised to cross the bridge into the Sinai on 8 October. Still farther south, the 16th Infantry Division was deployed between Ismailia and the Great Bitter Lake with orders to secure the dominant ridgeline to their front on 8 October. Control of this key terrain, which had been code named *Missouri* by the Israelis, would allow the 21st Armored Division to cross to the east bank while protected from Israeli artillery fire. Each of the Egyptian Infantry divisions was reinforced with the antitank elements of the mechanized and armored division and also had an exceptionally high number of *RPG-7* antitank rockets and *Sagger* antitank missiles. By 8 October, the Egyptians had about 600 tanks across the canal, while the IDF could assemble only 500. In addition to these forces, the Egyptians also had deployed numerous small commando units in front of their units and along Israeli lines of communications.

Actions in the Morning

At 0600, Adan's two forward brigades began their advance and almost immediately came under sporadic artillery fire (map 2). As the 600th Brigade approached Al Qantarah, it was engaged by the *T-62s* of the 15th Armored Brigade and also by a single *MiG* aircraft. The engagement quickly became serious. At the same time, the 460th Brigade on the left was delayed by Egyptian commando hunter-killer teams. Adan ordered the 217th Brigade, which was now assembled, to advance south along the Tassa road, and swing in on the left of the 460th Brigade (map 3). Although this road was to the rear of the Israeli forward positions, Arieh Karen soon found himself engaged by artillery and hunter-killer teams. The lack of prior reconnaissance by the Israelis was now felt as they were not certain of Egyptian locations and found

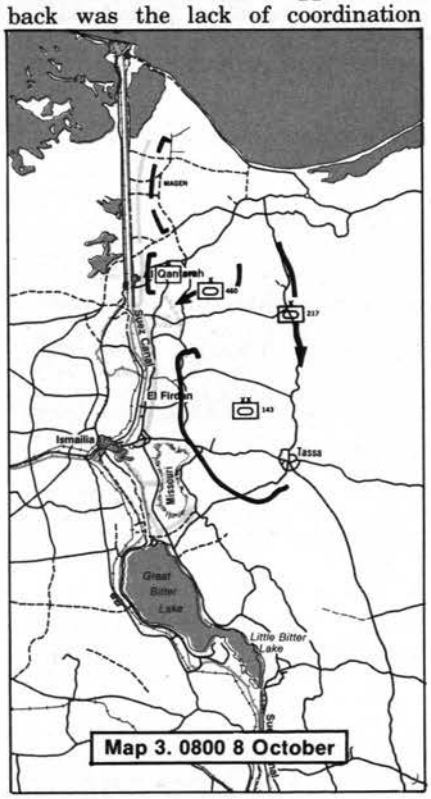
themselves held up by comparatively small enemy forces. Now, as Adan's forces became engaged, reports became distorted and generally underestimated the Egyptian strength.

As the lead elements of Adan's division moved into battle, the upper echelons of Israeli command were confused. As already noted, intelligence on the Egyptian situation was, at least, limited. The Egyptians were expected to panic and be routed by the first IDF elements to come in contact with them. Because of this belief, Southern Command continually modified the basic plan, making it more ambitious and uncoordinated. The basic change was the role of Sharon's division. Orginally, Sharon was to be the anvil for Adan's hammer, but Sharon pressed his former subordinate, Gonen, to allow him to relieve the Israeli Bar Lev strongpoint in his sector. So Sharon's mission was changed after Adan departed from the meeting. Sharon was to advance to the canal, relieve the Bar Lev forts, then fall back and allow Adan to come in from the north. Later, during the night, the plan changed again. Anticipating instant success with Adan's attack, Gonen gave Sharon orders to move out at noon to attack the bridgehead of the Egyptian Third Army, opposite Mandler's division. To accommodate this plan, Adan was to push down to the Great Bitter Lake and only then force a crossing (that was where the Israelis eventually did cross). However, the constant minor changes in the plan were never passed to Adan, whose headquarters was having communications difficulties. Instead, the changes were relayed via Magen, farther to the north, and never reached Adan.

Most military plans do not last much past the firing of the first shot, but the Israeli plan was changing even before the Egyptians had a chance to disrupt it.

Not only was coordination within the IDF weak, but coordination with the Israeli Air Force (IAF) was virtually nonexistent. The IAF found itself fighting the massive air defense umbrella set up by the Egyptians along the canal. As a result, air superiority could not be obtained until the surface-to-air missile *(SAM)* sites were destroyed. The Israeli combination of armored forces and aerial artillery which had brought rapid victory in 1967 was broken. There were no forward air controllers with the ground forces, and on 8 October, Adan's brigades were continually fired on by their own IAF aircraft.

Working under a different concept than that of his immediate superior, Adan gave the order to commence his north-to-south movement at 0753. By this time Nir's 600th Brigade was heavily engaged at Al Qantarah with the Egyptian 15th Armored Brigade, and could not easily disengage. So the movement was made with the other two brigades. Amir's 460th Brigade moved south on the right about three kilometers east of the canal and Karen's 217th Brigade was on the left but, because of the road network, had to swing west to coordinate its movement with Amir who drove south against steady resistance from small pockets of Egyptian antitank teams, and was then stopped cold just north of the El Firdan area when he ran into the main battle position of the Egyptian 2d Infantry Division holding the bridgehead around the El Firdan bridge as the 23rd Mechanized Division crossed the canal (map 3). Amir and Adan, in turn, were unable to get air support, and the attack stalled. On hearing Adan's reports, Gonen was convinced that the Egyptians were on the verge of breaking, and urged Adan to continue with the attack, despite the fact that only one of his brigades was committed at El Firdan. Slightly to the south, Sharon had pushed to within 3,000 meters of the canal, and was then halted by Egyptian resistance. On the tactical level, the Israelis were not prepared for the intensive antitank defenses set up by the Egyptians, and still tried to advance by using shock action. The diversion of the Egyptian mechanized infantry to the north was taking its toll of the IDF tanks but the biggest drawback was the lack of coordination between IDF units. As Amir found himself heavily engaged, 20 tanks of Lieutenant Colonel Ami's battalion of the 421st Brigade, an element of Sharon's division, was positioned on Amir's left flank, but did not participate in the action. Because of command foulups and Sharon's stubborness, Ami sat outside the battle and did not assist Amir in spite of his close proximity and Adan's repeated requests to gain operational control of the battalion (map 3).



Map 3. 0800 8 October

Karen's 217th brigade was moving toward the canal at this time to make contact with Amir's left flank. Because Sharon had moved forward and was not where Adan expected him to be, Karen was actually moving in Sharon's rear area. Accordingly, two battalions of Karen's brigade were moving forward along the Akavish road in the south, and Eliashiv's tank battalion was moving along the more northerly Spontani road towards El Firdan into division reserve behind Amir's brigade (map 4).

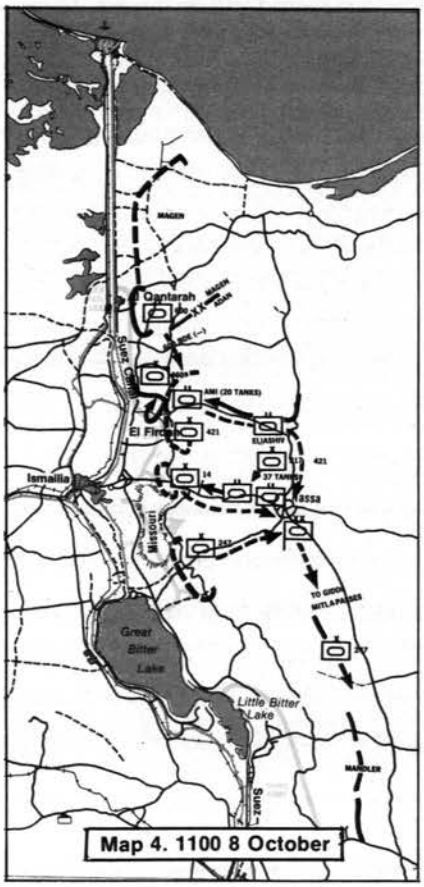
At 0955, with communications improved, Gonen ordered Adan to move south and secure *Missouri* and the area near the northern end of the Great Bitter Lake. Ten minutes later, Gonen's deputy, Brigadier Uri Ben-Ari, reaffirmed the orders, telling Adan that the Egyptians were on the verge of collapse and maximum speed needed to be applied to take the northern tip of the Great Bitter Lake before they "got away." A lull had occurred at Al Qantarah as the Egyptians pulled back to reorganize. Because of this Egyptian move and his latest orders, Adan directed Nir to move south to take up positions on Amir's right—near the canal. Adan received conflicting orders from Gonen about Al Qantarah. First he was told the Egyptians had withdrawn, then he was ordered to clear the rubbled town. Reluctant to move his armor into a built-up area, Adan eventually left a battalion from Nir's brigade to contain the Egyptians and the battalion was attached to Magen's growing northern command to facilitate control.

As the morning wore on, Amir's 460th Brigade of two tank battalions (the third was detached to Magen) found itself under increasingly heavy pressure. Lieutenant Colonel Amir's battalion on the right was particularly hard hit. The other battalion commanded by Lieutenant Colonel Adini was under less pressure, and attempted to ease the pressure on the rest of the brigade by conducting a "cavalry charge" type of attack against the El Firdan positions at 1100. This attack, which was launched on Adini's own initiative, cost him 18 of his 25 tanks. It was to be the first of many such small-

scale attacks that suffered devastating losses from massive volleys of *RPG-7* and *Sagger* antitank weapons (map 4).

The pressure on Amir and the ill-timed attack by Adini left Amir's brigade in bad shape. Therefore, when Nir's brigade, less the battalion detached to Magen, began to arrive, rather than being in a better position to attack, Adan found himself feeding Nir in on Amir's right, just to preserve Amir's remaining tanks.

At the same time, the most remarkable event of the day occurred—Gonen ordered Sharon to move to the south. Previously, Gonen had shown a lack of knowledge concerning what was actually occurring on the battlefield. Now he amplified his mistake. Sharon's three brigades were holding a line south of Adan from below El Firdan to the Great Bitter Lake. Originally ordered to hold the Egyptians in place, while Adan attacked the north flank, Sharon found himself under increasing pressure as the Egyptian 16th Infantry Division, reinforced with armor, attempted to expand its bridgehead to ease the crossing of the 21st Armored Division. The pressure on Sharon was very heavy when he received his orders. He was to move south and secure the Mitla Pass and aid Mandler in containing the Third Army. The withdrawal of Sharon exposed Adan's left flank at a time when the Egyptians were moving into the void. Karen, with two battalions was moving to secure *Missouri* ridge when Sharon withdrew, but was attacked by Egyptians from both the north and south and forced to withdraw to the northeast (map 4).



Map 4. 1100 8 October

Actions in the Afternoon

As the afternoon began, the IDF attack had not materialized. Poor reconnaissance, conflicting orders, and a lack of awareness had caused the IDF forces to launch uncoordinated, piecemeal attacks. However, Adan still planned to attack, now that he had two armored brigades positioned in front of El Firdan. Both Amir and Nir were to advance at the same time on line against the Egyptian positions. The morning's action had seriously reduced the forces that Adan could commit to a meager four battlaions of about 20 tanks each. Fire support was limited to three batteries of field artillery. Air support was "on the way" and scheduled to arrive in 30 minutes. There was no infantry.

Because of the situation, Adan deemed it best to advance slowly with the four battalions, using the terrain as cover and closing the distance between the Israelis and the Egyptians. Once air support became available, the final assault would commence. Reports indicated a steady flow of Egyptian vehicles across the El Firdan bridge into the Sinai; therefore, as soon as Nir was in position at 1315, Adan gave the order to advance.

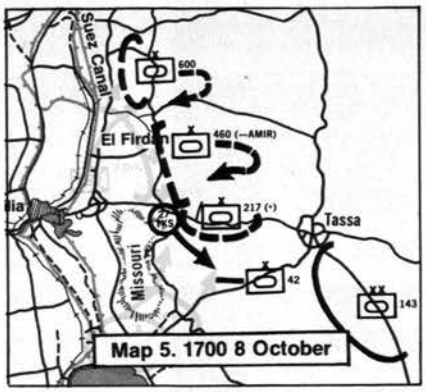
Initial movement was slow, and by 1330 Nir's right battalion, Lieutenant Colonel Nathan, commanding, was halted by fires from Egyptian tanks and *Sagger* missiles. The battalion's second-in-command was killed. Shortly afterward, Egyptian multiple rocket launcher volleys began landing among the lead elements, totally destroying their visibility and further slowing up the advance. While Nir's right battalion was stopped by this fire, his left battalion (with whom he was collocated) under Lieutenant Colonel Yagouri, continued to advance toward the canal. In the meantime, Amir's brigade, reduced to remnants except for a battalion detached from Karen, advanced only as far as the edge of the hills, approximately 1,500 meters from the canal. There, all cover ended and the ground was flat and open up to the canal. Already stung in the morning, Amir was prepared to wait for the promised air support before trying to advance again. To the south, Karen was to support the attack by attacking the Egyptians frontally—the role originally reserved for Sharon's departed division.

By 1400, only Yagouri's lone battalion, with Nir's advance headquarters—a total of 25 tanks—was advancing in what was supposed to be a divisional attack. When Yagouri's lead tank got to within 800 meters of the canal at about 1415 hours, all hell broke loose. The attacking force was trapped in the kill zone of an Egyptian ambush. Yagouri found himself suddenly among the Egyptian trenches and his tanks were fired upon at close range by machine-guns and RPGs. Further to the rear, Nir watched the tanks around him get picked off one after another. He beat a hasty retreat, taking only four surviving tanks with him. Then Yagouri's luck totally ran out. By 1430, Nir no longer received any radio messages from him. The Egyptian commander, Brigadier General Hasan Abu Saada, reported later that Yagouri's battalion had been destroyed within 3 minutes. Yagouri himself, along with four others, was taken prisoner. That night Yagouri was paraded on Egyptian television and Egyptian propaganda quickly "promoted" him to brigade commander. Out of the attacking force of 25 tanks, only nine survived. Adan had lost one tank battalion in the morning and a second in the afternoon.

The Israelis had little time to ponder their defeat because indications of an Egyptian counterattack were evident. Egyptian forces were massing in front of Amir and Nir, and to the south, Karen was already under attack. At 1430 Karen reported armored attacks from the north and south and heavy artillery fire began to fall on Israeli positions all along the front.

The Egyptian Attack

The Egyptian attack on 8 October was not a counterattack *per se*. The attack was part of the Egyptian plan and was made to consolidate the bridgeheads. The unsuccessful Israeli attacks just happened to play right into the Egyptian's hands. So did the time of day. The sun was slowly setting in the west and would be in the Israeli's eyes all afternoon, reducing visibility, and allowing the Egyptians to get closer before the highly-effective IDF tank gunnery could take effect. The attack would be launched along two axes, both due east. The northernmost effort would be made by elements of the 23d Mechanized and 2d Infantry Division moving out of the El Firdan bridgehead. This force was to seize the small range of hills upon which Amir had positioned himself and to push as far inland as possible. The southern drive would be made by elements of the 16th Infantry Division, reinforced with tanks, to secure *Missouri* ridge near the northern end of the Great Bitter Lake (map 5).



By 1400, Gonen had realized the need for holding Sharon at his present position. Sharon was given orders to return and resume his former position and, if possible, give aid to Adan. The result was that Sharon spent the greater part of the day marching, and ended up not being able to get in the fight. At the same time. Adan was being chewed up.

Large scale Egyptian attacks were made against Adan's position in late afternoon. Karen was forced to give ground to the 16th Infantry Division's attack and Adan ordered him to withdraw to the northeast to avoid destruction. Up to 1500, Israeli observers watched a steady flow of Egyptian tanks cross the El Firdan bridge and, by 1600, heavy artillery was hitting near IDF installations, and an attack had begun against Amir and Nir. The attacking force, the equivalent of one mechanized and one tank brigade, using the setting sun's glare, closed from 2,500 meters to within 600 meters of the Israeli positions virtually intact. At 1630, Amir and Nir were at Adan's headquarters planning what to do next when radio calls indicated that both of their brigades were on the verge of being overrun and they hastily returned to their units. Meanwhile, to the south, Karen was being attacked by another large force.

By 1700, Adan was thinking in terms of a general retreat to preserve his division, but he was told that Sharon was returning and would be able to counterattack, so he ordered his brigades to hold their positions. Due to muddled communications, Sharon's attack never took place, but one of his brigades, the 421st, conducted an uncoordinated attack abreast of Karen's flank. At the same time, Karen sent two battalions to the southeast to spoil the Egyptian attack and they were fired upon by elements of the 421st brigade. Nevertheless, the pressure on Karen was relieved and with the sun now set, the tables turned in the battle in front of El Firdan. The initial Egyptian attack was stopped in the same devastating manner as had been earlier Israeli attacks. Burning tanks lit the battlefield and when the Egyptians tried again—this time with mechanized and truck-mounted infantry—the attack was broken up before they were even close enough to dismount.

After this, the front became quiet, and Adan pulled his brigades back 5 kilometers to regroup and refit. The day's action was over.

Conclusions

In three brief periods of intense combat, three Israeli tank battalions had been virtually annihilated. The unexpected defeat and the manner in which whole tank units were quickly destroyed, shook the military world. Cries of "death of the tank" and emphasis on the "new" lethality of weapons were heard. However, the reasons the Israelis lost the early engagements were not new lessons of war, but old ones that had to be relearned. Not only did the IDF violate its own principles of war, but its command-level mistakes violated virtually every one of the classical principles of war.

The Israelis failed to mass sufficiently forces to accomplish the mission. Of the three-and-one half divisions available, only one was employed against an Egyptian force that consisted of more than two reinforced divisions. One entire division was given a containment mission and, because of intelligence failures at the tactical level and subsequent mishandling, spent the day marching in circles—in effect, out of the battle. Adan himself failed to mass sufficient forces. His attacks became small-scale battalion movements and were easily defeated in detail by the Egyptians. In general, the Israelis proved too eager to advance without adequate reconnaissance and flank protection. While unity of command under Gonen existed on paper, it did not exist in fact. His division commanders, being senior, generally disregarded his orders whenever they felt like it. The result was lack of coordination, which resulted in units of Sharon's division sitting watching Adan's units being destroyed, or later, units of the two divisions running into and shooting at each other.

One of the major causes of the early defeat was the lack of combined arms coordination. The tank is designed to be used as the center piece of a combined arms system consisting of armor, infantry, artillery, and combat support elements including engineer units and tactical air. Adan's force was almost totally lacking in these elements. The infantry had been given away to shore up hot spots along the northern edge of the canal. Air support was limited due to the Egyptians SAM threats and artillery support was meager because the IDF previously had relied on its air force to provide most of the fire support for the ground forces. As a result, tank units went into combat unsupported—and were decimated.

Although the lack of combined arms coordination contributed greatly to the initial Israeli failures, the main causes were:

- Poor planning.
- Lack of battlefield intelligence, or faulty analysis and application of that which became available.
- Piecemeal commitment of available forces.

The IDF failures were nothing new to the military historian. The Israelis did not fail because antitank weapons dominated the battlefield, or because modern weapons had become more lethal. They failed because they did not effectively use the resources they had. They failed because war has never allowed one side to get by with a slipshod, poorly executed plan. The lessons of 8 October 1973 should not be that the tank is dead, but that the traditional principles of war are still valid, and to violate them is to invite disastrous defeat.

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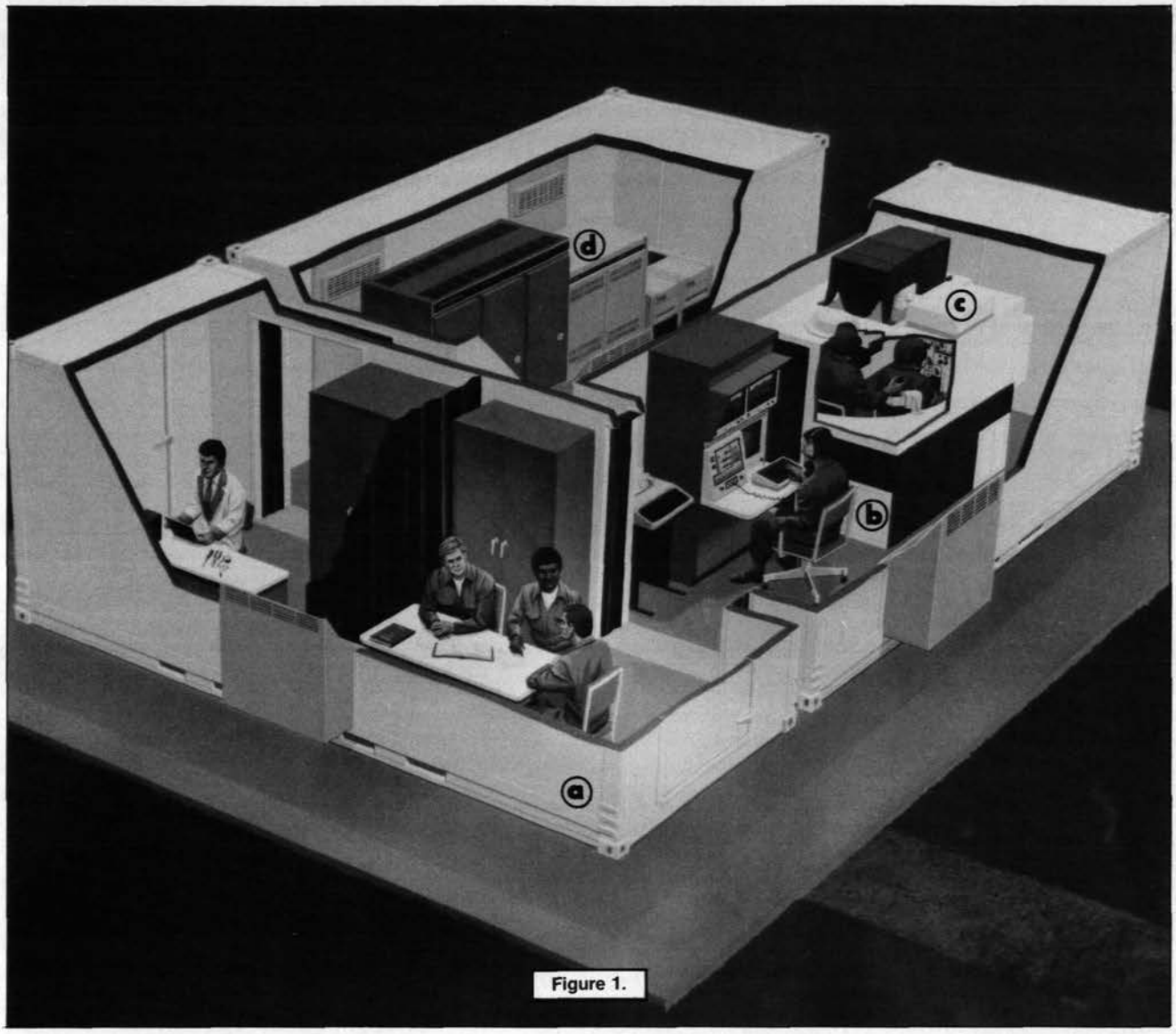

Figure 1.

Armor Training Simulators Are On The Way

by Lieutenant Colonel J. Michael Weaver and Richard A. Renfrow

After several years of red tape, engineering, building, testing, and modifying, a production contract has been signed and assembly lines are being set for the Unit Conduct of Fire Trainer (U-COFT)—one of several high-technology simulators that are designed to support armor training.

The U-COFT is a training device used to sustain a high level of gunnery proficiency over long periods of time. Unlike the subcaliber devices in current use, the U-COFT provides the environment, the scenario, and the feedback. It is a *simulator* that, in many ways, outperforms the real thing (in training), as opposed to subcaliber substitution or miniaturization devices.

Every Active Component battalion or squadron equipped with the *M1* Abrams tank or *M2/3* Bradley Fighting Vehicle (BFV) will have a U-COFT. The dust has not yet settled over whether or not we will have an *M60A3* model U-COFT and which Reserve Component units will get the U-COFT.

The most noticeable characteristic of the U-COFT is its size. It is not a table-top trainer. It is housed in three standard military shelters (a type of van without wheels) that are interconnected, placed on a gravel or concrete pad, and hooked up to a power supply (figure 1).

Internal Arrangements

Operational testing at Fort Hood, TX, using a two-shelter configuration, revealed a need for an environmental buffer—something to keep the air in the main shelters at a constant temperature. The first shelter (figure 1a) does this while also providing a waiting room, maintenance area, and a briefing/-debriefing area. The shelters avoid having to erect special buildings all over the world and make it possible to move the U-COFT, if necessary. However, the U-COFT is *not* meant to be a portable trainer and moving it is a big operation, not to be done unless absolutely necessary.

The instructor station (figure 1b) looks somewhat forbidding when viewed close up (figure 2)—Knobs, switches, lights, monitors and, most forbidding of all, a keyboard). But

it was designed to be run by armor platoon sergeants and platoon leaders. The operational test proved that these people can do the job. After the U-COFT is fielded, platoon leaders, master gunners, and Advanced Noncommissioned Officer Course and Armor Officer Basic Course students will receive instruction on it and be certified as U-COFT operators.

Operating the U-COFT

The instructor switches the trainer on, checks it out, and corrects minor problems. He may occasionally have to change a plug-in module when a faulty one is found during the before-operation check. All maintenance above the operator level—organizational, direct support, general support, and depot—will be done by contractor personnel. A contractor maintenance technician for organizational and direct support maintenance will be at or near each U-COFT site.

The instructor tells the incoming crew what they will be doing during their U-COFT training session, sees that they are properly placed in the crew compartment and following instructions in the Instructor's Utilization Handbook, selects the exercise to be conducted by using the keyboard and monitors the action. He sees what both the tank commander (TC) and the gunner see in their sights, hears what is going on, and has a monitor that displays the gunner's progress. If the crew has problems, he can talk them through the exercise or change them to one that is more appropriate to their level of expertise. After the session, the instructor can debrief the crew, using a printout showing what they did, or failed to do.

The magazine's front cover and figure 3 show a representation of a sight picture from the *M1* U-COFT. The picture is a computor-generated image (CGI). It looks like a color TV animation, and it could be made with more detail, but only at a greater dollar cost. Nevertheless, it does the job. The realistic action of the simulated engagements makes the crew forget that the scenes are animated. But, even though there is a wide variety of scenes, targets, and engagement exercises, the clarity of the U-COFT's visual presentations limits its ability to teach target acquisition and identification.

The crew compartment (figure 1c) includes only the gunner and TC stations and is cut down the centerline of the main gun to save space (figure 4). Nevertheless, the TC and gunner stations are nearly exact replicas of those in a real tank. One major difference is in the TC's hatch. There is only the forward vision block and the hatch must remain closed. This was a cost tradeoff.

The U-COFT enables the gunner and TC to do about everything they can do in a real tank in the closed-hatch mode. To achieve passing scores for the exercises and to progress to more advanced exercises, they *must* do everything correctly. Successful U-COFT training will not depend upon the instructor's mood that day, or what the crew thinks they can get by with.

The crew moves through a series of 390 different multiengagement exercises that are progressively more difficult. However, they do not have to go through each exercise to reach the top, and there are many paths through the system, depending upon the crew's ability and the selections of the instructor. The exercises range from stationary-tank to stationary-target engagements to moving-tank to moving-target engagements. Engagement conditions vary from full-up fire controls to a degraded mode, from single to multiple targets, and from day to night and other reduced visibility situations. Gunners use the periscope, telescope, and thermal sight; the laser rangefinder, and both the coaxial and caliber .50 machineguns. On a good day, the TC and gunner may attain a high score and return 2 weeks later to find that they cannot beat it. Users should not be discouraged by this because the device was designed to be as challenging as the tank system. No one is going to get bored from the same old, repetitious stuff.

The computer system (figure 1d) has two major functions—image generation and training management. The crews have no need to be involved with the computer system other than to satisfy their curiosity as to what it looks like.

When battalions get a U-COFT, tankers will, for the first time, have the kind of training opportunity that aviators have long enjoyed.

Unit Preparation

When the trainers roll off the assembly line, they will be packed and sent to units according to a priority distribution plan already coordinated with the major commands. (U-COFT production will eventually catch up to and keep pace with the fielding of the combat vehicles.) The receiving unit must select a site, and provide commercial power and a telephone hookup. By the time this article appears, major commands should have received the site selection criteria from the Project Manager for Training Devices (PM TRADE). This guidance tells the unit what kind of site it must have available. It is the unit's responsibility to survey their area for a suitable site, report their selection through the chain of command, and then reserve the site. It need not be too large—each of the three shelters is only 20-feet long and 8-feet wide.

Unit commanders scheduled to receive a U-COFT device should *not delay in securing the required power hookup* because the failure to provide adequate power could set back the unit's use of the U-COFT. The contractor will go from site to site on a tight schedule, build a pad, set up a U-COFT, and connect the power. Once the equipment is aligned and functioning, a New Equipment Training Team will teach the battalion trainers how to use the U-COFT and will leave them an instructional package, including a video tape. All this is the responsibility of PM TRADE and the contractor. The unit is responsible for a commercial power hookup of sufficient

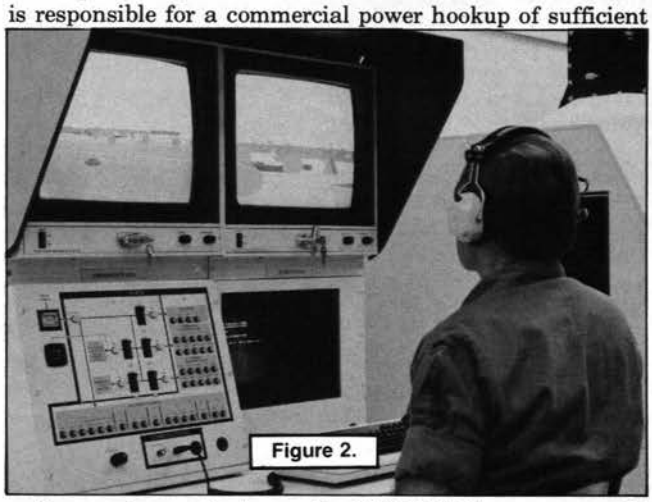

Figure 2.

voltage and capacity to run the U-COFT. The power specifications will come with the site selection criteria, and this is certain—a heavy duty extension cord will not do the job. Without an adequate power source, the installation team may be forced to move on to the next site leaving the unit with a "cold U-COFT" until an adequate hookup is installed and the contractors can return to hook it up and train the unit.

Unit Usage

Units must be prepared to use the U-COFT at its maximum capacity to sustain proficiency at substantial cost savings.

An armor battalion at Training Readiness Condition A requires over $2 million in ammunition costs alone for annual gunnery training and qualification. Multiply that by the number of battalions that exist and it is evident that an extremely large amount of money is spent each year for tank gunnery. Even that expenditure doesn't buy a high level of proficiency between qualification periods. Studies indicate a rapid decline in hit probability, coupled with an increase in

engagement time, beginning very shortly after the qualification period. An intensive training program to shore up this sag in proficiency, using standard training methods—a lot of live fire—would cost over $5 million per battalion (to say nothing of time and range space that are usually in short supply.)

That same high level of proficiency is attainable for a fraction of the cost using a U-COFT based training program. Of course, differing training programs and cost computation methods are going to make comparisons difficult. However, we are confident that substantial savings over current methods will be realized using the U-COFT program. More importantly, within current or reduced training budgets, units will be able to maintain a high level of gunnery proficiency between periods of intensive live-fire gunnery training and qualification.

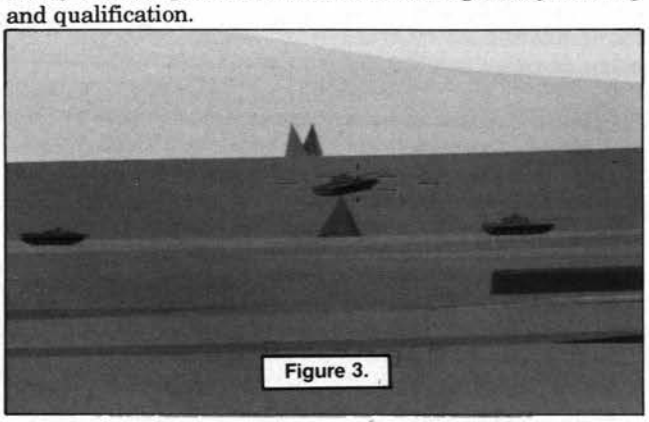

Figure 3.

Conversely, if the U-COFT is not used, or is used only in a perfunctory manner, neither savings nor proficiency will be realized and the unit will waste its time and money. Therefore, as ammunition and fuel costs continue to rise, as range space and time remain in short supply, and the need for sustainment of a high proficiency level exists, U-COFT use must not be left to chance or whim—time in the simulator must be made mandatory for tank crews, just as time in a flight simulator is for aviators.

New technology in the form of the U-COFT will make training:

- *Efficient* in terms of cost and time.
- *Frequent* with less scheduling problems and administrative time.
- *Objective* in terms of better scoring and feedback.
- *Interesting* and *challenging* with a variety of progressive exercises.
- *Standardized* because units the world over will use the same core training.

Hence, U-COFT will be more effective in sustaining and, when necessary, gaining gunnery skill and proficiency.

The U-COFT can be used for all types of single tank engagements. It can be used regardless of weather, doesn't require a range, provides proper feedback, and it gives the crews a challenge and a real change of pace. But with only one U-COFT per battalion to go around, each crew has a limited slice of time in it per month. And, it does not give interaction with the driver, loader, and other tanks.

More New Training Devices

Another high technology initiative is called the Tank Weapons Gunnery Simulation System (TWGSS). This is a precision gunnery trainer hooked into a tank which can be used on the range or in a tactical force-on-force exercise. It will be the product of technological evolution.

From 1975 to 1977, REALTRAIN, a low-level tactical engagement system for armor vehicles, was developed and fielded. At the same time, the requirements for a better system using laser technology were approved and engineering work begun. As a result, we now have the Multiple Integrated Laser Engagement System (MILES) for combined arms tactical training. The system enables a tank to kill and be killed in a fairly realistic manner. But while MILES permits you to shoot, it does *not* provide the capability to do precision tank gunnery—and wasn't intended to. The technology was not then available to put precision gunnery into a tactical trainer at a reasonable cost. There was also the safety problem associated with the *M60A3* and *M1* tank laser rangefinders to consider. But the idea of providing precision gunnery simulation on the tank was pursued.

The requirement was first expressed as the Marksmanship and Gunnery Laser Device (MAGLAD). After a feasibility study was made to explore possible technological solutions, the requirement for a laser was eliminated since its direct line-of-sight characteristics were not suitable for ballistic trajectory simulation. When the requirement was changed to allow any technological solution, the acronymn was changed to TWGSS. The weapons to be simulated were the main gun and both machineguns. A key feature was that it would not only be a gunnery trainer, for use with target systems on a range, but would also put that gunnery training into a force-on-force context, thus integrating tactics and gunnery, as must be done in battle. But in the force-on-force context it was restricted to tank-on-tank unless it could be integrated into MILES, which didn't seem likely at the time.

The TWGSS concept has evolved further. TWGSS was restricted to main gun use only, with the machineguns employing the MILES systems.

Now, there are indications that technology has evolved to the point where a precision tank gunnery system can be integrated into the total MILES. There are two ways to do this:

- Buy or build a system, distinct from the current MILES, which is capable of operating on ranges, and which would replace or be a substitute for the tank-mounted MILES devices for tactical force-on-force training.
- Obtain a "product improvement" of MILES to allow precision tank gunnery during tactical training and permit stand-alone precision gunnery with a target system on a range.

In either case, there should be one system in the field to support.

The TWGSS operational requirements can be briefly stated. It will be developed for the *M1, M60A3,* and *M60A1* tanks (and possibly the BFV) to provide the capability to simulate all engagements within the capability of the actual weapon system. It will provide flash, bang, obscuration, sight displacement during firing, a tracer display as appropriate, and an impact indication—hit or miss. It will simulate firing a round in engagements under the same kind of visibility conditions as could be fired in actual combat. Ranging to a target and leading moving targets will be done exactly as with the simulated weapon system with the same penalties for errors. TWGSS can be used to either engage a target system on a range or for force-on-force exercises at battalion level or below. It will be easily installed and removed and will also permit normal tank system calibration/boresighting to be done. One last, but very important feature, is the crew evaluation subsystem. The subsystem will record information on each engagement, including aim and impact points, true range and crew-determined range, ammunition indexed and fired, and engagement time.

To use the TWGSS on the *M1* and *M60A3* tanks, the laser rangefinder safety problem had to be solved. A set of two filters was developed for the *M60A3* tank to fit over the laser port. A completely eye-safe green filter is used for force-on-force exercises. But the beam is attenuated so much that reflectors are needed to aid the beam's return. Consequently there are no multiple returns. So a red filter was developed o

provide something less than absolute eye safety while permitting unaided returns and multiple returns. The beam is safe for the naked eye beyond 300 meters and beyond 3,200 meters it is safe even when using binoculars.

M60A3 tanks equipped with TWGSS and the red filter can be used on a range with full rangefinder capability. Furthermore, the red filter can also be used during sub and fullcaliber firing exercises to permit proper ranging practice in safety, since some ranges that are safe for projectiles are still not sufficiently safe for lasers.

Filters are being produced now to outfit *M60A3* tanks in USAREUR with other units to follow. A filter system for the *M1* tank presents a more complicated installation problem. Unlike the *M60A3*, the *M1* tank design does not lend itself to application of an external filter, since the same port used by the rangefinder is shared by other optics. The *M1* tank project manager has taken on the task of building the filter *into* the rangefinder.

A Mixture of Simulators and Other Devices

The plan, for these training simulators in general, is to field a sufficient variety and quantity of them to enable an effective sustainment gunnery training program to be accomplished economically, regardless of unit location. While that takes in new technology, it does not exclude the old when it serves a useful purpose. Thus, we will have a mixture of old and new devices, of "high" and "low" technology, with each filling a definite need in the training spectrum. How much of each need is filled by using a particular device is dependent upon the unit's training requirements.

For instance, for some gunnery skills training, the scaled range with the *Brewster* subcaliber device is good enough—if a range is available. Even though a complete precision gunnery engagement is not faithfully duplicated, some of the manual and coordination skills and some procedures can be taught. The troops get into the tank environment and they get cold, or hot, or dirty, according to the existing situation. They also get bored if that's all they ever do.

TWGSS will enable the whole crew to train together—the whole platoon, for that matter. (We are still investigating loader interaction.) Now they can tie together the manual and procedural skills derived from the subcaliber training with the engagement skills acquired from the U-COFT. They can train in an environment that checks out and confirms their skills, builds confidence in past training, provides still more training using a slightly different angle, and keeps their interest up between main gun live firings.

Since the U-COFT trains only two crewmen at a time, a platoon would probably schedule concurrent training for crew members not occupied with the U-COFT.

There is no single training method that is economical, efficient, and effective and that holds interest week in and week out. Tank crews need to do some of their work together, some as individuals. Sometimes they need to train in close contact with the vehicle and sometimes they need to save wear and tear on the tank.

The Armor Center intends to create a series of training devices that are adaptable to the varied training situations of armor units worldwide and will permit those units to gain and maintain gunnery proficiency within the local constraints of time, money, space, and people. A report by the U.S. Army Training Support Center makes this point, however: "Extensive visits to units in the field . . . revealed almost as many approaches to training as there were units."[1] The training devices under development will permit flexibility in scheduling and allow for differences in unit capabilities, while creating a considerable degree of standardization in training. That is *not* to say that everyone will use the U-COFT for 2 hours on alternate Thursdays. But everyone who uses the U-COFT will train on the same series of exercises to the same standard, using the same engagement procedures.

Future Developments in Training Devices

There is an almost endless stream of training devices in concept, under development, being tested, or in actual use. There are so many to look at that it is difficult to decide where to apply our resources of time, manpower, and money.

We are considering tactics trainers for platoon leaders that will enable them to learn much of what they need to know *before* they take part in exercises with MILES/TWGSS equipment. We are continually evaluating new technology—sometimes for old applications, but also for applications to training tasks we have not done well before. Some of these applications, if feasible, may add to the list of devices we already have. Some may replace existing devices. But we propose to add to our list of devices only when a new item fills a gap, and replace an existing or programmed device only when the replacement is clearly superior and affordable.

The Tank Gunnery and Missile Tracking System and the *MK60* low-cost gunner trainer are such devices under consideration. The *MK60* was developed to check out the application of video disc technology to army training.

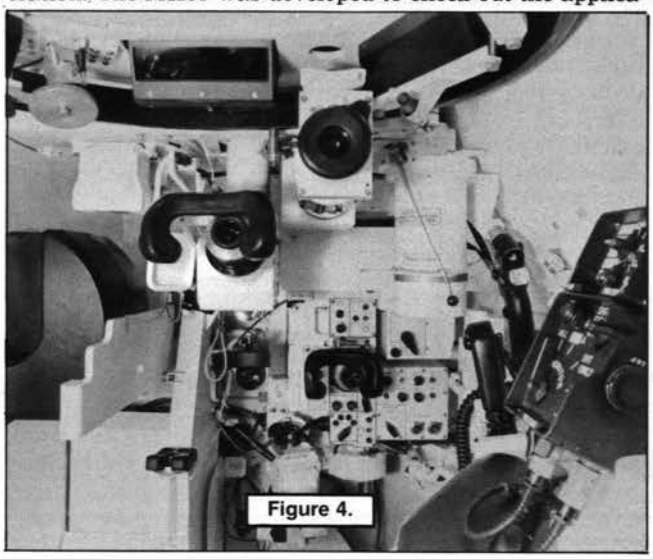

Figure 4.

The *MK60*, in its basic form, is a table-top device that provides stationary *M60A1* tank gunnery engagements for the gunner only. It can be adapted to simulate the *M60A3* and *M1* tanks, and the addition of a TC position is planned. Engagements are limited to "own tank stationary" using the gunner's primary sight—there is no compartment with realistically-situated controls as in the larger U-COFT. It presents realistic targets in a real scene on a TV monitor and permits the gunner to practice difficult engagement procedures with proper fire commands; particularly, it presents realistic moving-target engagements much more frequently than can be done with the U-COFT. The *MK60* should be used during the time gaps between U-COFT training and on-tank training sessions to provide effective, interesting, and *frequent* training that will prevent the rapid deterioration of gunnery skills. As a relatively *low-cost* device, enough of them can be purchased for each company to have one.

The Tank Gunnery and Missile Tracking System (TGMTS) is sometimes called *Detras*, the name of the British manufacturer, and is also known as the combat training theater. It's a device that turns the tank into a stationary simulator.[2] A rear-projection movie screen is the dominant feature (figure 5). As the gunner tracks the target in his sights, optical devices mounted on the tank and projector console track the line-of-sight aiming point. When the gun is fired, a small computer calculates the hit point for the detected aim point,

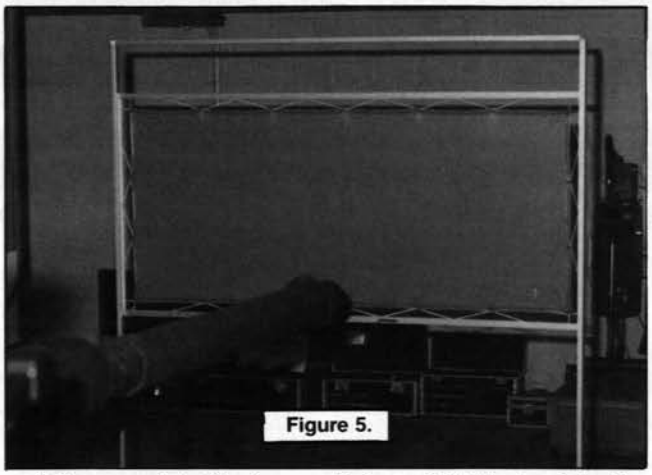

Figure 5.

and fires a point of red eye-safe laser light to simulate the trajectory and impact of the indexed round. The instructor controls the engagements and critiques the crew. This training occupies a relatively small space in a darkened building and gives the gunner and TC the ability to fire stationary-tank to moving-target engagements. Its disadvantages are ranging limitations, and no "own-tank-moving" engagements can be simulated. Its advantages over scaled-range, subcaliber exercises include more target realism and better engagement procedure duplication, while retaining the environment of the tank. TGMTS is now used by USAREUR units and it appears to have great potential as a gunnery trainer for Reserve Component units whose Training Readiness Condition levels do not warrant a U-COFT. It represents a good balance between training coverage on the one hand and cost/time effectiveness on the other, with the major alternatives being scaled ranges and U-COFT. Scaled ranges with subcaliber devices have a definite place in a full unit training program, but given the limited amount of training time available to Reserve Components, a training device providing more realism, but less costly than a U-COFT, is desirable.

Gunner and TC training devices are important because the cost of gunnery training has grabbed the lion's share of attention in armor training device development. But, training developers are also looking at training for the driver and the mechanic—for the full crew via a full-crew interaction simulator and, as we mentioned, for the platoon leader, and possibly the full platoon leadership team. Other devices in the works include new targets and target carriers plus new training ammunition and safety devices. The family of tactical engagement simulation devices is growing. A target acquisition training device using video disc technology and a microcomputer is under consideration. The TRADOC Combined Arms Test Activity at Fort Hood, TX has developed a "through-the-sight" video system that promises to make dry firing more objective and meaningful.

Finally, a trainer has been built for the *M2/M3 Bradley* fighting vehicles and a contract has been let for *M60A1* tank prototype devices resembling video arcade games that are to be used to determine their adaptability to military training requirements.

Conclusion

New technology in and of itself is not a panacea for all the old training ills, just as it is not necessarily the remedy for perceived shortcomings in combat readiness. There is abundant evidence that technology can cause more problems than it is intended to cure, if not applied carefully. One defense analyst concluded:

"The across-the-board thrust toward ever-increasing technological complexity just is not working. We need to change the way we do business, and in particular, we should use our superior technology in a positive way. Technology should and *can* increase readiness, not draw it down . . .

"The evidence presented reveals that: Our strategy of pursuing ever-increasing technical complexity and sophistication has made high technology solutions and combat readiness mutually *exclusive.*" (emphasis by original author)."[3]

At first glance, this quotation appears to be a damning indictment of what we are trying to do—apply new technology to training problems that affect combat readiness. But key to his conclusion is his statement that: "We need to change the way we do business . . . we should use our superior technology in a positive way. Technology should and *can* increase readiness . . ."

We agree. The fact that a certain technology is available does not mean that is has to be used. We must be selective and careful in its application—careful that, in prescribing a dose of technology to a training problem, we do not incapacitate the patient with pain from supply and maintenance problems—careful that the technology in question is really right for the training requirement—and careful that we do not replace something that works *for* us with something that works *against* us.

Yes, new technology is coming. We need to be alert, not alarmed. We need to be enthusiastic about the opportunity, not overwhelmed by fascination with gadgetry, or angered by the passing of the older forms of training. If we use new technology wisely, we can train better than we do now—and more cheaply.

Footnotes

[1] "Weapons Crew Training Study," Interim I Report, November 1980-February 1982. U.S. Army Training Support Center, p. 1-5.
[2] "Combat Training Theaters," by Ann Mulligan, May-June 1978 *ARMOR*, p. 46.
[3] "Defense Facts of Life," by Franklin C. Spiney, December 5, 1980. DTIC ADA111544.

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Soviet Wartime Tank Formations

by Major Albert Z. Conner and Robert G. Poirier

(This material has been reviewed by the Central Intelligence Agency (CIA) to assist the authors in eliminating classified information, if any; however, that review neither constitutes CIA authentication of material as factual nor implies CIA endorsement of the authors' views.)

Today's massive modern Soviet armored forces occupy territory stretching from the Pacific westward to the border of the Federal Republic of Germany. These forces, crowned by tank formations, are clearly the most formidable mass of that type found in any of the world's major powers. Together with the armored forces of the Warsaw Pact nations they embody the decisive ground-gaining strike force threatening NATO in both conventional and nuclear war scenarios.

Therefore, it is essential for the West to understand the underlying nature of this threat. In order to accurately do so, we must examine its historical progression in three ways.

First, the essential aspects of military art,[1] which drove the development of tank forces, must be set forth. Second, the organizational methodology used by the Soviets must be analyzed. Third, the evolution of the tank formations in the epoch years of WW II must be reviewed.

The "Great Patriotic War" (WW II), which served as the crucible for the development of all Soviet armed forces, can be more objectively studied now than at any time in the past. We have tried to do so in this article by using a combination of Soviet writings, recently declassified intelligence documents, and the files of the wartime German intelligence organization, Foreign Armies East (Fremde Heere Ost—FHO). We believe that these sources can provide the most realistic insights to date into the development of the Soviet tank force.

The ability to view tank force requirements through Soviet eyes is of prime importance to understanding their developmental processes. The U.S.S.R. is historically a Continental power and enjoys great geographic advantages when considering land combat in either Asia or Europe. Thus, Russian force planners pay considerable attention to specific military-geographic regions where their enormous ground forces are likely to be in combat. This is in contrast to American planners who, due to the nature of our global commitments, must shape forces that can operate successfully in any environment. Soviet military theorists have organized all of the regions of the periphery of the U.S.S.R. and the rest of the world's continental and maritime areas into theaters of war *(teatr voyny—TV)*.[2] These are three dimensional areas where hostilities

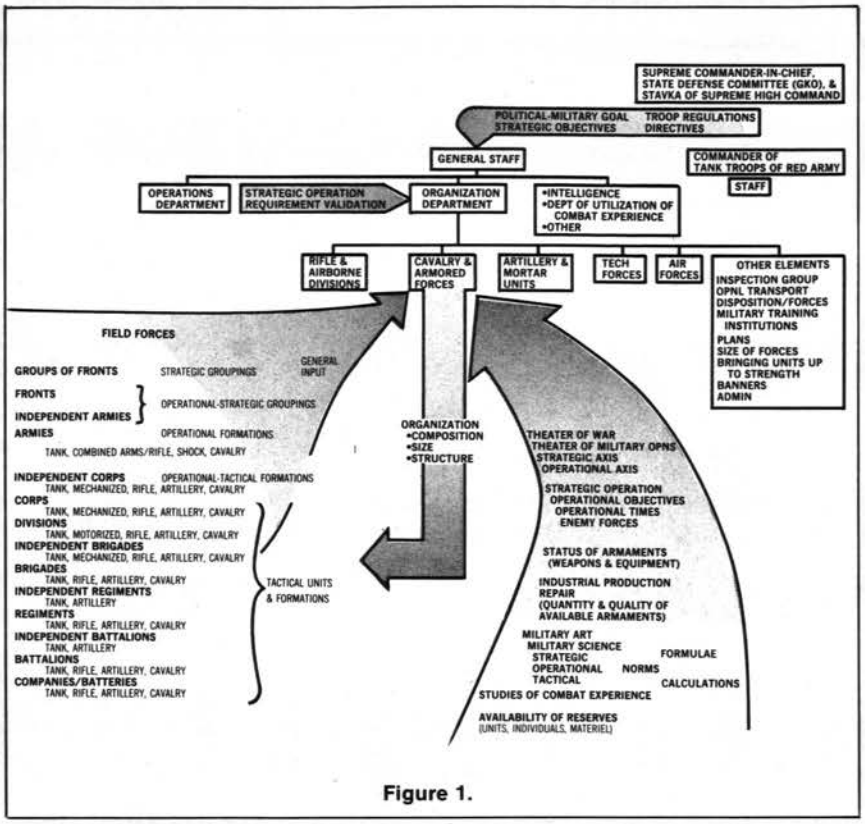


Figure 1.

may occur. The TV is further divided into theaters of military operations *(teatr voynnykh deystviy—TVD).* These are ground, maritime, or intercontinental areas where their armed services (strategic rocket, ground, national air defense, and air and naval forces) will engage in actual combat. TVDs are classified as either main or secondary, and are themselves subdivided into one or more strategic axes or directions. Strategic axes lead from key areas of Soviet territory to an adversary's strategic objectives.[4] Since the Soviets view the modern tank army as both a major field force and a strategic formation of the ground forces, the strategic axis *de facto* becomes an important military geographic entity in force planning. Even more important in the structuring of tank forces, however, is the operational axis. This is a subdivision of a strategic axis that, like its larger counterpart, leads to important objectives. The primary significance of an operational axis, however, is the fact that it considers the enemy's main forces in terms of both locations and composition. A shifting or restructuring of the enemy's forces causes a consequent shift in the Soviet operational axis. Otherwise, only a change in the goals or objectives of the operation could force such a shift. Thus, we arrive at our first significant conclusion: Soviet force structure for tank units is primarily based on the premise of defeating a *specific* enemy on the designated operational axis.[5]

Second in importance, when viewing tank force development through Soviet eyes, is an insight into their organizational methodology (figure 1). In order to accomplish this, we must first understand the roles of the Organizational Department of the General Staff. In WW II, as today, that department was responsible for the size, composition and structure of the armed forces. It employed an approach that may at first seem peculiar to American readers—that of extreme centralization. The command element at every level strictly controlled the actions of the units and means assigned to it in the execution of highly centralized plans and orders.

Centralization in the planning and organization of forces was (and is) the natural extension of that principle. Tank forces were systematically structured according to studied and established norms, calculations and formulae. This was accomplished in an environment that drew heavily on history and science, supplemented by experimental feedback. The available histories of the organizational processes reveal a confluence of the ruthless, driving personalities of major Soviet wartime leaders and the steady, scholarly seriousness of general staff officers. These staff officers immersed themselves in the study of military geographic regions, the battles or operations at hand, and the availability, quality, and quantity of weapons, vehicles, and equipment. All of this was intended to assure one result: the superiority of Soviet formations over those of their enemies. The end result of this process was vested in a "correct" table of organization to defeat a specific enemy, at a specific time, and in a specific operation.[6]

The mechanics of the organizational process are worth summarizing. The politico-military strategic goals were established by Stalin and the State Defense Committee *(Gosudarstvenny Komitet Oborony—GKO).* Military strategy, which primarily determined the mission of the armed forces and weighted the main efforts, was worked out by the senior military leadership *(Stavka).* A commander of a front or army was given a plan, orders, a predetermined and tailored force structure, and an array of subcommanders (artillery, tank, rear services, etc.), with strict vertical command chains and operating procedures. The combat order itself reflected this process: it was a rigid directive issued by the commander to subordinates to carry out the plans he made. The order not only included intelligence and other general items common to all orders, but it also contained radical differences. It had rigid timetables; designated placement of command posts with their deployment times and extremely precise tasks to be executed byt he chief/commanders of the various arms and services. It is withi this context that the organizational process took place.[7]

The Organization, or Second Department, of the General Staff received validated requirements from the Operations (First) Department. These were arrived at through the process described earlier. Specific responsibility for armored and cavalry forces was vested in a section of the Organization Department, which normally contained a dozen officers commanded by a general-major (one star). The section made a thorough study and analysis that led to specialized organizational structures of regiments, divisions, corps, and armies for the planned operations. This task required that the section have detailed knowledge of the current locations, personnel, and equipment status of every unit (by 1944, for example, the Germans had identified 173 Soviet tank regiments, 181 brigades and 33 cavalry divisions).[8] In addition to the normal factors, the section also had to consider studies of combat experiences written by a special section of the General Staff. Input from active field commanders and from the staff of the Commander of Tank Troops of the Red Army also had

to be solicited and considered. In fact, input from commanders, especially influential commanders such as Rotmistrov, often focused on a need for specific unit restructurings. Furthermore, as will be seen, organization could at times be almost exclusively driven by the availability of vehicles and weapons from industry and capital repair facilities. One immutable principal remained: only the General Staff, as the executive arm of the Supreme High Command *(verkhovnoye glavnoye komamandovaniye—VGK),* could determine the organization of the armed forces. Only they answered all the questions incumbent on such decisions. In the Soviet view, only a radical shift in the political goals of the war, or the introduction of dramatic new technology or weaponry, could radically alter this organizational methodology.[9]

The final step in comprehending the development of Soviet tank forces is the examination of structural changes that appeared during WW II. To set this scene into its historical perspective, we must first set forth the principal factors affecting tank troops before Germany's invasion of Russia. The Eastern Front in WW I was essentially the same futile bloodbath inflicted in the west. It had, however, left some Germans with an alternate school of tactical thinking that began to favor maneuver over attrition. It left Russia with a revolution followed by civil war and foreign intervention, all in the space of 3 years. These events convinced the Bolsheviks that modern, mobile forces, backed by strong industries, a viable military doctrine, and a powerful mobilization potential, were essential to the survival of the socialist state. Stalin's industrialization program, cooperation with German and western industrialists, and the education of a generation of technicians, laid the foundations for a successful survival. Marshall of the Soviet Union Tukhachevskiy provided a solid military science and a conceptual framework for the armed forces. Beyond that, the Russians applied the technology of mechanization and motorization to their military science. The growth of large tank and mechanized units was temporarily reversed by incorrect conclusions drawn from the Spanish Civil War and the great purges. But by 1940, the battles with the Japanese and Finns, the great success of the Germans in Poland and France, and the return of more objective policies as the purges ended, led to renewed interest in large tank formations. By then, the Russians had acquired new territories in Poland, the Baltic and in Romania. Analysis of the geographic factors in the three western strategic directions (west, northwest and southwest), and the threat posed by German *panzer* units, resulted in new tank organizations to face the *blitzkrieg.*[10]

The table of organization and equipment (TO&E) for the 1940 Tank Corps (figure 2)[11] was meant to have 650 combat vehicles. Few formations had anything approaching these numbers when the invasion came. The 1940 Tank Corps contained divisions and brigades on the German pattern and, had their organization and training been complete, the initial period of the war might have been less disasterous. It should be noted, however, that the existence of the *T-34* tank with its 76-mm gun, and the heavy *KV-1* tank came as a genuine shock to the Germans. They had no tank to match either the *T-34* or *KV-1* and immediately recognized these for the threat they were.[12]

"The growth of large tank and mechanized units was temporarily reversed by incorrect conclusions drawn from the Spanish Civil War and the great purges."

Nevertheless, the Soviets found their forces caught in numerous encirclements and many tank formations were badly mauled or destroyed. The results of these losses in tanks and trained personnel, together with the necessity of creating support for rifle units carrying the main burden of combat, led to tank force restructuring by the fall of 1941. The *Stavka,* that had thought the main German effort would come on the southwestern axis, had been outgeneraled.

As fall turned into winter, the Germans stood at the gates of Moscow. The *Stavka* VGK reorganized their few remaining tank assets into small brigades (figure 2) and regiments. Expediency dictated to organization as the remnants of the force were husbanded and sparingly used to back up rifle units facing the German threat on critical sectors. These brigades contained only 48 tanks (light, medium, and heavy) but retained the combined arms structure of the 1940 corps.[13] To the surprise of everyone, particularly their western allies, the Russians held. Not only did they hold at Moscow, but they inflicted the first major defeat of WW II on Germany. The counterattack of 6 December 1941, was spearheaded by *T-34s* and rugged Siberian rifle divisions from the Far East. The *Stavka* transferred some 40 divisions west when they became convinced Japan would not enter the war. The timing of their attack was too much for the exhausted and overextended Germans; the front was pushed back miles to the west and Moscow was saved.

The extent of their winter successes, combined with significant improvements in the availability of equipment, encouraged the *Stavka* to plan new offensives on the southwest strategic axis for the spring of 1942. The General Staff had studied the lessons of the first period of the war and had seen that tank units tied down with infantry support roles were clearly incapable of spearheading strategic offensives. Committed to the employment of tanks *en masse* plans for tank corps and armies were drawn up. The tank corps made their appearance in April, 1942 (figure 2), the tank army, in May.[14] Mechanized corps were identified in combat by the Germans in September 1942.[15] These corps could now be equipped due to increased equipment production, but were based on the brigade rather than the division, as in 1940. The tank corps contained three tank and one motorized rifle brigade, while the mechanized corps reversed the ratio.[16] Tank armies varied in composition but normally combined two or three tank corps and several rifle divisions. Although these formations met with limited success, the VGK still had problems in controlling large mobile formations.

After they had contained the ill-fated Kharkov Offensive in the spring of 1942, German *panzer* units had driven to Stalingrad and deep into the Caucasus by November. Concurrent with these battles, the Russians saw the emergence of new, dynamic and talented commanders within their armored force. In discussions with the *Stavka* representatives at the front and general staff officers, these men pointed out that rifle divisions and other nonmotorized elements of tank armies of combined composition could not keep up with the armor during attacks. This problem prevented the development of penetrations into operational depth and led to additional modifications to the structure of tank units.

"Furthermore, as will be shown, organization could at times be almost exclusively driven by the availability of vehicles and weapons from industry and capital repair facilities."

Modifications, such as would be suggested by field commanders, were easier to make in 1942 than in 1941. The VGK had made a concerted effort to form new reserve units and specialized armored formations. The generation of reserves

was a priority task of the *Stavka* from the outset of the war. The process had been disrupted in June 1941 and this had aggravated the problem of stemming the *blitzkrieg*. Now, expanding tank production from relocated factories in the Urals, and deliveries via the Lend-Lease Program, eased equipment troubles. Significant numbers of new and reserve units of all types were created. Besides tank battalions and regiments, independent tank regiments specifically structured for joint cooperation with rifle troops began to be formed. Heavy tank units were used to reinforce large rifle units in breakthrough operations and for combatting German tank units breaking through the Russian defense.[17] The Soviet *Military Historical Journal* provides insight into the organization, number, and use of new tank formations. The Russians distinguished between tank units designated for direct support of infantry and those meant for exploitation and pursuit. Independent tank and self-propelled artillery units and independent tank and mechanized corps were considered to be the principal organizations of tank troops in WW II.[18] More than 40 percent of all tanks and self-propelled artillery pieces were assigned to direct infantry support. The remainder were massed in the independent tank and mechanized corps included in the reserve of the Supreme High Command *(rezerv verkhnogo glavnogo komandovaniya*—RVGK). These RVGK units were placed at the disposal of front and selected combined-arms armies operating on the decisive axes of the operation. When their mission had been completed, control of these units reverted directly to the VGK. By the time of the Stalingrad counteroffensive, the Russians considered the tank troops to be the main strike and maneuver element of the ground forces.[19] Just as the Soviets depended upon these units for decisive offensive actions, the Germans recognized that their identification was critical to the detection of impending Russian offensives. Postwar declassified reports demonstrated the emphasis placed on the identification of tank formations by FHO.[20]

Independent tank and self-propelled artillery battalions, regiments, and brigades on the other hand, were considered High Command Reserves *(rezerv glavnogo komandovaniya*—RGK*)*. Unlike the RVGK, these units were placed at the disposal of army commanders. On their orders, they were attached to combined-arms divisions and corps to increase their capabilities to conduct successful offensive or defensive actions. In offensive operations, the tank units would be used to penetrate fortified defenses in conjunction with rifle units. During 1942, certain of these tank units were formed either into elite Guards or Heavy Tank Breakthrough Regiments (figure 3).[21] In defensive actions, RGK formations would backstop rifle and antitank unit defenses in key sectors. While it is denied, or conveniently overlooked today, the FHO archives clearly show that a number of these new tank units were formed using Lend-Lease British *Matilda* and *Churchill* tanks and American *Grants* and *Shermans*.[22]

The mobile units that cut off the German Sixth Army at Stalingrad, and fended off Manstein's attempts to relieve that force, were the results of organizations developed in Moscow during the preceding months. Orders issued by Zhukov in August, and Stalin in October 1942, took into account the lessons learned earlier that year and the main German effort on the southwestern axis. The new orders covered tank unit organization and employment techniques. Under Stalin Order 325, the main mission of independent tank regiments and brigades was the destruction of German infantry. Tank corps, on the other hand, were to be employed in the direction of the main thrust to widen the breakthrough while pursuing and destroying enemy infantry. Surprise was to be the prerequisite for success.[23]

In the aftermath of Stalingrad and Manstein's brilliant counterthrusts, it was realized that tank armies of mixed composition did not completely meet the requirements of highly mobile combat operations nor did they ensure the optimal use of the tank corps.[24] This problem was encapsulated in a meeting between Stalin and one of his most successful commanders, General P.A. Rotmistrov. Rotmistrov pointed out to the

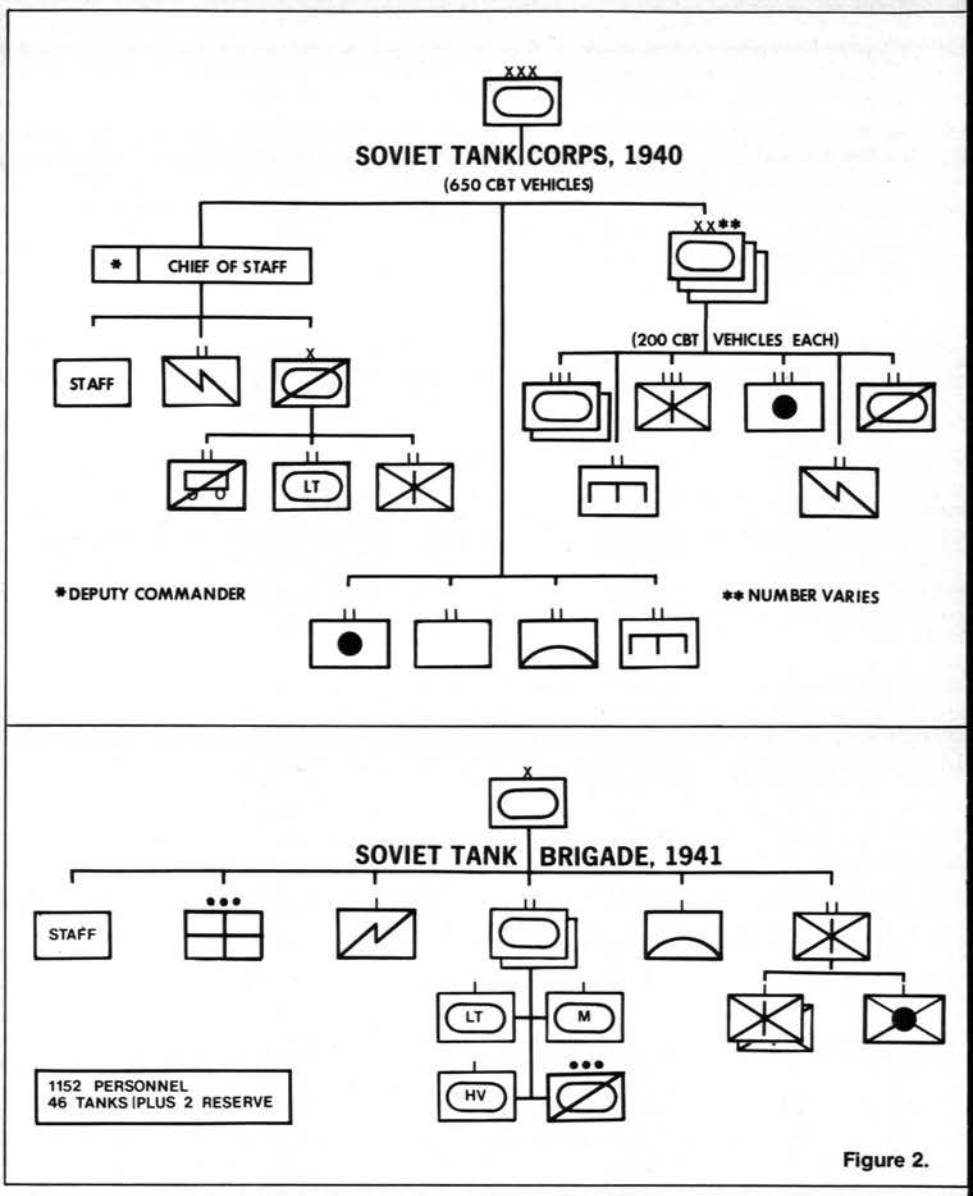
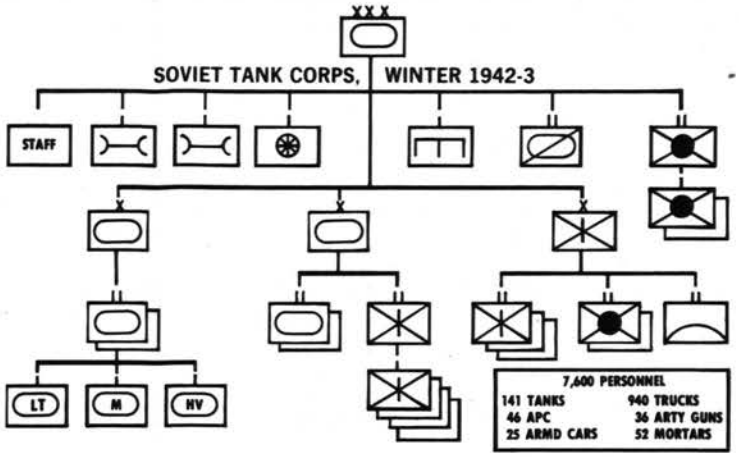
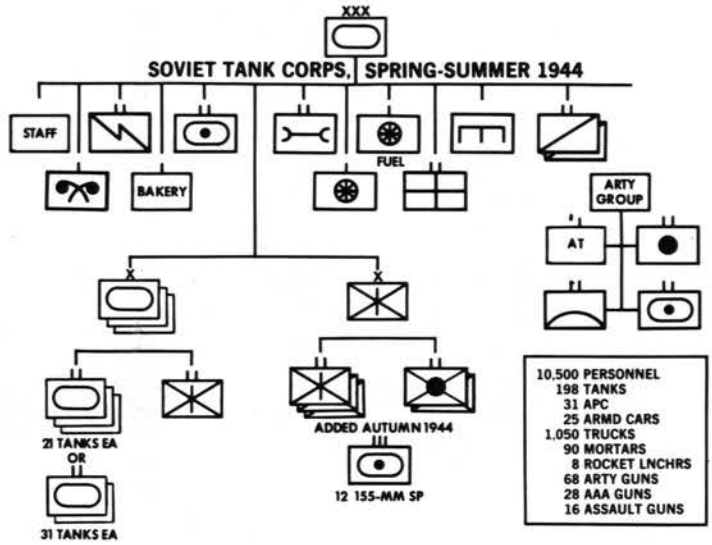


Figure 2.





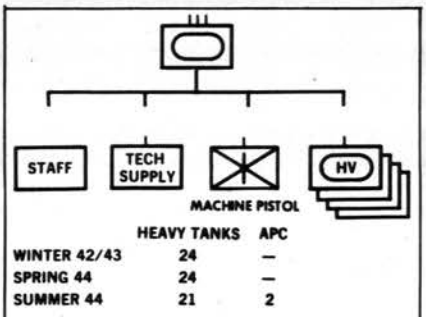
Supreme Commander-in-Chief that, in order to assume and maintain the offensive strategic initiative, it was necessary to have highly mobile formations possessing great striking power and firepower. These units would be the best way to develop success in the operational depth as well as ensuring proper conditions for massing tanks on critical axes. He proposed the establishment of a tank army of unified (homogenous) composition; it was accepted after lively debate.[25] The new tank armies were to constitute a reserve of the Supreme High Command and to be attached only to those fronts conducting the most important attacks.

The introduction of the tank army into frontal operations resulted in a modification of the echeloning of armored troops. They would attack in three echelons. The first was made up of independent RGK tank regiments and brigades in direct support of rifle units. The second echelon consisted of tank and mechanized corps, while the third echelon was formed from RVGK tank armies and independent tank and mechanized corps.[26] All units of the new tank armies, of which the first was 5th Guards Tank Army commanded by Rotmistrov, were mechanized or motorized. Five additional tank armies of unified composition were formed between February 1943 and January 1944. They contained two tank corps, a mechanized corps, antitank, artillery, and other specialized units and rear services.

The newly-revamped tank formations took the best the Germans could throw at them in the great tank battles at Kursk in July 1943, and in the Ukraine during the next few months. The successful battles on the southwestern strategic axis allowed the *Stavka* to seize strategic initiative, never to lose it again. The structure of the tank formations had essentially reached their final wartime form by the summer of 1943. Subsequent changes can be viewed as fine tuning (figure 2). The Soviets point out that the ability of the tank armies to ensure their combat independence was the major and decisive factor in determining their composition. Marshal of the Soviet Union, Yakubovskiy, considered the ideal structure of the tank army to be two tank corps, a mechanized corps, an independent tank brigade, and a mixture of army and combined units such as self-propelled artillery, tank destroyer, mortar, engineer, communications, and mobile rear services. With this structure, the tank army was easily controllable, could create powerful first and second echelons and have strong reserves.[27]

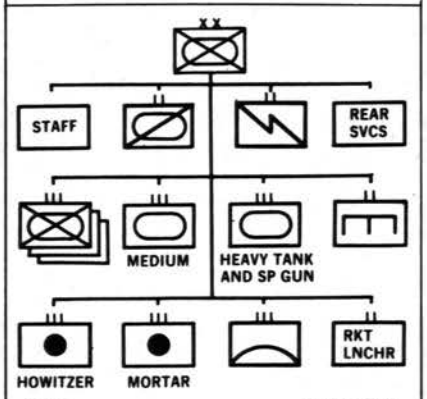
Concurrent with these actions, the Soviets attempted to perfect the blending of tank and mechanized units into *ad hoc* units known as mobile groups. The mobile group was tasked with developing success after German defenses were penetrated. They performed this role either independently or jointly with large combined-arms units. At front level, it became common to designate a tank army to function as the mobile group. The mobile group was fully capable of conducting independent combat actions. A sharp increase in the capabilities of Soviet ground forces to inflict deep, swift strikes to operational depth began to be noted by the Germans.[28]

In the last year of the war, it became obvious to the Germans that the Russians had learned their lessons well. With the issue of a new manual for armored warfare, the *Combat Regulations for Armored and Mechanized Forces* in 1944,[29] Soviet tank tactics reached full development. The core of the tank force was centered upon the excellent *T-34* medium tank now produced with an 85-mm gun. It was considered the main shock weapon of the tank corps and all other armored equipment was designed to support and protect it. *T-34*-equipped units prepared the way for the breakthrough while seeking surprise and maximum shock effect. They were not allowed to attack at an infantry pace. These units sought to disrupt German centers of resistance up to, but not beyond, the planned operational objectives. Heavy tank units were to support the *T-34s* by long-range fire and then destroy German heavy tanks, preferably from ambush. Once the breakthrough had been achieved, the exploitation force (mobile group) was committed. This action normally took place on the first or second day of the offensive. Tank units used in the exploitation were



	HEAVY TANKS	APC
WINTER 42/43	24	—
SPRING 44	24	—
SUMMER 44	21	2

Figure 3. Soviet Independent Guards Tank Breakthrough Regiment



14,194	PERSONNEL
23	HEAVY TANKS
185	MEDIUM TANKS
21	152-MM SP GUNS
42	100-MM SP GUNS
57	ARMORED CARS
56	SCOUT CARS
8	132-MM RKT LNCHRS
24	122-MM HOWITZERS
36	76-MM GUNS
44	57-MM AT GUNS
54	120-MM MORTARS
100	82-MM MORTARS
22	AAA GUNS
1,723	WHEELED VEH
202	MOTORCYCLES

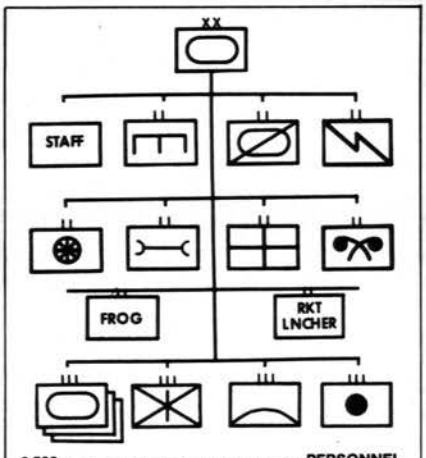
Figure 4. Soviet Mechanized Division

accompanied by armored infantry, mainly sub-machinegunners, riding on tanks or in Lend-Lease *Bren Carriers*, or *Weasels* when these were available.[30] The addition of armored infantry to exploitation units was made necessary in 1944 by German successes in organizing rear area defenses to counter breakthroughs.

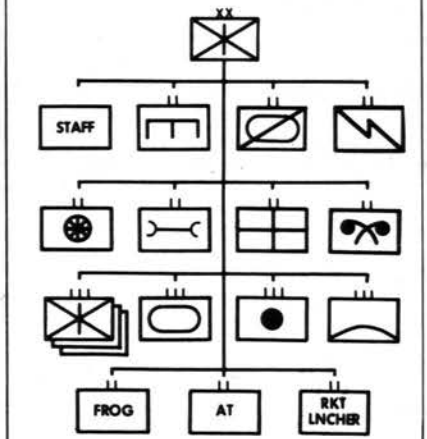
Success on the battlefield had not come cheaply for the Soviet tank troops. They expected to take heavy losses in men and material and were prepared to replace them. Their armored rear services, therefore, were organized accordingly. The prewar organization of the rear services was based on the concept that only minor repairs could be performed by tank crews. Other repairs were accomplished by specialists at army level or higher. Overhauls of major components were performed at military district repair bases or at the factory. Field repairs were essentially nonexistent. The major problems in the repair services were quickly solved—the Germans annihilated both the vehicles and the repair facilities. In spite of heroic efforts to increase production, tank losses rapidly outpaced the replacement rate in 1941. In the first months of the war, the Soviets lost three tanks for every one produced or received via Lend-Lease. The Germans overran hundreds on the battlefield that had been abandoned for lack of fuel or the inability to complete minor repairs. In 1942, new army-level Repair and Restoration Battalions *(remonto - vosstanovetelmy batlon*—RVB) and front-level, Mobile Tank Repair Bases, *(podvizhnaya remontnaya baza*—PRB) were organized. Their organization and techniques of employment were defined following Stalin's Order 325.[31] The Soviet Army Tank Repair Directorate was established on 1 January 1943. It initially contained 110 PRB, 42 RVB, 56 Damaged Vehicle Collection Points *(sborniy punkt avarennikh mashin* — SPAM), and numerous repair plants, shops, and trains. Increased tank production and Lend-Lease receipts led to a 50 percent increase in tank strength by the end of 1942 despite tank losses of 2,500 per month.[32] In the course of the last great offensives in 1944-45, calculated repair rates rose from 12,000 per month in 1944 to 17,000 in 1945. Soviet tank losses in the last 18 months of the war never exceeded 96 percent of the replacement rate.[33]

Evidence in FHO materials express German admiration for the successes of the armored rear services. The 6th Guards Tank Army conducted major offensive actions in the Balkans and in Hungary between August and October 1944. Its ability to replenish tank losses was impressive. During the course of the August battles, FHO personnel reported that the 134th Tank Regiment of the IV Guards Cavalry Corps was receiving tanks produced in July and August from the Omsk and Gorkiy plants. September losses were being filled in some units by tanks from the August production run at Nizhniy Tagil. In October, they seem to have reported with some relief that no tanks from the September production runs had yet appeared in Hungary.[34] These identifications, on what had become a secondary front, point to an efficient and well-organized rear services. By the Vistula-Oder Operation in 1945, Soviet tank strength had grown to 14,000 with an additional 7,500 assault guns.[35] A small part of this force was sent east and in August 1945, it helped overwhelm the Japanese Kwantung Army.

After the war, a major reorganization of the ground forces was undertaken in 1946. The lessons learned in the last period of the war and improved conventional weaponry served as the basis for reorganization and rearmament between 1946-53.[36] The wartime tank and mechanized corps were replaced by tank and mechanized divisions (figure 4) and tank armies became mechanized armies. The new mechanized divisions were formed from elite mechanized corps and selected rifle divisions; a large number of the latter, moreover, were retained by given a new TO&E. Self-propelled gun and heavy tank regiments and mechanized infantry were included in the composition of the mechanized division to provide them with greater striking power and mobility. Concurrent improvements took place within the Tank Troops. Appearing in



9,500	PERSONNEL
350	TANKS
390	AFV/TRACKED VEH
1,800	WHEELED VEH
4	FROG-7
54	122-MM HOWITZERS
24	AAA GUNS
24	RKT LNCHRS



12,300	PERSONNEL
200	TANKS
580	AFV/TRACKED VEH
2,050	WHEELED VEH
4	FROG-7
48	122 & 152-MM HOW
18	100-MM AT FLD GUNS
24	AAA GUNS
24	RKT LNCHRS

Figure 5. Modern Soviet Tank and Motorized Rifle Divisions

the armament inventory were new tanks with bigger guns, better armor, more maneuverability, longer range, as well as amphibious tanks and armored personnel carriers.[37]

By the 1960s, the increasing motorization or mechanization of the Ground Forces led to the disappearance of the rifle and mechanized divisions; they were replaced by motorized rifle divisions. This activity occured concurrently with a major debate in the Soviet armed forces referred to as the "nuclear revolution in military affairs."[38] For a time, it appeared that tank units and the bulk of the Ground Forces would either disappear or become permanent poor relations to the Strategic Rocket Force. This debate seems to have been resolved by the early 1970's in favor of a balanced force.

Today's tank and motorized rifle divisions (figure 5) are the product of some 40 years of evolution tempered by the bloody lessons of WW II. Many of the younger leaders of that period still hold high rank in the current force structure. Today's tank units resemble their forebearers in a way few of us readily grasp. What is different, is that a large number of tanks are now at the permanent disposal of the infantry. Motorized Rifle Troops, unlike the infantry of WW II, now have the capability of breaking through defenses to operational depth with their own assets. Creation of proper conditions for insertion of mobile groups will no longer require those formations to participate in the final breakthrough.[39] Current Soviet military art considers the most important missions of the tank troops to be the conduct of deep and powerful strikes upon the enemy.[40] While Soviet organizational methodologies for these forces are no longer readily available for western public analysis, extensive open-source publications suggest the continued validity of the process we have described.

In briefly reviewing the historical basis of today's armored threat, several distinct conclusions appear to have relevance. In preparing for combat against the west, it is highly likely that Organizational Officers of today's Soviet General Staff will consider the factors proven historically successful. Preeminent among these will be analysis of TVDs, strategic operational axes, enemy forces, force ratios, pertinent technology, and the availability and disposition of reserves. That analysis will lead to organization of tank forces based on the perceived threat presented on the key western strategic axes by the *Bundeswehr* and US Army Europe.[41]

The Soviet armored force, with its rich combat traditions and body of experience, must clearly be seen as a continuum from WW II. Tank Troops will continue to appear and be committed on what the Soviets consider the most critical sectors to gain decisive strategic and operational objectives. We must face up to and accept, as the Soviets themselves continually point out, that tank formations are and will remain "the primary strike force of the Ground Forces."

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Footnotes

1 "The theory and practice of engaging in combat, operations, and armed conflict as a whole, with the use of all the resources of the service branches and Services of the armed forces as a whole. It is the main field of military science and includes strategy, operational art and tactics." *Dictionary of Basic Military Terms: A Soviet View* (U.S. Government Printing Office, Washington, D.C., 1965), p. 39, #294. Hereafter referred to as *Dictionary*.
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5 *Ibid.*, p. 145, #1021
6 Army General S.M. Shtemenko, *The Last Six Months* (New York, Kensington Publishing Corp., 1977), pp.2-5. Hereafter referred to as Shtemenko.
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8 National Archives and Records Group, T-78 Series, Reel 496 from the files of *Fremde Here Ost* (FHO). Formerly classified SECRET, declassified by the U.S. Army and the National Archives and Records Service. Hereafter referred to as *FHO*. (All originals in German).
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22 *Ibid.*, T-78, Reel 462. T-78, Reel 481.
23 *Trends*, p. 16.
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26 *Military Thought, Poluboyarov*, p. 21.
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28 *FHO*, T-78, Reel 486.
29 *Military Thought, Poluboyarov*, p. 23.
30 *Trends*, pp. 21-22.
31 *FHO*, T-78, Reel 486. *Military Thought, Poluboyarov*, p. 20.
32 Major Stephen Shervais, Jr., "Soviet Tank Repairs in World War II," in *Strategy and Tactics*, Nr. 83 (Simulations Publications, New York, 1980), pp. 33-34.
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34 *FHO*, T-78, Reel 481.
35 *MHJ, Krupchenko*, p. 32.
36 *Military Thought, Poluboyarov*, pp. 25-26.
37 *Ibid.*, p. 25.
38 *Ibid.*, p. 27.
39 *Ibid.*, p. 26.
40 *Ibid.*, p. 27. *Military Thought, Yakubovskiy*, pp. 95-96.
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The LHX Pursuit H

by Captain G

Late October 1984 . . . As the lead tanks of Task Force (TF) 2-94 Armor were pushing through a hole in the enemy's lines, a leather-clad Soviet helicopter squadron commander calmly prepared to unleash a nasty surprise. The lead elements of A company's armor had just cleared the town of Oberfeld and were racing across a series of beet fields, intent upon being the first U.S. Army personnel to prove the concept of the deep attack. Suddenly, out in the distance, just above the trees, two flights of Mil-24Js *(Hinds)* rolled in for a nap-of-the-earth missile run from two directions and opened up at 6,000 meters with their supersonic *AT-10* missiles. The tankers of A company never had a chance. Two runs by the *Hinds* were enough. Fourteen blackened *M1* hulls were all that were left of A company after a mere 3 minutes. The accompanying *Sergeant York* air defense systems managed to clip a few Russian tail feathers, but 12 Soviet helicopter pilots had something to talk about over their vodka that night.

After the lines stabilized following TF 2-94 Armor's abortive attack, the TF commander was debriefed about the setback. "Our *Yorks* couldn't even see those guys, let alone shoot 'em!" he told his colonel. "And as for our *Stinger* teams, well, all they could do was dodge shrapnel. Where the hell was our air support? Who's going to kill those things?"

His questions deserve an answer. Who *will* deal with the rotary-wing threat in future conflicts? What is the best weapons system to use to ensure low-altitude air superiority, and how should this system be most effectively employed on an extended battlefield? These questions must be addressed and answers provided if we are to be successful in future conflicts.

Traditionally, the role of engaging enemy aircraft has rested with the United States Air Force and the army's Air Defense Artillery, with the Air Force having responsibility for aerial combat and the Air Defense Artillery being responsible for ground-to-air engagements. However, on the battlefield of today and, as projected to the year 2000, with the emphasis on rapid maneuver, dispersion, and combined arms operations, low-altitude air defense ground systems will be thinly spread, and the Air Force will have its hands full, contending with masses of Threat high-performance, fixed-wing aircraft intent upon owning the skies. Indeed, the air defense umbrella, upon which we rely heavily, may have a number of helicopter-sized holes in it. Even with the advent of today's notoriously lethal air defense systems and the most sophisticated interceptor aircraft ever fielded, helicopters have consistently evaded detection and engagement on every battlefield upon which they have been employed. Given the sheer weight of the devastating firepower that the numerous Threat *Mil-8 (Hip)* and *Mil-24 (Hind)* helicopters possess, and their subsequent effect on ground combat elements, it would appear that countering these rotary-wing platforms would give NATO forces the freedom of maneuver so greatly needed to fight a numerically-superior enemy.

"The helicopter is unique among the weapons of war. Like

elicopter Squadron

g R. Hampton

any other weapons system, its sole reason for existence is to allow the commander to bring maximum combat power to bear on the enemy at a time and place of his own choosing. But, unlike any other weapon, the helicopter can apply this tactic with speed, versatility, and effectiveness never before achievable through the employment of a single weapon."[1] By using the protection of terrain and by not being hampered by its trafficability restrictions, the helicopter can engage and disengage the enemy with a degree of flexibility previously unknown in the history of warfare.

Unfortunately, the current employment techniques for NATO'S armed helicopters are presently restricted to defensively-oriented antiarmor missions—using the hit-and-run method. The helicopter's capabilities as an air-to-air weapon system have just begun to surface in many publications, both foreign and domestic, all of which extoll the virtues of the rotary-wing platform. What other weapons system can operate in the same environment as a helicopter? What system has the versatility, maneuverability, and firepower? Air defense weapons have great difficulty engaging terrain-flying helicopters. Small arms are easily defeated by armor plate and specific component hardening. High performance, fixed-wing aircraft have great difficulty acquiring and engaging helicopters operating in a nap-of-the-earth environment. Only a helicopter—an advanced, lightweight, highly-maneuverable fighter helicopter—can deal most effectively with the rotary-wing threat.

The planning for an aircraft to fill this void is currently underway at the United States Army Aviation Center and the Army Aviation Research and Development Command, and is centered on a variant of a new family of light helicopters, collectively known as the LHX.

LHX is the acronym used to describe a family of light, highly-maneuverable, multipurpose rotorcraft that are to be fielded in the 1990's. The LHX series of aircraft will replace the aging fleet of *OH-6, OH-58, UH-1,* and *AH-1* helicopters and will greatly enhance Army Aviation operations into the 21st Century. The LHX will incorporate designs that emphasize simplicity, small size, and light weight.[2] Two versions are now being planned: a scout/attack helicopter (SCAT) and a light utility helicopter, both sharing common components and many design features. Some of the proposed designs for the SCAT variant are shown in figures 1-4. These aircraft are seen to be roughly the size of the *OH-58*, with a mission-gross-weight of from 6,000 to 8,000 pounds. Performance will be one of the key selling points of the LHX SCAT. Maximum airspeeds of up to 300 knots are within the reach of these designs and, when coupled with upcoming improvements in rotor system design, the LHX will be afforded a degree of maneuverability far beyond that of our current fleet of helicopters.

Incorporating advanced, highly-automated cockpit technology, the LHX will be capable of single-pilot operation, with many pilot functions automatically executed by

onboard computers. Operations will be possible during even the worst lighting, ceiling, and visibility conditions, due to a sophisticated array of electro-optical sensors operating in conjunction with a panoramic flight display screen. Simplified flight controls and a preprogrammable automatic pilot, capable of extreme low-level flight, will free the pilot to concentrate on the overall tactical situation and weapons employment.[3]

Armament and fire control systems under consideration for the LHX SCAT include turreted, lightweight cannon, air-to-air hypervelocity missiles, and directed energy beams. Coupled with an automatic target recognizer and an extremely sophisticated millimeter wave radar, which can detect low-altitude, nap-of-the-earth helicopters, the LHX will possess an extremely lethal and accurate punch. In short, the LHX will embody the qualities that are needed to provide low-altitude air superiority to the maneuver commander.

Organization

No matter how potentially effective a weapon may be by itself, it must be effectively organized into a cohesive, well-trained, properly-employed unit in order to fully exploit the weapon's full combat value. During the Battle of France in 1940 the French Army possessed a qualitatively superior tank, the *Somua 35*, but poor unit organization and improper tactical employment resulted in its defeat by the well-organized, technologically-inferior German armor force. Thus, to fully exploit the advantages of the LHX in the counterhelicopter, low-altitude, air-superiority role, it must be organized into a unit with the primary mission of destroying aerial targets. The unit's training and organization should reflect one single focal point: that of owning the airspace just above the trees.

The notional organizational diagram (figure 5) reflects the structure necessary to support the *LHX* in the Airland Battle.

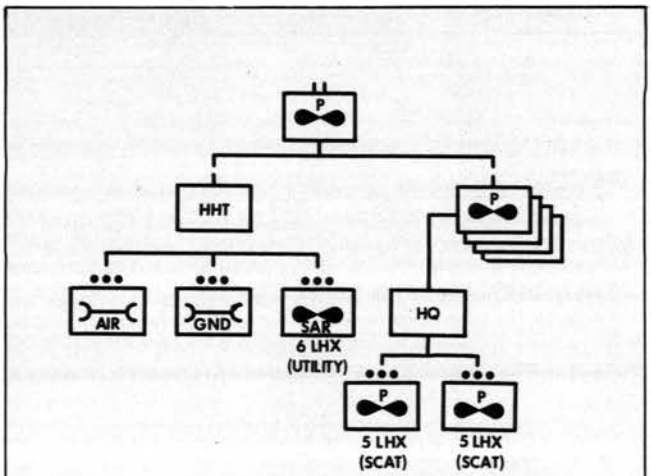

Figure 5.

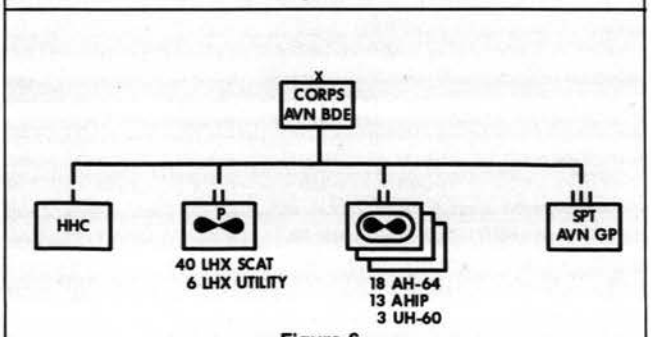

Figure 6.

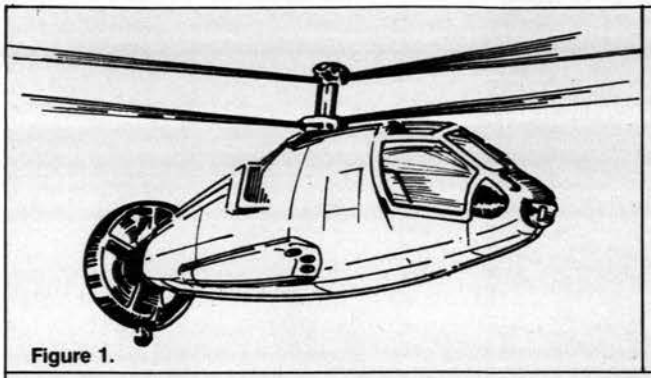

Figure 1.

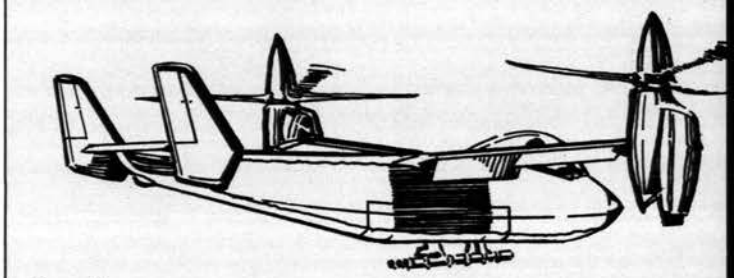

Figure 3.

This squadron-sized unit is to be assigned to the corps aviation brigade (figure 6) and subsequently tasked to support division and brigade-sized units. In this manner, the corps and division commander can have fingertip control over the low-altitude airspace in their zone of operations. Based upon the principles of Corps and Division 86 organization, the LHX Pursuit Helicopter Squadron provides four operational troop-sized maneuver units, each capable of employing up to 10 LHX SCAT helicopters simultaneously. Additionally a platoon of six LHX utility aircraft is attached to the headquarters troop to provide for general support and search-and-rescue operations. All major maintenance activities are provided by the aviation and ground maintenance platoons assigned to the headquarters troop. The entire squadron organization, both ground support and aviation elements, are organized to be extremely light and mobile in order to meet the tremendous maneuver requirements of the Airland Battle.

Pursuit Helicopter Squadron Employment

The LHX Pursuit Helicopter Squadron's primary mission in the Airland Battle will be to clear the airspace from the top of the weeds to some 300 meters. Inside this air envelope, helicopters and fixed-wing aircraft will be conducting intensive operations to further the ground force's scheme of maneuver, and the LHX Pursuit Helicopter Squadron will be afforded numerous scenarios for employment on the battlefield. The following scenarios show how the Pursuit Squadron may be employed in a counterair role.

Scenario One. Threat mechanized forces are attacking in echelon against a U.S. heavy division in Europe. The Threat ground commander commits his attack helicopter assets early in the battle in an attempt to suppress the U.S. antitank helicopters. Anticipating this tactic, the U.S. division commander orders an LHX Pursuit Troop, which has been placed under the division's operational control from corps headquarters, to provide protection for the attack helicopters of the division's Cavalry Brigade, Air Attack (CBAA). The LHX SCAT aircraft, operating above and around the CBAA's aircraft in a combat air patrol formation, acquire and engage

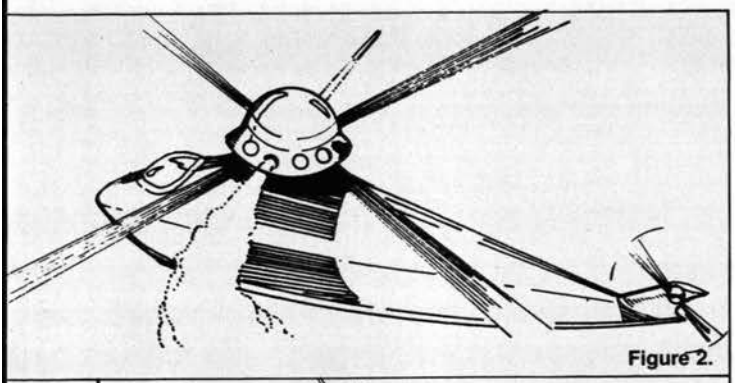

Figure 2.

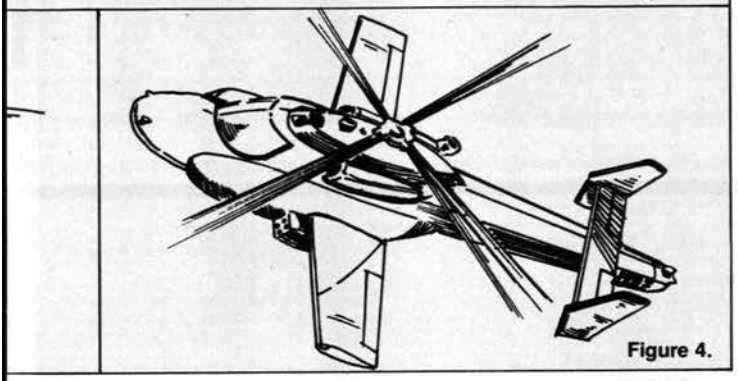

Figure 4.

the Threat attack helicopters before any serious degradation in friendly aerial antitank fires can occur. As a result, the CBAA is free to concentrate on the destruction of the Threat armored force.

Scenario Two. Elements of the U.S. Central Command (formerly the Rapid Deployment Joint Task Force) have been conducting operations in a desert environment to repel a Threat invasion of a friendly nation. Going into the offensive, the friendly force attacks in depth, using its high-speed, wheeled, armored vehicles and airmobile assets. Because his ground elements are being outmaneuvered, the Threat commander employs his most responsive maneuver weapon, his attack helicopters, in an effort to counter the ever-increasing danger to his forces. The friendly force commander deploys his LHX Pursuit Helicopter Squadron to the front and flanks of the lead ground elements, which are operating far in advance of their own slow moving *Sergeant York, Roland,* and *Chaparral* air defense systems. As the Threat helicopters attempt to fix and engage the ground column in conjunction with any available armor support, the high-speed LHX SCAT helicopters, operating in pairs for mutual support, peel off and pounce upon their heavily-loaded opponents. After a short, fierce air battle, the LHX helicopters emerge victorious, confident that the ground attack will remain free from any Threat helicopter interruptions.

Scenario Three. After extensive 2-week long operations, Threat forces have been forced to consolidate their gains short of their European objectives. Lacking the logistical support necessary to make one, last, all-out assault, the Threat commander opts for an airmobile assault in conjunction with a limited ground attack to seize key locations in the NATO rear area. Launching a massive array of troops and equipment-carrying, heavy-lift helicopters, the Threat airmobile force penetrates the line of contact under the cloak of darkness relatively unscathed and proceeds toward its prearranged landing zones. Alerted to the presence of the impending attack by the forward air defense radar network, two LHX Pursuit Helicopter troops are alerted for action. Having been placed on pad alert as part of their standby, rear-area, security mission, the two troops are quickly airborne and are vectored toward the lumbering airmobile assault formation. Using their advanced night vision and target acquisition devices, the LHX aircraft knife through the unsuspecting Threat attack helicopter escort and proceed to cut the main formation to ribbons. Lacking the night-fighting capability, the surviving Threat helicopters scatter, and the Threat operation collapses.

Scenario Four. In an operation designed to stem a multi-echeloned Threat general offensive, a US corps commander initiates a counterattack to engage the enemy in depth and destroy his follow-on elements. As a part of this deep attack, the LHX Pursuit Squadron is employed in a sweep beyond the forward line of troops preceeding the ground force's main attack. In this operation, the LHX SCAT helicopter exhibits its dual capability by engaging targets of opportunity as they appear and also by keying on enemy aircraft (both fixed and rotary-wing), helicopter staging areas, small forward airfields, and artillery positions. In doing so, the LHX's help eliminate the Threat's most responsive and destructive conventional assets and break down his scheme of maneuver.

The Right Tool for the Job

"With the advent of flying machines which are capable of operating within the protective embrace of the terrain, while at the same time demonstrating the high mobility and striking power of an aerial force, no longer is there a clear distinction between the ground and air battle."[4] The ground force commander in the Airland Battle must constantly plan for the combat that will occur in the airspace immediately above his maneuver elements. As stated in FM 100-5, local air superiority during corps, division, or brigade-sized operations will be highly desirable but, given the fleeting nature of helicopter air-to-ground engagements and the helicopter's capability to operate during periods of reduced visibility, Air Force assets cannot adequately provide the protective umbrella that the maneuver commander requires. Frequently, ground air defense systems will be unable to acquire tree-top level helicopters due to the effects of smoke, jamming, and terrain masking. Indeed, only a *pursuit* helicopter, a small, fast, extremely agile and well-armed helicopter, can effectively deal with other armed helicopters in a nap-of-the-earth environment. Given the proper weapon, which the LHX SCAT will provide, and the proper training and organization, the Airland Battle can be fought and won against one of the most elusive and destructive of adversaries—the Threat attack helicopter.

Footnotes

[1] Brittingham, Michael L., "Attack Helicopter Employment Options," p. 1, U.S. Army Command and General Staff College, Fort Leaavenworth, Kansas, 1980.
[2] Feaster, Dr. Lewis, "LHX-Light Helicopter of the Future," p. 10, *United States Army Aviation Digest,* Volume XXVIII No. 1, May 1981.
[3] Artis, Donald R. Jr., "LHX-Keeping Pace with Technology," *United States Army Aviation Digest,* Volume XXVIII, No. 12, December 1981.
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Attacking the Attacker

by First Lieutenant Ralph Peters

The regiment is the most coherently developed tactical formation employed by armies organized and trained in the Soviet manner. Just as the battalion task force (BTF) is the key to Soviet understanding of U.S. battlefield integrity, our frontline how-to-fight decisions must be based on a knowledgeable critique of the enemy regiment. The regiment is the Soviet's basic battlefield package; it is the level at which the Soviet commander first enjoys the flexibility and independence of the U.S. battalion commander, and it is the level where his combined arms are in the most fruitful and responsive balance. At the same time, the regiment is the level at which the Soviet force is most predictable and therefore, the level at which its tactical chain of command and control can most effectively be broken.

Although many authorities differ as to the degree, it is generally accepted that the Soviet army is tactically less flexible than our own, slower in comprehensive battlefield reaction to unexpected developments, and with a decidely more rigid system of command, control and communication. Without further thought, this iron clad structuralism is routinely cited as a weakness because the North American temperament perceives only its awkward and brittle aspects. Yet the Soviets view this rigidity not only as a necessity but also as a source of strength. Despite the sophisticated technical development of all Soviet military forces since the raw days of WW II, the Soviets still see ground forces as more of a bludgeon than a rapier. The primary difference is that they now possess a high-technology bludgeon—but it remains a bludgeon. And flexibility is not a desirable quality in a club. There is nothing wrong with rote-learned battle drills so long as they prove appropriate to the situation, as when a quick, clear response is necessary to retain or wrest the initiative at the lowest levels. Battle drills reduce or even eliminate decision time and economize tremendously on the extent of troop-leading procedures junior leaders need to employ.

Our task is to strike the mind behind the bludgeon, to aggressively create situations where ingrained battle drills prove ineffective, and to force enemy commanders at all levels to reorient their efforts away from the goals their superiors have assigned. It is my argument that all this can be accomplished best by making maximum, rather than the present minimum/median (read: defensive), use of the capabilities of our new and superior battlefield systems by swiftly and relentlessly attacking the attacker to the depths of his *regimental* deployments, while operational and joint assets fight the deep battle just over the horizon.

Our current tactical doctrine for Europe, despite the advent of the August 1982 version of FM 100-5, *Operations,* involves a passive defense against the enemy's firstline regiments. This amounts to waiting for the bludgeon to descend. Only

when the enemy's first tactical echelon has broken against—or over—the wall of our main battle area (MBA) positions do we begin to contemplate counterattack. Although they are couched in aggressive language in the manual, our initial tactics are essentially passive and we largely surrender the maneuver initiative to our opponent, relying on firepower above all else to default him. Bluntly, we expect to disrupt the enemy's plan by successfully engaging his critical combat power. But our own published doctrine insists that there is a better way to give battle. The outnumbered force that behaves aggressively and violently, insisting on its right to the initiative in both fire *and* maneuver, stands a greater chance of winning than does the outnumbered force that allows its opponent to engage it in a bloody frontal battle of attrition. Although preservation of the force is certainly a desirable goal, the outnumbered commander who is unwilling to risk any of his force is likely to lose all of it. Rather than planning to combat the enemy's direct-fire systems in a head-on ambush, we should attend to these proven how-to-fight axioms:

- Disrupt the enemy's plan.
- Destroy, or further disrupt, his ability to make and execute a new plan in a timely manner.
- *Then* strike his critical combat power while he is disordered or, at the very least, attempting to redirect his strength.

At the tactical level, this can most effectively be accomplished by thinking of our enemy in a regimental format and combatting him, initially, with regimental destruction in mind. The authors of FM 100-5, who are fond of quoting Clausewitz, remind us that a sound defense should resemble a "shield of blows." To affect this on the modern battlefield will require the daring to strike out beyond the limits of our conventionally-defined covering force area (CFA). In certain European deployments, this will have artificial (political) limits, until we openly recognize and act upon the fact that in wartime an opponent's national boundaries become inoperative as a local limit of advance. But just a few kilometers back from the death fences, and in various other theaters such as the Middle East, an extended "shield of blows" could become immediately applicable for planning purposes. The purpose of striking out beyond the CFA is to engage the enemy while he is not yet fully prepared to give battle.

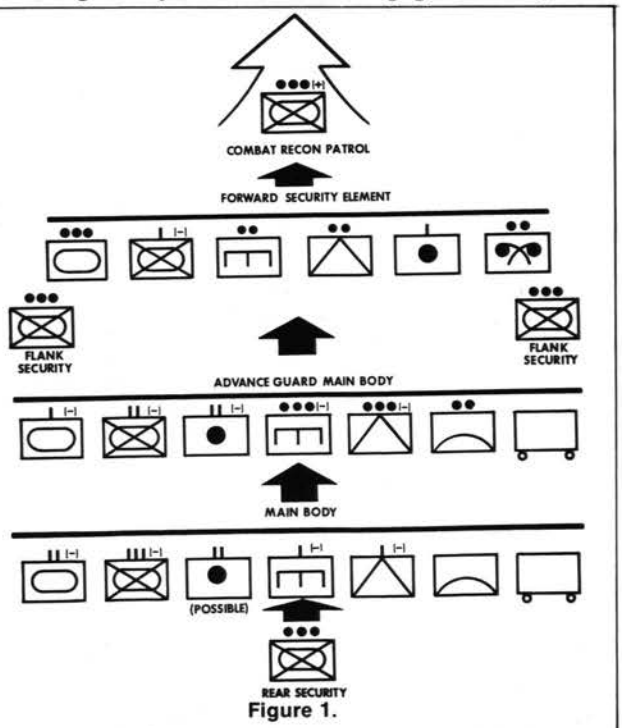


Figure 1.

Any military element is more vulnerable while on the march than after it has deployed for combat. The predictability of the Soviet march order and the internal density of formations (normally 25 to 50 meters, or less, between vehicles, for ease of comand and control) makes their approaching regiments particularly vulnerable to the opponent who possesses highly mobile forces and just a few scraps of solid initial intelligence.

Figure 1 illustrates the prescribed order of march for a Soviet-style motorized rifle regiment. Both "task organization" and distances between elements will, of course, vary according to mission and terrain but this basic structure is the Soviet's "school solution"—the ideal he will seek to achieve. Each of the building blocks of this formation has a specific and considered function. When the Soviet commander is allowed to maintain the initiative, this movement technique works extremely well for him. The missions of each march element follow:

The Combat Reconnaissance Patrol (CRP) is dispatched from the forward security element, which follows behind at a distance of up to 10 kilometers. The CRP is differentiated from other reconnaissance elements in that it will attempt to fight its way through enemy formations of comparable firepower, rather than relying purely on evasive action. Basically a motorized rifle platoon augmented with NBC and engineer reconnaissance personnel, the CRP is the needle-sharp tip of the regimental spike.

The Forward Security Element (FSE), dispatched in its turn from the advance guard, is a true combined arms formation that bristles with artillery. Any U.S. element engaged by the CRP can expect to see this FSE appear over the horizon in approximately one-half hour. At that time, the Soviet-style formation in contact will consist of the firepower of a motorized rifle company, a platoon of tanks, a mortar battery, and a battery of 122-mm howitzers. The FSE will attempt to complete the job of locating and pinning down U.S. forces, thereby developing a favorable situation for the commitment of the next element.

The Advance Guard Main Body (AGMB), considered with the detachments above, makes up a solid one-third of the regimental force. The advance guard commander controls a motorized rifle battalion, a tank company, an artillery *battalion,* an antitank platoon, an engineer platoon, an antiaircraft section, a signal platoon, and light support assets. With this force, he is expected to neutralize his opposition through fire and maneuver, allowing the regiment to get on with its advance, or, should the opposition prove too potent, to fix the enemy firmly in place to await a flanking maneuver, envelopment, or bypass by the regiment's main body. The AGMB, in a classic deployment, would move between 5 and 10 kilometers behind the FSE and 20 to 30 kilometers ahead of the main body itself.

The Main Body (MB) can have an additional battalion or more of artillery attached, to supplement the firepower of the two remaining regimental motorized rifle battalions and the regimental tank battalion, minus the company deployed forward with the advance guard. The regimental commander, with his headquarters section, usually travels at the head of this march column. The 20-to 30-kilometer distance he must cover to the battlefield where his advance guard is engaged equates to 90 to 150 minutes of planning time. Monitoring the contact reports from his advance guard and working over his maps, he designs his attack.

This is his tactical "window of vulnerability." As part of a main attack effort, the Soviet-style regiment travels along a single march route for the purpose of maintaining force control. It is critical to the regimental commander that momentum of subunits be fairly uniform. If U.S. forces can strike him

along his route of march, before he deploys into even prebattle formation, our chances of halting, disrupting, and then destroying him are far greater than they will be after we have allowed him to bring his deployed formations against us in the manner of his choosing. We must *attack the attacker,* making full and early use of all tactical intelligence assets available to identify the regiment's complete march route and approximate march tables, then locate critical choke points where a carefully-tailored *shallow-attack* force can strike most effectively.

"The initial use of our new array of combat vehicles in a purely defensive role would rob us of their greatest potential to create havoc in the midst of a less-responsive, less-well-equipped enemy force."

The prime requirements for this U.S. shallow-attack force will be:

- Timely warning and operation orders that get the force out front without waiting for all of the mail to come in.
- Tailoring for maximum speed and firepower.
- Aggressive leadership that is willing to take intelligent risks. Dependent upon local mission and assets, a force of between company team or battalion/task force-size is envisioned. Allocation of attack helicopters and aeroscouts will tremendously increase both the impact and survivability of the force, although the paramount importance of air-ground coordination will require greater coordination efforts in this sphere than units are in the habit of making in peacetime.

Clearly, such a force could not suddenly be conjured up after we come into heavy contact with the enemy, amidst the wildfire of calls for fire support and reinforcement. In this case, timely orders mean that a commander has already been informed that his unit will not be initially committed to the forward edge of the defense, but will be detailed as the local shallow-attack force. Whenever possible, this should be done before the local battle commences, before we have lost the psychological as well as the physical initiative. This would give the shallow-attack force commander the maximum time to carry out his vital—and time-consuming—troop-leading procedures. It would enable the timely linkup of attachments critical to the mission, and would abet the coordination of the aviation effort with the ground scheme of maneuver.

In support of such daring tactics, our attitude toward intelligence collection cannot be a passive one of waiting for the situation to achieve clear outline, and then color itself in. Rather, as part of the tactical plan, local intelligence assests capable of real-time or near-real-time collection and reporting must be tasked to actively seek and swiftly report the specific and so often perishable information required by the tactical commander. To this end, intelligence personnel must be better trained to understand the whys and wherefores of the battlefield. The routine lists of dryly-phrased essential elements of information and electronic parameters must be transformed into flesh-and-blood reality that awakens the operator's and analyst's initiative and helps them to aggressively target critical nodes and formations, rather than indiscriminately scanning the electro-magnetic spectrum. It is the simple and critical difference between looking *for* something and merely *looking;* one more instance of the ever-present active-passive dualism in war.

The intelligence specialist too often becomes so enmeshed in his own small web of expertise that he fails to grasp the general military knowledge needed to wisely guide his own efforts. Neither does he like being directed by outsiders. If there is one critical failing common to intelligence personnel, it is ignorance of the friendly force. In a related area, this narrowness results in hysterical Threat estimates that serve no commander well, and in Threat briefings that frighten our troops.

The second requirement for the shallow-attack force designated to attack the attacker is tailoring for speed and firepower. As stated above, this force would ideally include aeroscouts and attack helicopters, with their extraordinary abilities to provide real-time combat information, demoralizing firepower, and active security. If the warning time is short, the shallow-attack force could consist of aircraft alone, although such a force would lack the hard-hitting staying power of a ground maneuver force. Further, the suitability of our present attack helicopter tactics for such a role is questionable. Although we rehearse the use of all troops as emergency reaction forces to stymie tank-led breakthroughs, we are reluctant to mass attack helicopters, preferring a lower-risk piecemeal employment of these very expensive assets. Is it possible that we fail to recognize the full potential of these magnificent killing machines? Are we making the same mistake the British and French did between the world wars, parceling out their armor assets while Guderian recognized the vital principle of mass? Is the correct response to the Soviet tactical air defense threat to hide from it, or to overwhelm and destroy it? Certainly, there are many problems beyond price tags with the employment of massed attack helicopters. The Division 86 concept seems to be a tremendous step in the right direction. But even before its realization, and with slight modifications to current aviation tactics, attack helicopters would play a vital role in the shallow-attack force in locating and stripping away enemy platoons engaged in screening the regimental flank (figure 2). They would add another dimension to the attack on the enemy march column by adding to the enemy's confusion, and would provide a security screen for our own forces when they elect to break off the engagement. Key to our success would be intensified training of attack helicopter formations in support of battalion task force *maneuver.*

The ground force must consist mostly of main battle tanks, with bare-bones mechanized infantry, air defense, and engineer support. Although the exact numbers and propor-

Figure 2.

tions would be subject to the mission, enemy, terrain, troops-time (METT-T) factors, the basic rule would be "maximum firepower from the minimum number of vehicles." As the *M1, M2* and *M3* become more available, together with likely improvements in tactical air defense, such as the fielding of the DIVAD gun, the employment of shallow-attack forces will become easier and more desirable. Tactical concepts such as this best suit the incomparable speed and maneuverability of the *M1* and its peer combat vehicles. The initial use of our new array of combat vehicles in a purely defensive role would rob us of their greatest potential to create havoc in the midst of a less-responsive, less-well-equipped enemy force. The tank was not designed as a defensive weapon. It is only employed to full advantage in the attack. The *M1,* representing the fullest realization to date of the potentials of tank design, is conspicuously under-used by our current tactics—one more symptom that our ability to create weapons has greatly exceeded our talent for efficiently employing them.

Consider the marriage of the *M1* with the concept of the lightning shallow-attack beyond the CFA. All of the *M1's* superior features—great speed, state-of-the-art target acquisition systems, and enhanced main gun stabilization—could be brought fully into play in a lightning strike against an enemy still in his dense, mule-train march column. Supported by attack helicopters, the relentlessly maneuvering force, with *well-controlled M1s* as its backbone, would require and agile-minded and heavily-armed opponent to react quickly and effectively enouth to deflect—let alone defeat—it.

"The potential for creating a massive and deadly traffic jam at the front of the enemy formation is high, as successful ambushes in Afghanistan have shown."

One internal enemy we would have to combat is our tendency to fatten every force with support that finally becomes a burden—a burden that not only slows down the combat force, but adds to its vulnerability. For a mission of limited objective and duration, combat vehicles must depend upon their basic loads of ammunition and fuel. Recovery operations are certainly not to be attempted forward of the CFA, and resupply vehicles will not ride to the rescue. A rule of thumb could be: "If it can't shoot, it stays home with the trains."

Now, with the enemy's march route identified and our shallow-attack force enroute under a daring, inventive commander, we must decide where it is most advantageous to strike. Where we are able to strike the enemy's regimental column will depend on the terrain, the location of other enemy forces, intelligence gaps, the size of the friendly force to be committed, locally-imposed limits of advance, and many other battlefield variables. Given a choice, the greatest potential for disrupting the enemy's plan and inflicting a maximum or critical casualties upon him would be gained by striking the *forward flank of the main body.* At a glance, this also entails maximum risk in terms of combat power immediately available to the enemy and in our distance from friendly lines. But closer analysis indicates that a combination of swift, hard-hitting tactics and effective use of terrain could allow a force far smaller in size to inflict serious damage on a Soviet-style regiment (figure 2).

First, the regimental commander and his principal assistants customarily travel at the front of the main body. Second, if surprised on the march in terrain where off-road maneuver is restricted, the enemy will only be able to bring a small part of his unwieldly main body into battle-drill formation. The number of his direct-fire systems present will not prove so important as the number he can effectively bring to bear. The potential for creating a massive and deadly traffic jam at the front of the enemy formation is high, as successful ambushes in Afghanistan have shown. Thus, a fundamental requirement for the U.S. force is domination of the local terrain that best supports swift, open maneuver for the duration of the engagement. Maneuvers such as a sophisticated form of the old naval "crossing the T" could prove devastating, and, once he is forced into a halting, bloodied deployment, the enemy has not only lost much of the forward impetus that's central to his plan, he also becomes extremely vulnerable to air and indirect fire attack. Meanwhile, the enemy commander, if he has survived, must decide whether to halt his advanced guard's forward movement for an attack to the rear or to continue, as far as possible, with the programmed mission. Sub-elements would probably go static—especially in non-Soviet armies—or at least suffer a temporary disorientation of effort.

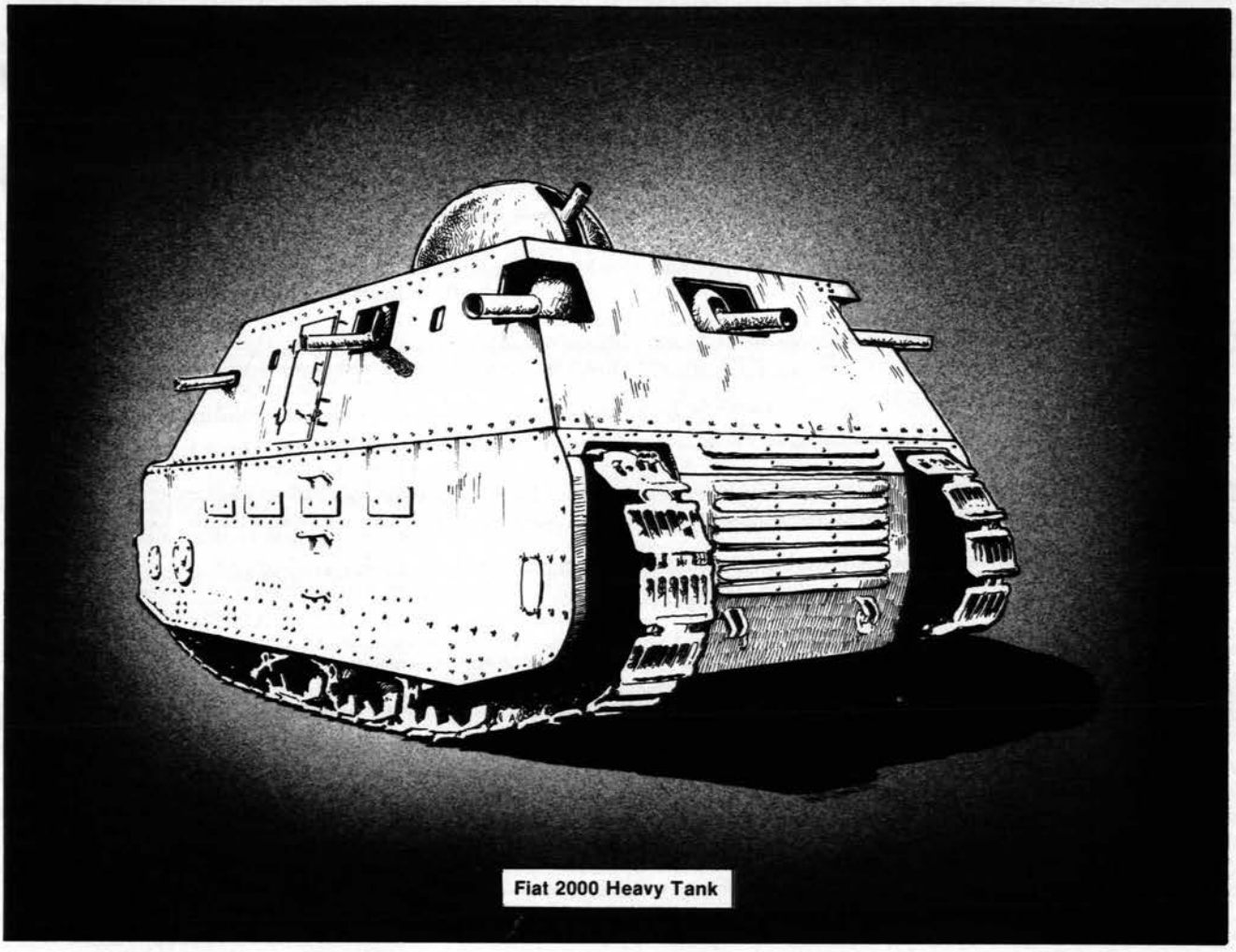
Dependent upon the degree of success of the operation, the decision could be made to maintain and reinforce our effort. We could exploit success by sending additional elements forward to intercept and destroy the advance guard while it is attempting to react to the changed situation; we could reverse the shallow-attack force and stalk isolated elements during its return to friendly lines, or just return our force to friendly lines by the safest route possible.

Should the last course of action prove most desirable, attack helicopter support would be invaluable both in the interdiction of enemy pursuit or blocking attempts, and in providing an overhead guide to the battlefield.

At best, you have begun the destruction of the enemy regiment and thrown its stricken elements into confusion. As a minimum, you have slowed him and forced him to reconsider his efforts. A strike against the regimental main body, as described above, is only one of many possible options in employing shallow-attack forces. The effects of strikes against elements of the advance guard would range from forcing premature deployment to destroying a significant percentage of the enemy force. Certainly, our intelligence picture will refine as the enemy is forced to respond and reveal his intentions, allowing us to mount further, increasingly effective, attacks.

Finally, these proposals are most valuable as stimuli. Actual battlefield events, influenced by the myriad of details that coalesce to determine the efficiency of the fighting force, are not so forthright. What is vital here is the spurring on of our evolution of fresh tactical concepts. The sooner our dust covers the last traces of the barely-disguised passivity of the 1970's "active defense" doctrine, the better. Whether our overall mission is to attack or defend, our manner of giving battle must be characterized by the earliest possible seizure of the initiative, by the exploitation of attack dynamics, and by the swift imposition of our own will upon that of our enemies.

FIRST LIEUTENANT RALPH PETERS' initial contact with the Army was in 1975 as a volunteer English language teacher for Vietnamese and Cambodian refugees. Shortly after he enlisted and later was a distinguished graduate of the 7th Army NCO Academy and a winner of the MacArthur Award and the Patton Award for leadership. He is a professional level German linguist and has served with the 8th ID (M), and 1st Bn, 46th Inf, 2nd Bde, 1st AD. He is the author of *Bravo Romeo.*



Fiat 2000 Heavy Tank

Italian Armor, Past, Present and Future

by Lieutenant Colonel Pasqualino Verdecchia

The Italian Army's first tanks were tested in 1917 and were organized in separate assault tank batteries under the concept that armor units were mobile assault artillery. During WW I, the Italians used Lancia armored cars and, after British successes with true tanks (armored, track-laying vehicles), initiated a tank production program. However, due to technical difficulties, no Italian tanks were completed until 1919. The *Fiat 2000,* which was not completed in time for war service, was a 44-ton tank armed with six machineguns and a 65-mm main gun. It was crewed by 10 men.

From 1919 to 1927, only one company-sized tank organization existed. On 1 October 1927, Italian armor was organized as a separate branch of the ground forces. In 1926, an independent five-battalion tank regiment was formed.

During 1936 and 1937, the Italians merged their armor units with the infantry branch, although the tanks were not an organic part of the infantry divisions. They remained as separate support battalions and gained their first combat experience during the Italian-Ethiopian War of 1936 to 1939.

When Italy entered WW II, her armored divisions were equipped with the *MM11/39* and *M13/40* tanks. The former was a light tank weighing 11 tons and armed with one 37-mm main gun and two 8-mm machineguns. The latter was a medium tank weighing 13.5 tons and armed with a 47-mm main gun and four 8-mm machineguns. Both vehicles had 30-mm frontal armor. Three Italian armored divisions were sent to North Africa in 1941 where, along with Italian infantry divisions, they became part of the North Africa Command which included the Italian armored divisions along with the German *Afrika Korps.* They served with distinction until they were forced to withdraw due to maintenance and resupply problems caused by allied air attacks from Crete against the Mediterranean convoys.

Post World War II.

At the end of the war all Italian armored divisions were disbanded and tanks were once again assigned an infantry support role. However, the red and blue colors that had distinguished the armor units were still used to trim the collar badges worn by Italian tankers.

The Italian word for armor is *corazzati.* It comes from the Latin word *corium,* which means a leather hide and, more precisely from *corrazza* or *armaturs.* The word "armor" derives from the latter word, which was the name for the leather protection worn by the Roman legionnaires in combat.

The 1950's saw the reconstitution of the Italian Army's new tank regiments. These regiments were initially separate organizations, but were later organized as the *Ariete, Centauro,* and *Pozzuolo del Friuli* armored divisions and were equipped with U.S. *M24, M36,* and *M47*

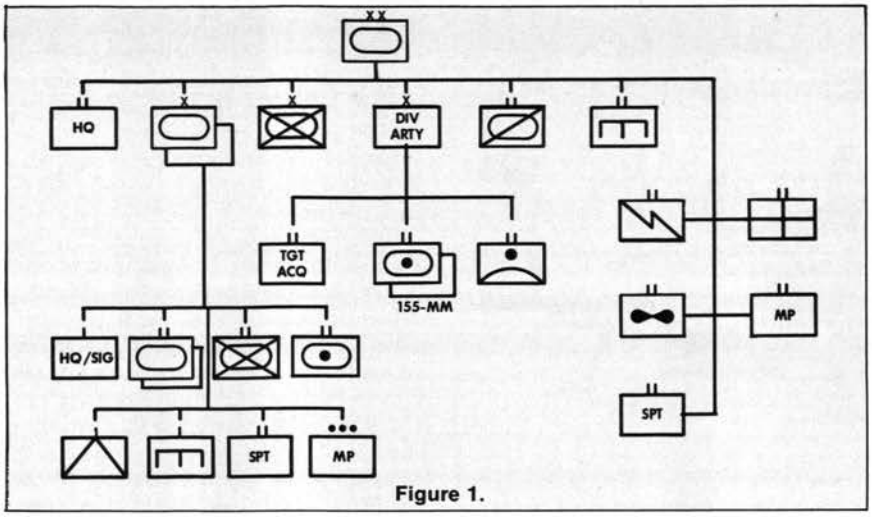


Figure 1.

tanks. The renewed interest in tanks was based upon the following perceptions:

- A doctrine that foresaw a massive employment of nuclear weapons whose effects could be exploited only by units with armor protection.
- Initial successes of Israeli armor in the Middle East.
- The Soviet Union's emphasis on the tank as the backbone of its army.

In the 1960's, Italian armor made only a few organizational changes and acquired the *M60A1* tank, followed by acquisition of the German *Leopard I* in the 1970's.

In 1976, one of the most significant changes in the Italian armored force occurred when the tank regimental organization disappeared and the armored brigade was created. The battle flags and the glorious traditions of the tank regiments, however, were handed down to the battalions, which perpetuate the lineage of the most significant armor units. Each of these 18 tank battalions borne of the reorganization bear the name of a tanker who had died in combat and had earned the Gold Medal, the highest Italian military award for valor.

Italian Armored Units Today

The armored division is the largest armor formation in the Italian Army (figure 1). It is comprised of two armored brigades, a mechanized brigade, and combat and combat service support units. The mechanized division is similar except for the makeup of its brigades—two mechanized and one armored. The Italian brigade is a complete, autonomous, formation that is self-sufficient in fire and logistical support.

Armor branch is still part of the infantry. And, while this situation is not preferred by armor proponents, it does result in closer cooperation between the armor and mechanized units whose missions demand combined arms operations. It should be noted here that the armored brigade in the *mechanized* division is manned entirely by cavalrymen, as are the reconnaisance squadrons of both types of divisions.

Cavalry is one of the oldest branches in the Italian Army, dating back to 1503. During that year, units of Italian and French cavalry fought each other as representatives of their respective armies because the opposing army commanders challenged one another to accept victory or defeat based solely on a battle between their cavalry forces. This historical event is known as "The Challenge of Barletta." Since then, there has never been a battle in which the Italian cavalry has failed to distinguish itself with courage and resolution. These traits were to reach a peak in Russia during WW II when the Savoia Cavalry Regiment at Isbushenskij and the Novara Cavalry Regiment at Jagodnij charged Soviet tank units on horseback. This heroic deed astonished the world, but it marked the beginning of the end for the cavalry of all armies. When the horse-mounted era ended, modernization and mechanization began. But it did not end the traditional *esprit de corps* and *elan* of cavalry.

Percentage of tanks visible at various ranges in the Italian Combat Zone.

Warning Distances(m)	Tanks Visible (Percent)	
0-700	25	
700-1,000	16	81
1,000-2,000	40	
2,000-3,000	14	
		19
over 3,000	5	

(Figure 3.)

The armored brigade, whether manned by cavalrymen or tankers, is composed of two tank battalions, one mechanized battalion, one artillery battalion, and supporting units. There are three tank companies in each tank battalion and each company has three five-tank platoons for a total of 98 tanks (including 8 command tanks) in the brigade. A headquarters company provides the entire logistical support to the tank battalion.

Based upon ongoing US studies of

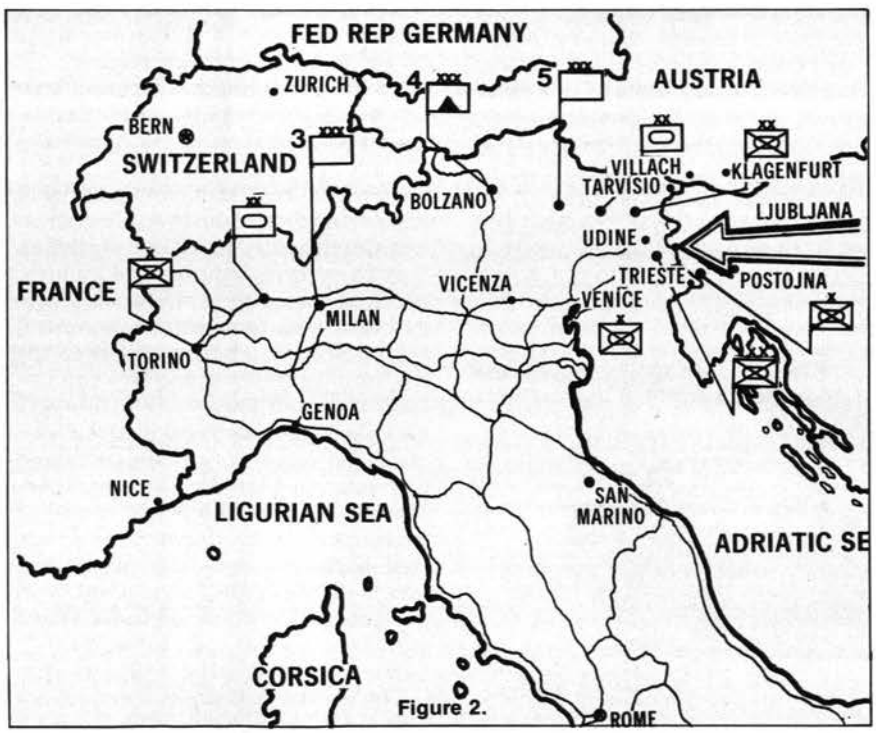


Figure 2.

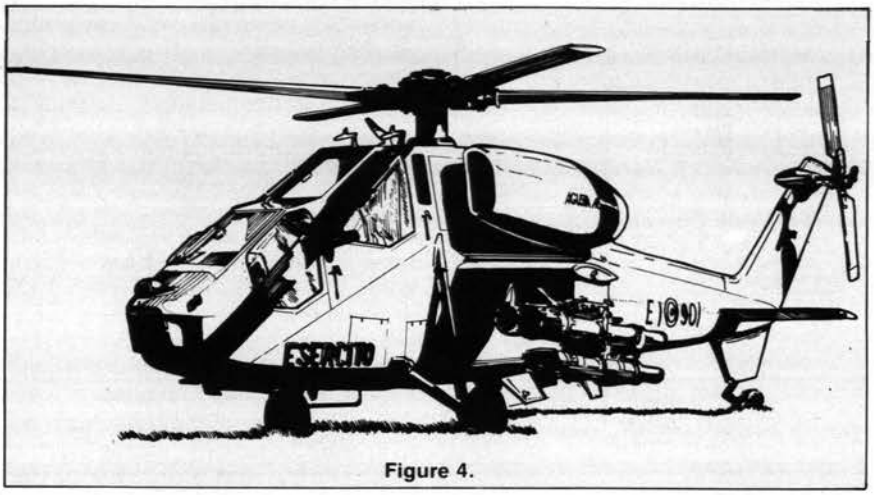


Figure 4.

the Division 86 concept, which has reduced the number of tanks per platoon from five to four, the Italians are undertaking studies to determine the optimum size of their tank platoon. The reduction in the leader-to-led ratio at platoon level should simplify command and control as well as enhance training.

In the latter regard, I must point out that the Italian tanker is a 12-month draftee who spends the first 2 months in basic training and the final 10 months with an operational unit. This 12-month period has built-in limitations on tank crew training.

The draftees spend the first 2 months of their service in the Armor School where they learn how to be soldiers and tankers before going to their battalions. During their 10 months in the battalion they are trained to fight as part of a tank platoon and a combined arms team. This training is continuous and includes bi-monthly live-fire exercises.

Italian Area of Operations

Italy has been a member of NATO since 1949. In this role, its armed forces are ready to face any threat that should occur in the southern sector of the European Theatre.

The geographic position of the Italian peninsula, in the middle of the Mediterranean region, between the German plain and the Middle East, makes Italy strategically important and sensitive to every type of land or sea threat.

Fortunately, the nature of the seas washing the Italian coasts do not permit large scale amphibious operations. Neither does the terrain, with its mountainous configuration throughout the middle of the peninsula, facilitate military operations from south to north and *vice versa*.

These difficulties became obvious during the Italian Campaign of 1943-44 when the Allies experienced problems in dislodging the Germans from defensive positions that exploited these natural features. After the Salerno landings, for example, General Montgomery's 8th Army advancing northward along the east coast and General Clark's 5th Army on the west coast were forced to conduct almost separate operations due to the intervening mountainous terrain. On the other hand, the German defensive lines ran continuously from east to west and overlooked the city of Cassino, from which they could block the attacking forces by controlling the valleys below.

Today, the most likely threat faced by the Italian Army seems to be a land operation led by Soviet armored units attacking the northeastern border, and subsequently spreading out into the Venetian plain to reach the industrialized northwest.

Based on these considerations, it is obvious that most Italian units would be deployed close to the eastern border, determined to fight as far forward as possible where the mountainous terrain offers the defense the most advantage in blocking an invasion (figure 2). The defensive mission in this forward edge of the main battle area would be accomplished by mechanized forces reinforced by tanks. In this instance, employment of tanks in a defensive role is very effective and not as tactically uneconomical as some might think. This is true, not only because, as Liddell-Hart wrote, "A tank that shoots from a hill needs only to back a couple of meters to become invulnerable to direct-fire enemy weapons," but also because its armor makes it less sensitive to artillery fire and nuclear, biological, or chemical threats. Additionally, the tank's mobility allows it to fire repeatedly from alternate hull-down positions and quickly move laterally to face enemy attacks from several directions. Its firepower also enables the tank to make forward thrusts when the tactical situation is favorable. Therefore, the greatest defensive effort would be made in the first defensive line to prevent the enemy from making a breakthrough in order to achieve greater mobility for his armor units on the flat terrain of the plains.

On the other hand, the plains area offers a greater challenge for the defender who must make maximum use of built-up areas, vegetation, and the network of irrigation canals to delay advancing forces and then block them by exploiting strong natural obstacles.

Such terrain requires the employment of company-size teams due to mobility and command and control limitations. The characteristics of this environment favor aggressive ambush tactics along the main axis of advance to exploit the chessboard-like locations of the built-in areas and the cover and concealment offered by the vegetation. These teams are comprised of one or two tank platoons, one or two mechanized platoons, and fire support elements of heavy mortar and antitank weapons, all of which are trained from their inception to operate jointly.

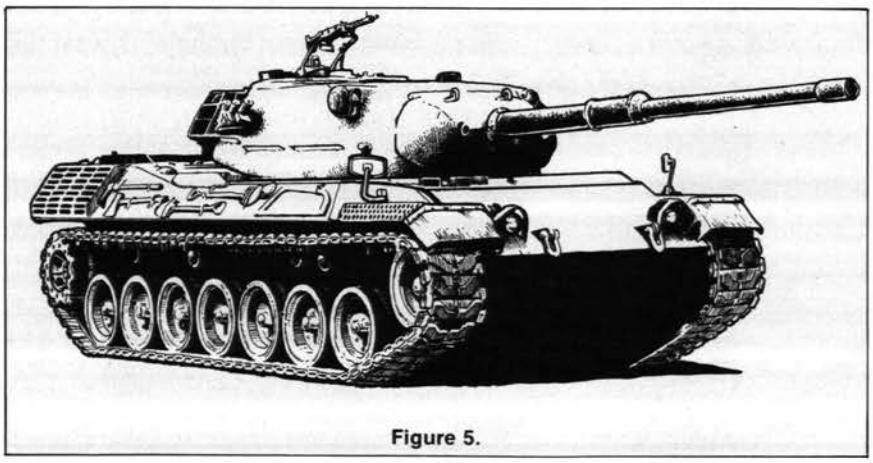


Figure 5.

Tanks and Antitank Systems

The presence of many natural and manmade obstacles and the resulting

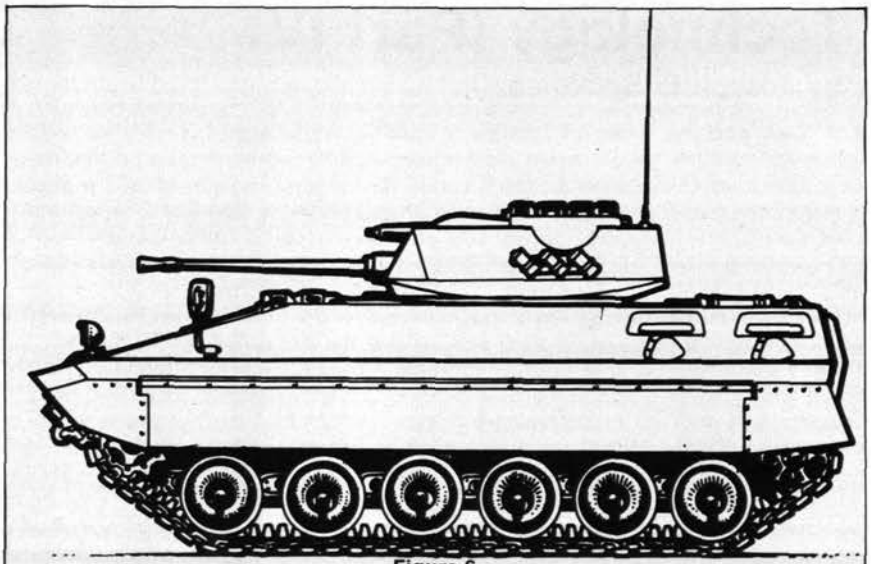


Figure 6.

limitations to observation and fields of fire do not justify the employment of tanks with large caliber guns that are able to engage targets at 3,000 meters and beyond. This is borne out by an Italian Geographic Institute study (table 1) that shows that in the combat zone only 19 percent of enemy tanks can be seen beyond 2,000 meters. At these distances and farther, attack helicopters are used to seek out and destroy enemy armor.

Italian Army Aviation is primarily oriented to support antitank operations. The Italian aviation industry is very active and up-to-date in helicopter developments. In addition to the in-service *A-109 Hirundo* which is armed with the TOW missile, Agusta is building the *A-129 Mongoose*—the first Italian (and European) attack helicopter (figure 4). This twin-engine, turbine-powered helicopter, when fielded in 1985, will provide armor units with greater antitank capabilities in all-weather conditions, day and night.

Great importance is also given to antitank weapons, such as the long-range TOW, the French-German *Milan* for middle range, and the Italian short-range *Folgore*.

The main antitank role is, however, played by the tank. It is the only antitank system that fires kinetic energy projectiles that can penetrate vegetation and brush and hit targets without premature explosions—as often happens with antitank guided missle systems.

The above mentioned study indicates that 81 percent of enemy tanks will appear at less than 2,000 meters. At these ranges, the *M60A1* and *Leopard I* (figure 5) 105-mm guns, both licensed to be built in Italy, provide the required performance due to improvement in their fire control systems and also in their night fighting capabilities, both of which are enhanced by Italian-built on-board systems.

In the field of armored personnel carriers, the infantry has replaced its US-made *M113s* with an Italian made carrier, the *VCC-1* (figure 6) that allows fighting from onboard, and a new fighting vehicle that is in the advanced conceptual stage.

While armor experts are studying the tank for the nineties, the Italian firm of Oto Melara, in collaboration with Fiat, is producing the *OF-40 Lion* (figure 7) tank. It is the first Italian main battle tank to be produced since WW II and is technologically between the *Leopard I* and the *Leopard 2*. The tank is being built as a "private venture." A decision has not been made as to whether or not Italian armor units are to be equipped with it, because it is too early to assess the technological impact of future tank requirements *vis-a-vis* the Threat and possible NATO responses thereto.

Assuming that the current political and strategic situation remains stable for the forseeable future, and given the tactical and technical considerations previously discussed, I feel that Italian armor should select a tank that has speed and agility and a high rate of fire; that weighs 40-45 tons, has an automatic loader, and that is extremely lethal at the mid-ranges. Therefore, Italian industry could play an important role in its development because of its experience and relative success in armor research.

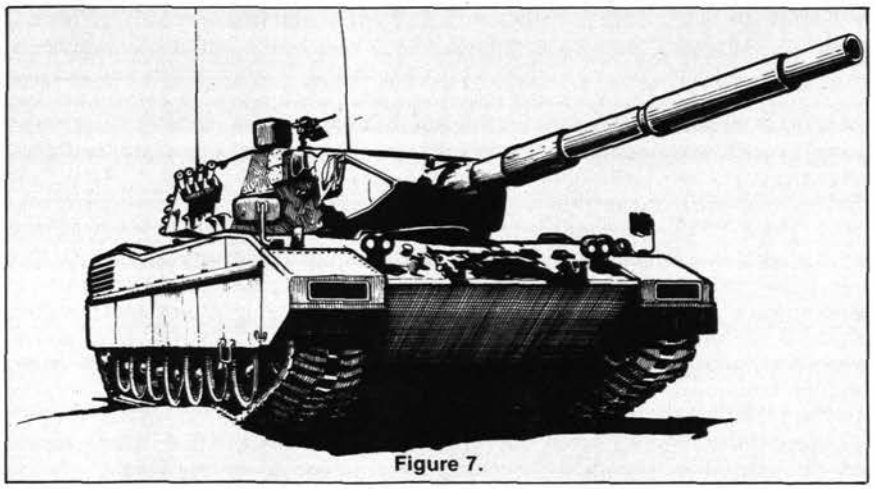


Figure 7.

LIEUTENANT COLONEL PASQUALINO VERDECCHIA entered the Italian Military Academy in 1960 and was commissioned in armor in 1964. Prior to attending flight school in 1969 he served as scout platoon and tank platoon leader. He also served as tank company commander and aeroscout company commander and as a flight instructor.

He is a graduate of the Italian Command and General Staff College and the Italian War School. He served as a brigade G3 prior to coming to Fort Knox, Kentucky, where he currently is the Italian Liaison Officer at the USAARMC.

Armor Technology (Part IV)

by Joseph E. Backofen, Jr.

This is the eleventh in a series of articles on tanks and the technologies of armor penetration, armor, and survivability.

When armor protection requirements lead to bulky arrays having high weights and volumes that reduce the crew space inside the vehicle and/or unfavorably impact upon the volumetric/weight restrictions for strategic transportability, then battlefield mobility and agility (hit avoidance) are usually suggested as alternatives or supplements to armor.[1-5] To an extent, this shifts the dead bulk and weight of armor into consumables such as fuel which add greatly to the logistic burden.[6] Recently this has occurred with main battle tanks (MBT) and with light armored vehicles (LAV) mounting antitank weapons, designed for use by rapid deployment forces. Thus, on one hand, it has been somewhat responsible for the high power-to-weight ratio designs of the *Leopard II* and *M1 Abrams,* which are expected to increase the effectiveness of their heavy armor arrays by bounding about from one defilade position to another.[7] One the other hand, it has also led to the development of high mobility test rigs, such as HIMAG and HSTVL, and lightweight antiarmor weapons platforms, such as the Mobile Protected Gun System.[1, 3, 8]

The original concepts of using agility and speed in order to outrun an enemy tank's fire control system or a missile's guidance system, as well as to take advantage of horizontal terrain masking of enemy fire, generally were and still are worthy in themselves.[1, 9] However, they are somewhat shortsighted in that they neglect basic engineering facts, which implies that it is easier to overcome smaller systems, such as hydraulic motors for turret traverse, and guided missile fins or thrusters, than larger systems such as the tank itself.[10] Furthermore, they also neglect the third dimension of engagement (vertical) represented by mines, bomblets, and aircraft-delivered ordnance.[11, 12]

Spaced Armor Applications

Has this happened before? Is this blindly happening in the field of land-based armored vehicles? Unfortunately, the answers to both these questions appear to be—Yes. For example, in naval warfare, the torpedo boat was developed as "the warship of the future, which would render armored vessels superfluous."[13] This feeling was based upon the enormous offensive power of the torpedo which, however, needed to be delivered at close range requiring, in turn, that the attack be carried out by surprise and/or in relative safety (but at high risk to individual ships) by small-sized, unarmored, or very lightly-armored, high-speed ships in such great numbers that they could not all be effectively engaged. These small ships were meant to survive by means of their agility.

The first solution to the torpedo boat threat was the torpedo boat destroyer (commonly called a "destroyer") which was larger than the torpedo boat, somewhat better armored, and could travel at about the same speed so that it could either ram the smaller boats or engage them with guns.[13] The destroyers also carried torpedoes themselves and could engage the large armored ships using the torpedo boat tactics. (Many of both types of ships were lost to mines.)

The second solution was the development and deployment of rapid-firing guns (or quick-firing guns) from which modern tank cannons are derived.[13-20] These secondary armament guns were placed on mechanized mounts enabling the larger vessels to successfully engage the small, high-speed threat by means of well-placed, high-volume firepower.[13-16] Later, when aircraft became a smaller, higher-speed, highly-maneuverable threat, delivering aerial torpedoes, bombs, or even themselves in the form of Kamikazes, or radio-guided precision weapons, the rapid-firing guns were modified to be automatically loaded and over-driven with optical and/or radar-directed stabilized fire control systems in order to successfully engage them.[17-22] The engineering principles of these rapid-firing naval gun systems are not unlike those already used in modern tank and air defense gun systems.[7, 10, 22-24]

Yet another example of the failure of agility occurred in the form of battle cruisers which were provided with the firepower of battleships but were not provided with as much armor so that they could attain higher speeds.[25-27] Unfortunately, this left these ships very vulnerable to all the weapons designed to destroy battleships and many lesser ones which could also successfully engage them. These led to disastrous results when they were committed to a slugging battle which, in theory, they were supposed to avoid.[25-27]

Armor Selectivity

The idea of hiding in defilade and then looking over to engage an enemy, which is implied both in the need for agile vehicles and for those using an elevated gun is not without historical precedent. Coastal fortifications used the "disappearing gun" such as the American 12-inch coast guns once employed at Fort Monroe, Virginia, so that the gun would only present a silhouette when it was elevated and ready to fire.[28] These types of guns have been successfully attacked by both high angle (artillery/mortar) fire, and by aircraft.[29] A more unique example pertains to the ability of the *MBT 70* and some other armored vehicles to raise and lower themselves by means of their hydropneumatic suspension systems. This effect was to be similarly achieved by flooding water ballast tanks on the Stevens Iron Battery which started construction in 1854 but was not completed for lack of funding.[25]

Nevertheless, as a supplement to armor, hiding under/behind local material is still desirable when at all possible. It is also obviously highly desirable to be able to move out to another similar protective position as quickly and efficiently as possible before your present position is located and pulverized. However, predicating the survival of an armored vehicle on hiding its silhouette behind suitable terrain, or on its rapid movement, does not seem wise from the perspective of history. It would also seem unwise to use this as a "new" philosophy when it has long been used tactically in land warfare. For example, Soviet defensive operations call for their tanks to be dug in sufficiently so that the hull is protected.[30-32] This has been observed not only in text books, but also in practice at Brody-Dubno, at Kursk, on the Golan Heights, and in Lebanon; a tactic covering a span of 40 years.[33-35] It has also been remarked by Soviets that older tanks could be "statically" emplaced in defensive positions, when necessary, and fitted with improved turret armors and fire controls.[36, 37] (It may be true that the lower depresson limit on Soviet tank guns may be detrimental in using them from reverse slopes; but their design philosophy might be based more on digging their own emplacement which would set the slope of the vehicle and, as necessary on the plains, most suitable for armored warfare.[5]

The protected defensive antitank firepower from a hull-down BMP, or even the very lightly armored BMD, which can lower itself by means of its adjustable hydropneumatic suspension, is already quite impressive considering that they are relatively old vehicles weighing about 14 and 10 tons, respectively.[31, 38-44] From dug-in positions, they could turn an

enemy's armored counterattack into a suicide charge. Further improvements in their weapons, including new ATGM and gun-mortars such as recently developed in the West,[43, 46] could extend their usefulness into the next century.

The employment of terminally-guided mortar shells for top-attack of armored vehicles in defilade might be more effective for LAVs as an assault weapon than high-rate 60- to 90-mm automatic cannons which would be limited to firing high-velocity kinetic energy penetrators at dug-in, or defilade, vehicles in the direct-fire mode.[2, 3, 7, 47-50] The historical precedent for the adaptation of mortars both for the attack of armored ships through their top deck armor has been well-established.[51-52] The modern difference is contained in the need to hit the hard point-target represented by a tank or LAV with a projectile capable of perforating the top armor array and causing behind-armor damage. This could be obtained by using shaped-charge and terminal-guidance technologies.[45, 46, 53]

Hiding—An Old Tactic

From the previous articles of this series and *ARMOR* articles such as those by Brigadier R. Simpkin, it is obvious that armored vehicles are going to be subjected to heavy attack from all directions.[54-56] It is also obvious, that under attacks, they can neither run nor hide. Table 1 presents a ball park estimate of the present severity of the problem. Clearly, an MBT cannot be fully protected with armor to defeat all these threats. Since LAVs, such as infantry combat vehicles and rapid deployment force light tanks, will face the same weapons as MBTs, the case for their complete protection by means of bulk armor seems even more hopeless. When brute thickness and weight of armor cannot be used to counter the threats, then one must become more sophisticated in the use of armor and selective in what gets protected.

When warship armor was clearly overmatched by torpedos and large caliber projectiles, spaced armor was employed.[13, 17, 25-27] In particular, the American navy was the first to use the "raft body armor" concept of spaced armor wherein only the critical parts of the ship were heavily armored.[25] Furthermore, useful but battle-unnecessary items such as food, water, and the like, were considered expendable and part of the armor array during battle. When one wonders if these techniques could be adapted to armored vehicles, the answer is that they have been in the past to a limited extent and appear to be an acceptable approach by some designers for future armored vehicles.

For example, spaced armor was deliberately and clearly applied to many German vehicles during the uparmoring program started in July 1941. This was most obvious in the use of skirt armor. However, it was also employed for hull and turret armor, (Examination of the shields of captured German anti-tank guns at Aberdeen Proving Ground, Maryland, has shown that they consisted of spaced plates.[57, 58] Much earlier, the Christie tank's suspension provided that vehicle and those derived from it, such as the Soviet B1 series, with a form of spaced armor in the early 1930s.[59, 60] This provided protection to the crew, although it was true that the suspension could be damaged easier than if the springs had been located completely inside the armored hull. Later, the British *Matilda II* incorporated spaced armor in its suspension design when it went into production in late 1939.[39, 62-62] More recently, skirt armor along the suspension has been used on most modern battle tanks such as *Centurion, Vickers, Merkava, Leopard II* and *Abrams*.[30, 46, 63] Recently, it has been employed on Romanian-redesigned *T-55's*.[64, 65] Prior to the Soviet use of skirt armor on the *T-72*, there was always a vague suspicion that they used it on some vehicles. The suspicion was greatly confounded by information such as a training film showing an unidentified heavy skirted tank working with *T-62* tanks, *Stalin* tanks and propeller-driven aircraft.[46]

A simple form of spaced armor can be achieved by means of stowage boxes, equipment, and fuel cells carefully placed outside the main armor. The use of stowage boxes around the turret was most notable on the *Centurion* and *Vijayanta* (Vickers Battle Tank).[34, 36, 62, 63] However, an early example of the deliberate incorporation of stowage boxes as hull armor over the suspension appeared in the late 1940's with the Soviet *JS-III* heavy tank and carried on to the *T-10M* heavy tank.[66, 67] For a time, the appearance of stowage boxes on the turrets of *T-54/55* tanks was generally a way of distinguishing Polish and East German vehicles from Soviet vehicles.[34, 44, 68, 69] However, since the *T-64*, the *T-72* and its variants have been shown to employ equipment stowage outside their turrets.[31, 44, 66] Soviet *T-55's* have also been modified with similar arrangements.[70, 71] The potential effectiveness of stowage boxes as a form of spaced armor can be implied with respect to present hand-held, shaped-charge weapons of small caliber from previous battlefield experiences, such as: "Instances are

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known of *Centurions* surviving hits by HEAT projectiles, both 90-mm and *Cobra* antitank guided missiles, with no more than the loss of a stowage bin or bazooka plate."[72] As previously discussed in *ARMOR,* this was more true in the days of relatively nonprecision shaped-charge warheads than it would be during the 1980's.

External fuel tanks can also be used as a form of spaced armor. It has long been noted that the Soviet *T-54/55/62* MBTs have incorporated fuel cells on their fenders and have provisions for carrying fuel drums at the rear.[44, 46] The *T-64* and *T-72* have continued this trend.[44, 46, 73] A similar arrangement has been incorporated in the *Leopard II.*[74] This use of fuel as armor has not been generally favored in the past by American designers as they considered the fuel to be too vulnerable in the exposed position. However, the recurrent theme of US vehicles being susceptible to catastrophic fuel and/or ammunition fires has persisted to the extent that the WWII German Army called the *Sherman* the "Ronson" because it "lit every time." Israeli *Centurion* crews have similarly referred to the *Patton* in 1973.[72, 75-77] This situation was not helped in the past by slow practice in converting from gasoline to diesel fuel (although the importance of doing this was emphasized by the American Major John K. Christmas as early as 1937), nor in the continued resistance to locating fuel cells outside the principal armored envelope in tanks and armored personnel carriers. Advanced armored vehicle designs for providing protection for the tank's most important element, the crew, appear to place the fuel in the front and sides of the vehicle as part of the armor protection scheme.[34, 78, 79] The rationale for this includes the fact that cool diesel fuel provides a certain amount of protection from all the threats, including nuclear radiation, when the tanks are full; and at the very least, the empty tanks form a simple spaced-armor system.

Crew Protection Uppermost

The deliberate incorporation of simple spaced-armor as the principal armor can be found in the relatively modern Swedish LAVs *Pbv 302* and *Ikv 91.*[46, 80-82] The spaces are used for equipment and fuel stowage as well as for buoyancy to aid in swimming performance.[80, 81] The more modern Israeli *Merkava* tank has fully incorporated the philosophy of spaced armor.[83-86] This is clear from the construction of the tank's hull, the incorporation of skirts, and the use of stowage boxes on the hull and turret. However, the philosophy of design went further than that "to make every part of the tank play its part in the protection of the crew."[85] This has been reflected in the forward position of the engine, amongst other things, similar to the Swedish *"S"* tank, but which has apparently been patented by a German firm.[86] The design progression of modern German tanks from the early *Leopard I* to the *Leopard II* has further shown the following:[30]

- Cast homogeneous armor[46]
- Simple spaced armor[46, 86]
- Add-on spaced armor[87]
- Add-on laminate armor (steel/plastic)[88, 89]
- Special spaced armor[46, 86, 90-94]

The French *AMX-30* has similarly progressed from homogeneous armor to spaced-armor and further into the special space-armored *AMX-32.*[46, 86, 95-97] A progression from homogeneous armor to laminated steel/plastic armor has also occurred with the *Jagdpanzers, Rakette* and *Kanone*[46], Israeli *Centurions*[72, 85, 98] and modified US *M113* APCs.[77] The additions of laminated steel-plastic spaced armor were most notable, however, in the progression of the *XM723 MICV* toward the *M2 Bradley,* where a basic aluminum armor hull was protected by add-on laminate armor panels.[30, 46, 99-05] Here, the basic effect of the plastic is to hold the spaced steel plates apart and provide secure flotation for swimming operations.

Up-armor appliques for older tanks, such as the *Centurion* and *Patton,* have recently come into favor as shown by newsreels and photography of the Israeli action in Lebanon.[106-108]

Special Armor Configurations

Although there is little information available on them at present, the potential of applying similiar applique armors to the current tank fleets of the world will soon lead to controversy over their compositions and effectiveness.

Special armor arrays have been used in the most modern tanks such as *Challenger, Valiant, Leopard II,* and *Abrams.*[7, 46, 109-114] It has been obvious from photographs and discussions, that the arrays are some special form of spaced-armor containing various materials. Regardless of the speculation that has revolved around these armors, and the materials used in them to include titanium, ceramics, plastics, and active materials[5, 34, 46, 54-56, 59, 61, 86, 116-117], one can not really be sure of the exact configuration. Furthermore, they apparently can be changed and reconfigured within the same external form. Herein lies the real beauty of these armors, as

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they need not change on the outside such as has occurred with the changes of homogeneous armors to spaced-armors or with the addition of applique armor.[107, 108, 118] This should at least help armor engineers keep ahead of weapon designers by keeping them guessing.

Unfortunately, the tanks employing special armors are obviously only so protected over the frontal arc as explained in various articles and as shown by photography. They are also relatively heavy, leaving little room for redistribution of armor weight in order to counter the expanded threat spectra of the 80's and 90's.[119] This has stimulated the recent interest in new configurations such as the external gun tanks and pod-concepts of which the articulated Swedish tank destroyer derived to a certain extent from the *Bandvagn 206* vehicle may be an extreme example.[4, 55, 79, 119-112] However, analyses in the early 1970's had already indicated that externally-mounted guns and advanced automatic cannon like the *DARPA 75*-mm could be quite susceptible to aerial attack by advanced controlled-fragmentation munitions due to the net increase in exposed moving surfaces as well as the thinness of the mounted armor. Furthermore, the external mounting dictated a requirement for a flat deck and exposed turret ring which would be difficult to armor against top attack weapons such as aircraft cannon-fired projectiles, bomblets, and submunitions. From these and other considerations, such as NBC warfare, the trend seemed to point toward turreted fully encapsulated automated weapons stations such as used on naval vessels. This would, of course, necessitate the personnel to be fully removed from the gun, its ammunition, and its mechanical autoloader. However, this is already contained in the trend toward external mounts[124] and is very much similar to the pod concept recently discussed by Brigadier Simpkin.[54, 55]

Until now, armored vehicle design concepts have been driven by two assumed requirements that essentially prescribed how they would be finally configured:

- The crew was slaved to the weapon(s).
- The vehicle would be threatened to the greatest extent over a narrow frontal arc.

Slaving the crew to the gun was necessary as long as the gunner needed to stare down the barrel at the target through an optical system. With modern electro-optic systems (and faith in their reliability and ability to withstand specialized weapon attack), the gunner and/or commander can now be placed anywhere in the vehicle so long as the fire control sensors can provide a 360-degree search and gun-aligned, target-tracking capabilities. This would then allow the gunner and commander to be placed in the hull somewhere near the driver such as in the pod concept.[30, 55] Releasing the crew from the weapon would permit further mechanization of the weapon station, reduction of its volume and inertia, optimization of explosion containment/fire suppression, and increased speeds of elevation and rotation. It would also reduce the loads on the environmental systems required to provide crew comfort and NBC protection. In a sense, this was almost all in the Swedish *"S"* tank; but the crew and this vehicle were slaved to their gun which lead to some undesirable characteristics related to having to move the entire vehicle in order to engage the target.

Automatic Weapon Stations

The automation of the weapon station could further lead to the generation of a standard interface into which different packages could be inserted. Some of the following could be considered for development as weapons stations for not only the armored vehicle but also for use with fixed ground fortifications emplacements or trailers provided with a power supply and a separable control station for protected emplacement:

- Automatic gun/mortar weapon capable of firing terminally-homing, shaped-charge, antiarmor, controlled-fragmentation, proximity-fuzed, and earth/rock-penetrating delay-fuzed projectiles.
- Twin-gun air-defense system capable of engaging aircraft, helicopters, remotely-piloted vehicles, and light armored vehicles.
- Vertical-launch (cold launch technique) dual-purpose antitank/antiaircraft guided missile capable of at least engaging heavily-armored tanks by means of a plunging trajectory.
- Single dual-purpose gun system such as the Bofors 57-mm gun on the *Begleitspanzer*[123] for engaging most ground targets, helicopters, aircraft, and remotely-piloted vehicles.
- Large-caliber gun/howitzer firing separate-loading ammunition capable of direct and indirect engagement of armored vehicles, fortifications, areas containing soft targets, and personnel.

These have the ring of systems common today to some extent with a cry for their use on a common vehicle chassis. The real difference is the requirement for their complete automation and control by personnel physically separated from the working mechanical components and ammunition.

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Table I. Range of early 1980's threats to armored vehicles

Penetration (mm)	Weapon Type
300-700	Hand-held, shaped-charge launchers
400-800	Shaped-charge projectiles from guns and recoilless rifles
300-550	Gun-fired, kinetic-energy penetrators
500-1000	Antitank guided missiles
200-400	Guided top-attack munitions
50-100	Aircraft cannon armor-piercing projectiles
80-300	Shaped-charge bomblets
50-150	Self-forging fragment submunitions
Undefined	Radiation (neutron and gamma)

The obvious question arises as to how such a change in the weapon station can lead to better protected systems. The answer is that it doesn't necessarily do so. The crew can be protected to the extent that it can survive the threats to the vehicle represented in Table 1. However, the vehicle/weapon systems will suffer in proportion to the severity of the attack and the employment of arrayed armor. For example, a common vehicle chassis could be configured with spaced armor, fuel, water, ammunition, or other materiel inserted according to the mission and the weapons suite carried. In other words, two vehicles could look the same and be configured with the automatic gun/mortar weapon; but one vehicle would have extra, advanced-armor panels inserted into the hull spaces whereas the bare-bones vehicle would be suitable for air transport and subsequent uparmoring by means of taking on ammunition, armor panels, earth fill, water, or additional fuel. The enemy would not be fully aware of whether he was engaging a heavily armored or lightly armored vehicle. He would only be sure of the weapons that threatened his own existence.

The importance of both using all the armored vehicle's structure and material as protection and moving away from configurations where the crew were slaved to the weapons they serviced has been recently recognized by some armored vehicle designers. They also have recognized that the present and future threat spectrum is such that only a limited number of components can be fully protected. *Of these, the crew is the most important.*

The modern trend toward spaced special armors has shown how people can be kept guessing as to what an armor array actually contains. This was successfully done before when the British circumvented the wording and intent of the Washington Naval Treaty of 1922 limiting battleship armor protection by means of weight restrictions by using a spaced waterfilled array.[17, 25, 27] Similar armor array techniques could be adapted in the design of the chassis of an armored vehicle class so that it can be configured and reconfigured by the designer, commander and/or user according to the mission. This can add the military principle of surprise to the deployment and use of each armored vehicle.

(This article has continued the examination of vehicle armor by reviewing the application of spaced armor arrays in the past and projection of the need and potential for their application in the future. Additional information and materials providing insight into the historical applications of armor arrays and materials have been gathered into a bibliography available from either the editors of ARMOR or the author at Battelle's Columbus Laboratories, 505 King Avenue, Columbus, Ohio 43201.)

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Recognition Quiz

This Recognition Quiz is designed to enable the reader to test his ability to identify armored vehicles, aircraft, and other equipment of armed forces throughout the world. *ARMOR* will only be able to sustain this feature through the help of our readers who can provide us with good photographs of vehicles and aircraft. Pictures furnished by our readers will be returned and appropriate credit lines will be used to identify the source of pictures used. Descriptive data concerning the vehicle or aircraft appearing in a picture should also be provided.

(Answers on page 49)

PROFESSIONAL THOUGHTS

How to Conduct an Inventory

You're finally going to take over your own company—great! You grab the latest property listing and the outgoing commander and go forth in search of 14 accessory kits, 35 desks, 17 tanks and all that other stuff you're going to be signed for. Wrong, wrong, wrong! You've got a lot of work to do before you start counting wrenches.

Your change-of-command is an immense job. It requires, in staff officer lingo, "careful, detailed planning, and aggressive execution to assure mission accomplishment." I'm not going to hand you a line like that. Instead, I will give you, the brand-new, incoming, company commander, a very detailed set of instructions on how to properly conduct an inventory that is 100 percent accurate. It worked for me—it will work for you.

If you've followed the usual progression of jobs, you've been a platoon leader, an executive officer, and maybe a battalion staff officer. If you were lucky on your way up, your company commander made you sign for your platoon's equipment, and you became familiar with the common supply forms, such as the DA 2062. Hopefully, you've also had some experience with the various methods of property adjustment (e.g., Report of Survey, Statement of Charges, etc.) But, even if you have only a passing knowledge of supply procedures, take heart, it isn't all that complicated, just detailed.

There are two principles that prevail in the proper accountability of any set of property—every item has components and, every item, *and component* of that item, that is on your property book must be either on hand, or on requisition.

For example, you surely would not take responsibility for a tool box (the item) without making sure all it's wrenches and such (the components) were there, or were noted somewhere as being missing, and on requisition before you signed for that tool box. The same thing holds true for an entire company, except that there are many more items and components and it's usually the components that cause the most problems.

There are three phases to an inventory—preparation, execution, and followup. Most people do little, if any, preparation, are pretty good at execution, and get really bored with the whole thing halfway through the followup. All phases are important and deserve your complete attention.

Preparation

Take your most current Modification Table of Organization and Equipment/Division Logistics System (MTO&E/DLOGS) printout and make sure you know how to read it. Then annotate it with any gains or losses of end items since the printout was published. You can get all this information from the company supply sergeant. Then take your listing and verify it with the Division Property Book Officer (DPBO). This is also your first check on your new supply room; if there are any discrepancies, you know there are problems.

Next, you set up a working manual property book which will take you a few days. Label your notebook "MTO&E Property." This will be your friend throughout your tenure of command. The first page is the index—simply list the hand receipt annex numbers with the related sections or platoons. On the second and subsequent pages of your working property book list the line number, item description, nomenclature, and the authorized and on-hand quantities of each item which appeared on the printout. List only two items per page—it gives you room for later notes.

Next, you are going to do what very few people do well—make sure all the major item's (line numbers listed in your working property book) are also listed on someone's hand receipt annex. If this doesn't "zero-out" the on-hand quantities in the property book there is some unaccounted-for property. Take the first annex on your index and, item-by-item, note the quantity and annex number under the appropriate line number in your working property book. At this point, all you are interested in are major end items; for the time being, ignore all the component annexes you (hopefully) will come across. Be sure to include end items issued or turned in on temporary hand receipts that have not yet been posted to the regular hand receipts. Continue on in this manner through all the hand receipts. Total up the quantities you have found and check to see if they all match the total hand receipt quantities. If the total quantities are less than on the DLOGS's printout there are some unaccounted-for end items. If a total is more than the DLOGS's quantity, two or more people are signed for the same piece of equipment. In either case, the problem must be resolved.

Prepare a list in duplicate for those items whose quantities do not match. Keep one copy and give the other to the outgoing commander so he can have a chance to resolve the differences.

Your next step is to make sure all the components of the end items are listed on the appropriate component annex. There are two places the components for a particular item might be listed—in a supply catalogue (SC) or in a technical manual (TM). Be adamant on this, and don't let anyone try to railroad you into thinking a particular item has no components.

There are several places where you can obtain *current* SCs and TMs. Unless otherwise stated, you're responsible for all components of an end item that are supposed to accompany the end item prior to and including the date on which you sign the hand receipt at the DPBO. The unit supply room, battalion S-4, DPBO, Inspector General and MOS Library are some places that will have manuals you can use. Go one step farther and check the SC or TM date and the number of changes against the DA-310 series pamphlets to ensure that it is current.

Now comes a lot of slow, boring work—cross-checking the manuals with the component annexes. Check for two things. First, that all the components that are listed in the SC or TM also are listed on the component annexes and, second, that the authorized quantities of those components listed also are correct. Sometimes, the authorized quantity for a component changes from the last time an inventory was conducted with that particular annex. *You are responsible for the quantities authorized as of the date you assume command.* You are not concerned at this point whether or not the components are on-hand, so don't let that distract you and slow you down.

Should you do all this yourself, or is it permissible to have someone help you? As strongly as I believe that cross-checking is clerical work, it is best to do it all yourself this first time.

No one cares as much as you do that all components are listed, and it gives you a good idea of just how much you'll be signed for.

One thing you should have checked while reviewing the hand receipts and component annexes was to determine the last time the annexes were updated and who signed both the hand receipt and component annexes. Hopefully, all were current and signed for by someone still in the unit.

If you did it all correctly you've been at it from 3 to 7 days, depending on the size and type of unit. You have:

- Verified whether or not all items on the DLOGS printout were accounted for on individual hand receipt annexes.
- Given the outgoing commander an idea of what he might be short.
- Ensured accurate component annexes.
- Inspected your new supply room's hand receipts and publications. You are now ready to enter the execution phase.

Execution

Counting things is relatively easy; however, a few tips. Take the SCs and TMs with you *and use them.* In many cases, a nomenclature description means nothing, and the manual will show a picture. Use your newly-updated hand receipts and component annexes for your inventory. Lay everything out, have the person responsible for the equipment with you, and when you have finished your inventory have the responsible person sign the hand receipt and the component annexes on the spot.

You are checking the authorized quantity against what is present, and checking both of those against what is recorded as onhand on the hand receipt annex. There is no easy way to record discrepancies. All sorts of variations are possible.

- Authorized quantity and recorded on hand quantity match, but the responsible person doesn't have the item (*he* has a problem)
- Recorded quantity and actual on-hand quantities match, but is less than the authorized quantity (the *outgoing commander* has a problem.)
- None of the three quantities match (*everyone* has a problem). It's a dirty job, but someone has to do it.

A word about substitute items, mainly components of end items. Use your common sense. A 7-inch screwdriver is pretty much the same as 6-inch screwdriver, but a ball-peen hammer is quite different from a claw hammer. The overriding question is: do you think that the commander that takes over from you will also accept it as a substitute?

The execution phase is finished, and it probably took as long to accomplish as the preparation phase. What you now have is a set of current hand receipts and annexes, and you have also had a good look at the unit and its equipment.

Followup

The last phase, the followup, is perhaps the most difficult, because you're probably sick of all this supply stuff. But if you don't spend at least as much attention to the followup as you did with the other phases you're going to loose big, because this is where it all ties together.

Set your hand receipts and manuals off to the side, because you will primarily be comparing your list of discrepancies with other sorts of supply records. Ask the supply sergeant for the current expendable and nonexpendable due-in listings. Again you have a slow and laborious job of checking the items listed on your notes as being short against the items that are actually on requisition. If the hand receipt holder will admit to losing something, he might agree to pay for it through a Statement of Charges, Cash Collection Voucher, or cash sales. The document number or whatever collection action was used is your authority to order a replacement item. If the items cannot be accounted for in any way, put an X in the Report of Survey column. I must emphasize that the *on hand quantity* plus the *on order quantity* must equal the *authorized quantity.* This is why you spent so much time with the SC's and TM's.

Now everything is either on hand, on order, or identified as an unaccounted-for shortage. The last group of items, the unaccounted-for shortages, if any, will go on the change-of-command Report of Survey. Check this document carefully.

You're done! It took a while and was perhaps more complex, than you expected, but if you followed every step as described you covered every base. If no human error crept in, your inventory is 100 percent accurate. Keep all the notes you took during inventory. Save everything! You will need it later. I have referred back to my notes at least once a week.

After 3 to 6 months, go through the operation phase again using your original notes. This is just to catch any errors you might have made the first time. It's a lot easier to explain mistakes at the 3-month point than at the 18-month point.

Three months before you change command, go through the preparation phase again. This will give you enough time to resolve any of your supply difficulties before you begin your own inventory. It works.

Most units have several property books that will include your office furniture, billets furniture, etc. You must go through all three phases for every property book in your organization. These other property books will probably not take as long to set up as your MTO&E property book because you will most likely not have the large number of end items and components in these listings.

There it is. If you choose to do it differently, you might come out all right in the end, but if you do it my way you will be a winner. Keep in mind as you go through all the procedures that not only are you conducting an inventory now, but you are also preparing for your own changeover. If you do a good job, everyone profits. You might even save a few bucks in the end.

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The Role of the US Tank

One morning, I was leaning on the railing of an old bridge and heard the sound of boots on the wooden planks. I looked up and saw an officer approaching. He stopped a short distance from me and turned to lean on the railing nearby.

"Good morning," he said in a strong voice, and I identified his accent as Russian.

I answered, "Good morning," and he said, "It is so peaceful here. I am sad the world situation is in such a bad state of affairs."

I said, "If your people come against us one of these days, it will be an awesome mass to contend with."

"It must be that way," he replied. "We do not wish a long conflict. We must strike with superior combat power."

"Meaning tanks," I said.

"Among other things, yes," he replied. "Tanks and all that support them to gain ground quickly. My father was a tank leader in the Great Patriotic War. We could not outgun the Germans, so we had to overwhelm them with numbers. We won, and we are prepared to do it again."

"That's interesting," I said. "My father was also a tank leader in World War II. After several battles where one or two *Panthers* took on a dozen U.S. tanks and destroyed half of them, he and others decided to employ other available combat power such as artillery, rockets, and air against *Panther* and *Tiger* formations and employ U.S. tank task forces at weak points. It was very effective. We also won, as you know."

He looked at me for a moment and replied, "We endorse this technique. You are making it very difficult for us, however. Our tanks are becoming very expensive. They have to become tougher and tougher and more sophisticated. You and your friends are fielding land battleships designed for decisive battle when there are many other aspects to ground combat in winning the day. The characteristics of your new *M1* series tanks is sobering to us. You mentioned *Panther* and *Tiger* tanks before. What is the *M1* but a heavy tank? We must tie down this threat, especially where it is massed. We are preparing for tank-versus-tank so we can employ other armor formations at weak points. We have additional numbers of tanks to employ, you know, after we numerically tie yours down."

Obviously, he was a professional tank officer. I told him that for many years, "U.S. armor people have had a problem with the role of the tank in armor formations." I said, "the *M1* series is a combination of the theory that a tank must be able to come onto the field in the open, if necessary, and fight to the death like a bull. Some believe we are being forced into a mobile bunker, a fast mobile bunker, but nevertheless, a big, heavy bunker. I believe your tank philosophy is what changed the role for the U.S. tank."

He pondered, "Interesting." Why", he asked, "do you need fast mobile tanks, if they are going to be tied down killing our tanks? And I assure you we *will* tie them down. They are too much of a threat to be let loose."

"I understand," I said. "I personally feel, as do others, that your massed armor formations must be engaged and broken up by other than tank formations. Tank-versus-tank engagements are very costly. If we can effectively engage your massed armor with other systems, then our so-called land battleships can exploit your weak points, get into your rear and cut logistical and communication tails. You would always have to be prepared to defend as you attack."

"We can hope," he said, "your role for the tank will remain as that of a primary tank killer, and you will not change that. We plan to engage your tank threat and keep it committed by whatever means we may have available. We cannot afford to be concerned about penetration into our rear areas."

"Hopefully," I replied, "our tanks will not be turned into expensive tank destroyers, but will be released for their intended role of penetration and exploitation. In fact, I would like to see U.S. tank formations kept out of major engagements until the odds are closer to a one-on-one basis. The attrition of the attacker should be left to other powerful systems. It will take a change of thinking in our armor philosophy."

"I must go," he said curtly. "For me, I hope there is never a confrontation to prove who is right or wrong, but I guess that's not a field soldier's decision."

"I agree," I said, "war is an untenable situation. There don't seem to be any winners anymore. However, if you must come, we will give you a 4th of July welcome."

He turned, looked at me, and smiled and said, "I believe that." He turned slowly, walked off the bridge and I awoke to hear the briefing officer conclude that by careful study and war gaming, the primary role of the U.S. tank remains to destroy other tanks.

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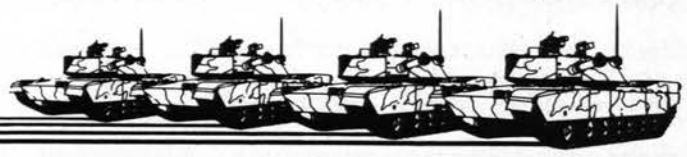

A Computer for Every Orderly Room

I remember when the first sergeant carried all critical written documentation in his fatigue shirt pocket. Information such as the Morning Report; who was on leave, sick, or AWOL; the KP roster, theater schedule and mess hall menu—all those things crucial and necessary for the smooth operation of our awesome military organization were literally at his fingertips. Then it happened! Printers, paper manufacturers, and bureaucrats united to set into motion the most complex maze of forms and "required" documentation that the genius of man has yet to devise. It ran the gamut from privacy statements to flypaper reports. This proliferation of publications and forms caused massive internal hemorrhaging within our army, and society as a whole. It soon became apparent that if on any given day all paper were to disappear from the face of the earth, the Army—and civilization as we know it, would grind to an abrupt halt.

On the premise that all the aforementioned data is actually needed, the question is not whether we are going to deal with it (we are), but how we are to deal with it. Is there a more comfortable, efficient way to enter, tabulate, store, and retrieve this glorious poop? Enter the desktop computer.

These clever little devices are small, relatively inexpensive, and surprisingly versatile. I own one because I absolutely abhor the stubby pencil routine in both my work and personal life. From the first moment you sit down in front of the screen, you just know something stupendous is going to happen. The basic computer language as well as the "rules" by which you and your microprocessor can coexist are fairly simple and can be mastered rather quickly. Most of these small systems are designed for just plain folks, and no degree in computer science is required. Perhaps this is why so many business executives are smuggling their own personal com-

puters into the business sector because, simply put, it is a lot easier to train a manager how to use one of these jewels as a management tool than it is to teach the post automatic data processing (ADP) section (with its monstrous mainframe) about management, or the peculiarities of your unique problem or set of requirements. In short, do it yourself.

The previous statement may horrify some in the bureaucracy but it needs to be said for, after all, who has the expertise and the most interest in your information, needs, desires, and so on? There are those, however, (I call them Dinosaurs) who have far outlived their usefulness and should be extinct. The days of feeding management some computer jargon or lipservice are over. We have, through the use of these microprocessors, the means to manage our assets, to solve our own problems, and hopefully gain a little better control of our own destiny. The application of the modern day personal computer in today's Army is only limited by the imagination.

The intricacies of the internal combustion engine are of litte interest to me because, basically, if the vehicle goes, I'm happy, but when something does go wrong, my computer will troubleshoot the difficulty because I have programmed it to do so (makes maintenance simple and it is a lot easier to update the software than to rewrite and publish TMs). Inventory control, reordering, and many other facets of post and depot operation lend themselves to the microprocessor (and yes, they may be hooked into massive storage devices). At the battalion level, what S4 and property book officer wouldn't welcome a desktop computer to simplify the management of "bean counting" and petroleum, oil, and lubricant expenditures and forecasting? The battalion maintenance officer could keep track of the prescribed load list, vehicle status, service scheduling and dollar expenditures to maintain the fleet. The food service NCO can plan menus, inventory utensils, and keep track of meal cards, and cash collections. The S3 can plan training and forecast available resources, such as range space and ammunition requirements. Realtime battle simulation games are already on the market to train crews. Training NCOs can keep track of skill qualification test schedules and results. The S1 can forecast personnel losses and requirements, maintain vital data on each individual, such as MOS, or special skills, and can also employ the microcomputer as a word processor. In short, not only can the desktop computer do many things that we do today with the stubby pencil but it can do them faster and more accurately. The computer can enable us to make many forecasts and calculations that we don't do today because of the time and effort involved.

What are the drawbacks? Present generation computers can only accommodate one program and one operator at a time. Consequently, if only one is available in a battalion, two or more operations can't be accomplished at the same time. Staff officers may vie with each other for computer time or to be the *computer meister* in the battalion.

Another drawback is cost. Present generation desktop computers are relatively inexpensive to the average individual user who buys only one. But, getting more than one per battalion today to accommodate all potential uses and users may be cost prohibitive.

But, the time is coming in the not-to-distant future when these drawbacks, and others, will be overcome by technology and volume production.

Perhaps the Army of the future will have a microprocessor in every orderly room and the First Shirt again will have all of his required data tucked away neatly on a floppy disk or a cassette in his upper left pocket . . . we have the technology to do this and more. We need only to apply it. Personally, if I am going to be a bit on a byte, I would prefer it to be on one of our systems rather than on one of the Soviet's.

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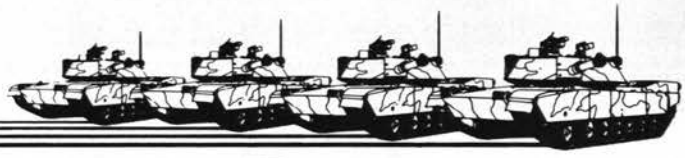


Sustainment Gunnery Training

The Army must be prepared to perform it's primary combat missions on short notice; therefore, critical combat skills must be maintained at a high level all year. The key to maintaining these skills is a solid, comprehensive annual training program that incorporates sustainment training. Although tank gunnery is the main topic here, the principles discussed hold true for any skill.

It is impossible to teach an individual a skill and train him to a high level of proficiency and then expect him to perform that same skill, at the original high level of proficiency a year later, unless he has been allowed to practice it in the meantime. He will forget steps, step sequences or, in a manual task, he will lose the dexerity achieved during the initial training.

All skills are perishable. The more complex the skill, the more susceptable it is to deterioration. When gunnery training is conducted before and during annual qualification, and what we currently call sustainment gunnery, gunnery skills will steadily increase and peak on Tables VIII and IX because crew members are practicing their skills in accordance with set procedures and standards. There are valleys between the peaks of qualification and sustainment gunnery that represent low points in gunnery skills proficiency. These valleys are unavoidable because it is impossible to fire Table VIII frequently enough to maintain the peak achieved during qualification. What a commander must do is develop and implement a year-round training program designed to retain, reinforce, and maintain those skills obtained when his unit peaked. This effort is known as sustainment training.

The ideal way to maintain a skill is to practice that skill using equipment under conditions that duplicate those that will prevail on a frequent and regular basis. This, however, is not possible for tank gunnery due to lack of facilities and resources.

Cuts in annual allocations of rounds per crew have reduced ammunition availability to where it is only possible to fire two or three gunnery periods annually.

A close second problem for some units, and a primary problem for USAREUR units, is the availability of training facilities. There are four major training areas (MTA) available to US units on a regular basis in Europe. All US armor units must use as well as share these with our NATO allies. These MTAs are small, restricted, heavily used and often far from the training unit's home station. Also, tight scheduling and rail movement costs prohibit their casual and frequent use.

The third problem is other mission training or tasks that

must be accomplished. A unit must maneuver as well as fire, if it is to succeed. Other critical skills that include individual survival skills must be taught and maintained.

The problems above are only a few of the items that prohibit live-fire training. However, through ingenuity, careful management, or just plain luck as to where a unit is stationed, some or all of these problems may be solved. But these factors also prevent an Army-wide sustainment program from being developed. Nevertheless, some recommendations can be made for more or less standard sustainment gunnery training.

Plans for sustainment training should be made *when the annual training program is being developed.* This ensures that service firing and the means of maintaining it's training effect are planned together, and that gunnery is taught as a complete package. Furthermore, the trainers who implement the plan will be able to schedule the required training assets or resources in advance. Crises management, or poor training because subcaliber ammunition was not forecast and therefore not available, can be avoided.

Live-fire exercises, using service ammunition, are undoubtedly the best method for attaining crew proficiency in tank gunnery. Unfortunately, sustainment gunnery training with main gun ammunition is not possible in garrison. Therefore, subcaliber firing with a variety of devices becomes the best alternative.

Of all the subcaliber devices available, the *M179 Telefare* is the best because it develops crew interaction and permits firing runs on full-scale ranges. Its one shortcoming is that the loader does not receive full training, even though he can be required to load a dummy main gun round after the first .50 caliber round is fired from the *Telefare.* The other crewmembers, however, perform almost all the duties related to firing service ammunition during gunnery qualification.

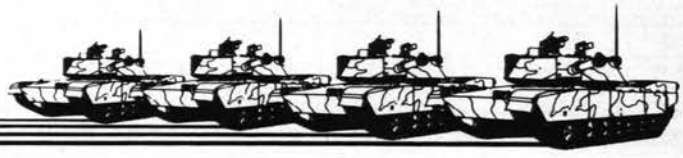
If facilities do not allow the *Telefare* to be used, the *Brewster* device using either 5.56-mm or .22 caliber on 1/5, 1/10, 1/35, or 1/60 scale ranges should be substituted. On 1/5 scale and 1/10 scale ranges it is still possible to maneuver, but this is not possible on 1/35 and 1/60, and driver's training drops out. Crews of *M1* tanks will be able to range on 1/5 or 1/10 scale ranges, but not on 1/35 or 1/60 scale facilities. Crews of *M60A1* and *M60A3* tanks can range on all scale ranges. In all instances, however, the important individual and coordinated skills of the tank commander (TC) and gunner are still exercised.

Dry firing is another means of conducting sustainment gunnery training in crew duties. Most units establish a dry-run course with target arrays and engagement standards, based upon the Table VIII qualification run the unit uses. During dry firing, a crew examiner, or assistant instructor, rides on the tank while the course is being run and critiques crew duties and performance as they simulate engaging targets. This offers the crew an opportunity to practice crew duties and receive on-the-spot constructive observations and criticism.

Other devices exist or are being produced to assist in training. The *M55* laser, when used in conjunction with the *Stout* board, is effective in training TC-gunner interaction. The *Detras* device, now used by V Corps, is also excellent for TC-gunner training.

The important point, however, is not what devices or methods are used, but that they are used in conjunction with each other to cover gaps in training in a manner that maintains skills acquired during service firing.

H.W. COYLE
Captain Armor
Fort Devens, MA



It's Time for Master Scouts

The time to implement a Master Scout Program is long overdue. We cannot, however, turn back time; what we can do is explain the need for such a program and how a master scout is used in the 1st Squadron, 1st Cavalry.

From the squadron commander's view, the absence of a Master Scout Program is a serious problem, one that affects his unit's training and combat readiness status. The Armor School's excellent Master Gunner's Course (now known as the Advanced Gunnery Course) provides highly-qualified professionals who are readily available to help the tank unit commander in planning and conducting the unit's gunnery training program. Yet, no such course or program exists to render equally-essential scout training for the cavalry.

Training for an armored cavalry squadron's major fighting systems is reviewed quarterly and immediately after the master gunner's briefing the next question invariably asked is, "Now, what about the scouts?" Unfortunately, there is no master scout to respond, and the need for a Master Scout Program becomes glaringly obvious.

There are three compelling reasons for a Master Scout training program:

• Scouting is vital to battlefield success. In order to win in war, the commander must "see the battlefield". Knowledgeable scouts are essential for reporting accurate and timely battlefield information.

• Scouting is a complex business. The modern scout must intimately know a variety of weapons and vehicles, and be able to accomplish a great variety of tasks. Currently, the absolute basics include seven weapons *(Dragon,* TOW, *M60* machinegun, *M2* .50 caliber machinegun, *M72* LAW, mortars, *M16)* and five vehicles *(M151, M113, M901, M106,* and *M551/M48/M60)* and a staggering number of tasks, i.e., land navigation, NBC, reconnaissance, mine warfare, demolitions, communications, and the maintenance of sophisticated weapon systems. In the future, the *M3* Cavalry Fighting Vehicle and its sophisticated fire control systems will add to the complexity of the 19D MOS.

• The Master Gunner's Program has been highly successful in improving the performance of 19E. While empirical scientific data does not exist to rule out other factors, the Master Gunner Program is an intuitively obvious reason to explain the improvement. Some data would be easy to collect by simply polling tank battalion commanders and asking them if they would give up their master gunners. Better yet, ask tank crews the same question during preliminary training for record-fire ranges. The answer would be a resounding "No!"

The unofficial master scout in the 1-1st Cavalry is a sergeant first class selected on the basis of experience, schooling, and level of performance. His principal qualifications are previous success as a scout section leader and platoon sergeant and attendance at the TOW and Dragon training courses. The squadron master scout's major function is to "orchestrate" all scout activities—training, tactical employment, and weapon and equipment maintenance.

The training philosophy is very straightforward—"What tasks are required, and how frequently must they be performed to sustain combat readiness?" For example, the squadron's master scout determined that a scout section needs to maneuver as a section a minimum of once a quarter to sustain combat readiness. In addition to monitoring his master schedule, weekly training schedules, and assisting in training, he also planned major scout exercises in the maneuver rights areas and at major training areas.

The squadron's master scout, like the master gunner, also has significant maintenance responsibilities. He provides technical expertise on the *M901* turret, the TOW and *Dragon,* and the *M-106* mortar-carrier. Finally, he supervises and conducts training for the *M901* turret mechanics.

The most recent example of the master scout's value to scout training was a scout section live-fire and maneuver evaluation conducted at the Grafenwoehr Training Area. The evaluation was completely planned and executed in four phases under the supervision of the squadron's master scout.

• *Pre-combat inspection.* Getting off to a good start is vital to the success of any training or combat operation. Therefore, precombat inspections of each scout platoon were conducted to ensure that everything and everyone was ready for the mission. Vehicles were parked on line and their crews formed in front. Thorough preventive maintenance checks and services were performed on each vehicle. Each trooper was inspected for uniform, cleanliness of individual weapon, and knowledge of MOS skills and the mission. All assigned equipment was checked for operability and proper loading. Crews were tested on use of maps, communication and electronic operating instructions, orders, and NBC reporting formats. In short, all scout sections had to present themselves fully prepared to "move out" for extended combat operations.

• *Maneuver.* Each section was given a demanding tactical situation, required to conduct a tactical road march and movement to combat, and was evaluated on specific Army Training Evaluation Program tasks. These tasks included troop leading procedures, tactical control measures, conduct of the tactical road march, selection of firing positions, land navigation, battle drill, hasty decontamination, use of indirect fire, radio-telephone procedures, and reporting. Aggressor troops were employed to add realism and to increase the tempo of the exercise.

• *Live-fire.* A five-lane range containing an array of popup, stationary, and moving Threat targets was used for live-fire competition. This phase exercised and evaluated the section leader's ability to control the fire and movement of his section, and to direct .50 caliber and *M60* machinegun fire on identified targets.

•*Critique.* Hasty critiques were held throughout the competition. Minor deficiencies were corrected on the spot and evaluator comments emphasized the scout section's strengths and weaknesses. Upon completion of the competition, a formal critque was held on all phases of the exercises. Troopers were first allowed to evaluate their own performance and then detailed comments on all tasks were provided by evaluators. Finally, the section's overall tactical strengths and training deficiencies were noted to provide a basis for future training.

In conclusion, it should be noted that other combat specialties have gained great success with a "Masters" program. The airborne has master jumpers, tankers have master gunners, and the need for a master gunner for the infantry fighting vehicle has been determined. The "master" designation not only provides important expertise to commanders and crewmen, but it also gives the entire career field added prestige and a motivational boost that is realized in performance. The need for an "expert" scout is most keenly felt in cavalry organizations with their tremendous mix of weapons, vehicles, and tasks. Without the master scout, there is simply no one else to provide the essential services needed to sustain trained crews. For any organization that must be prepared to fight and win at any time, the time for master scouts is now!

KIM H. OLMSTEAD
Lieutenant Colonel, Armor
Commander, 1-1 Cavalry

TERRY L. COLLINS
Sergeant First Class
Master Scout, 1-1 Cavalry

Recognition Quiz Answers

1. **M48** (Medium). More than 11,000 of the M48 were built in a number of variants. It has a 4-man crew and a 90-mm main gun. The *M48* is in service in some 13 countries and the U.S. Reserve forces.

2. **M4 Series Sherman** (Medium). The *Sherman* was designed in 1941 and first used in combat at El Alamein, North Africa in October 1942. *Shermans* have been armed with 75-mm, 76-mm and 57-mm guns; 105-mm howitzer, 155-mm gun-howitzer, 160-mm mortar and 17-pounder and 25-pounder guns. Other weapons, engines, and armor modifications have been made. The *M4* series *Sherman* is currently in use in 12 countries.

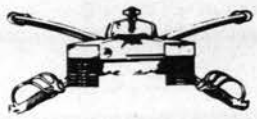
3. **M47 Patton** (Medium). One of three Patton-named tanks, the *M47* was developed from the *T42* medium tank program that began in 1949. It was replaced by the *M48*. It had a 90-mm main gun and five-man crew. The *M47* has undergone several prototype variations, most of which have not gone beyond the prototype stage. The *M47* is in service in 15 countries today.

4. **M24 Chaffee** (Light). In March 1943 authorization was given to develop a new light tank to replace the *M3* and *M5* tanks. First production was completed in April 1944 *(T24)* and the vehicle was type-classified in mid-1944 as the *M24. Chaffee* tanks mounted a 75-mm gun, served until the early 1950s when they were replaced by the *M41 Walker Bulldog.* The *M24* currently serves in eight countries.

5. **M41 Walker Bulldog** (Light). The *M41* light tank with a 76-mm gun went into production in 1951. It was known as the *Little Bulldog,* but was renamed *Walker Bulldog* in honor of General W.W. Walker, killed in action in Korea in 1951. A limited number of powerpack and main gun modifications have been made and the *M41* is in service in 17 countries.

6. **M3 Stuart** (Light). The *M3,* nicknamed "Honey", carried a four-man crew and mounted a 37-mm gun. The *M5* light tank and the *M8* howitzer motor carriage are derivatives of the *M3. M3* and *M4* tanks were replaced by the *M24 Chaffee. M3s* still serve in 10 countries.

OPMS-EPMS



Officer Personnel Actions Clarified

This is the first of a series of articles written especially for Armor officers who are commanding, or who are about to command, battalions and brigades, and for senior officers in supervisory positions. The purpose is to provide up-to-date information concerning professional assignments, professional development, and efficiency reports—all of which affect armor officers careers.

Officer Assignments

The most frequently asked question received at Armor Branch is, "When will I be reassigned?" Branch programs officers for reassignment based upon their date of availability (DTAV). The DTAV appears in Section IX of an officer's official record brief (ORB). That is the date on which an officer will normally report to his next assignment, and it is an important consideration when figuring projected strength.

Branch receives a number of requests from commanders to extend or curtail officers. In general, these requests may be approved for compelling, substantive reasons, when circumstances and Army requirements permit. A compelling reason for extending or curtailing an assignment might be whether a move, at a particular time, would aggravate a family member's medical problem; a noncompelling reason might be that the officer does not want to sell his house.

Commanders occasionally ask to keep an officer beyond his DTAV, or after orders have been issued, in order to complete one more training event (REFORGER, ARTEP, NTC, etc.).

Whether or not Branch can do this depends upon the strength of officers, by grade and speciality, at the *post level*, and how that current and projected strength compares with the number of officers the post is supposed to have under the Officer Distribution Plan (ODP). This must be considered in light of other factors before the outcome of the request can be decided. These include: whether the officer is being considered for, has been alerted for, or is on orders to another assignment; how the action will affect the officer's career interests; the impact on the unit, and whether there is a more compelling need for the officer at another location.

Troop assignment opportunities are limited. The situation Branch is usually faced with is whether the extension will preclude an advanced course graduate from going to a troop command.

Commanders are alerted through the post personnel action channels before an officer is placed on orders so the commander can notify and counsel the officer on the assignment. Then Branch waits at least 72 hours before orders are issued. This affords the commander and the officer an opportunity to surface matters that may have an effect on the reassignment. If commanders are not receiving alert notifications, they should check on the failure through their chain of command; Branch wants commanders involved in permanent change of station counseling. Next, Branch sends a request for orders via AUTODIN to the command, where orders are printed by the military personnel office. (See *ARMOR,* January-February 1981, p. 64, for more information.)

Newly Commissioned Officers

The Branch's goal is to have newly commissioned lieutenants report to their units within 5 to 8 months of commissioning. This permits approximately 9 weeks of schooling beyond completion of the Armor Officer Basic Course (OBC).

Newly commissioned lieutenants may volunteer to attend Airborne and Ranger Schools. Those assigned to cavalry units may attend the Infantry Mortar Platoon Officer Course instead of Ranger School. However, new lieutenants will not attend the Junior Officer Maintenance Course, unless the gaining commander requests it by contacting Branch.

Officers are commissioned in the U.S. Army Reserve (USAR) or Regular Army (RA). The USAR officer enters service as an obligated volunteer (OBV) with a specific length of obligated service (e.g., 3 years). Unless he requests Competitive Voluntary Indefinite (CVI) status, he will be separated on his OBV date. He can apply for CVI upon completion of 2 years of active federal commissioned service (AFCS) and if accepted by a board for CVI, he incurs an additional 1-year obligation beyond his initial obligation.

An officer's performance is the most important factor in determining whether he will be selected for CVI. During the 8th month of the 1-year probationary CVI period, he is boarded for Final Voluntary Indefinite (FVI) status. Standards are high for CVI and FVI. Not all who apply are selected for CVI, and of those selected for CVI, not all are selected for FVI. In some cases, officers have been selected for promotion to captain, but not selected for FVI. These actions are determined by separate boards, and the selection rate for promotion to captain is higher than the rate for FVI. Commanders are encouraged to take an active part in the CVI/FVI process by endorsing the officer's request with meaningful comments and providing timely, useful information. (See *ARMOR,* September-October 1982, p. 50, for a list of terms, and the May-June 1982 issue, p. 50, for more discussion of CVI/FVI.)

(To be continued)

New Armor Branch Personnel

LTC Thomas P. Barrett ..... Branch Chief

Assignments

LTC James E. Quinlan ..... Lieutenant Colonel
Ms. Gloria Johnson

MAJ Al Bergstrom ..... Major
Ms. Janice Boyce

CPT William T. McAlpin ..... Captain
Ms. Vicky Arnold

CPT George Edwards ..... Captain
Ms. Frances Ware

CPT Mark E. Williams ..... Lieutenant

Accessions

Mrs. Diana Lueker ..... Lieutenant

news notes

704th TD Battalion Awards Update

Members of the 704th Tank Destroyer Battalion who served with that unit during WW II and who are authorized to wear the unit's combat awards may now submit their separation documents for updating to include the awards of the French *Croix de Guerre* with Palm (two awards) and the French *Fourragere* in the colors of the *Croix de Guerre.*

Members wishing to update their separation documents must submit a request stating the action they desire as follows: "Please add the French awards as indicated to my Army discharge paper." Name (signed), Social Security Number, and address.

Members are to include a copy of their separation document, WD AGO Form 53 55, and verification of their entitlement to the awards in the form of a copy of the citation. Such request should be mailed to: **U.S. Army Reserve Components Personnel and Administration Center, Attention: AGUZ-PSE-VS, 9700 Page Boulevard, St. Louis, Missouri, 63132.**

Battlefield "Fix-it" Manuals Are On The Way

A new series of technical manuals that show how to repair battle-damaged combat vehicles on the spot so that they can be returned to action in the same battle, or at least used in the next battle, are being produced by the U.S. Army Materiel Systems Analysis Activity.

The manuals are based on the philosophy that, "A degraded or impaired performance is better than no performance at all." Therefore, some repairs will be improvised and may be considered unorthodox; but on the other hand, few of the battlefield fixes are expected to be permanent.

Draft pilot manuals are expected to be available by late 1983.

710 Tank Battalion

The 710th Tank Battalion will hold its 33d reunion and also observe its 40th anniversary from September 23 to the 25 at Monroeville, Pa. Interested persons should contact: H.S. Walker, Jr., 7 Circle Road, Darian, CT. 06820.

2d Division

The 2d (Indian Head) Division Association has set its 62d annual reunion at the Dunfey Hotel, Dallas, Texas from July 13 through July 16. Interested veterans should contact: Second Infantry Division Association, Dallas Branch, 2813 Sanders Drive, Garland, Texas, 75042 for details.

3d Armored Division

The 3rd Armored Division (Spearhead) Association will hold its annual reunion from 28 September to 1 October 1983 at the Denver Hilton Hotel, Denver, Colorado. For information contact: Clifford L. Elliot, 1262 East Green Road, Fruit Heights, Utah 84037.

11th Armored Division

The 11th Armored Division (Thunderbolt) will hold its annual reunion from 11-13 August 1983 at the Broadview Hotel, Wichita, Kansas. Contact Alfred Pfeiffer, 2328 Admiral Street, Aliquippa, PA 15001 for details. Home phone (412) 375-6295.

16th Armored Division

The 40th anniversary of the 16th Armored Division and the 32nd annual reunion of that unit will be held at the Frontier Hotel, Las Vegas, Nevada on August 11, 12, 13, 1983. For further information contact: Jack C. Ladd, P.O. Box 306, Lake Hughes, CA 93532.

104th Infantry Division

The "Timberwolves" will hold their 38th annual reunion at the Sheraton Twin Towers, Orlando, Florida, from August 31 through September 5, 1983. For further details contact: Franis R. Calamita, 841 Wesport Drive, Rockledge, FL 32955.

USAARMS History Instructor Seeks Interviews

The Military History Instructor, U.S. Army Armor School is trying to locate armor and cavalry officers and troopers who served in WW II, Korea, and Vietnam and would be willing to share their experiences with today's armor and cavalrymen and with serious military historians.

An oral history program has been established at the Armor School with the objective of obtaining such experiences and preserving them for future use.

Interviews will be conducted either at the home of the interviewee, or arrangements can be made for travel to Fort Knox, KY. Copies of the interviews will be held at the Armor School library and at the U.S. Army War College. Persons interested in taking part in this program should write or call:

Captain James R. Carlen
Military History Instructor
Command, Staff, and Doctrine Department
U.S. Army Armor School
Fort Knox, KY 40121

AUTOVON: 464-3420/5450
Commercial: (502) 624-3420/5450

Anniston Hot Line Available For Problems

The Anniston, Alabama, Army Depot has a telephone Hot Line available to answer operational and equipment problems.

The Alabama depot will help sort out problems on the *M-60* and the *M48*-series tanks, small arms, and missile guidance and control systems, including land combat support services (LCSS), ground TOW, TOW *Cobra, Dragon, Lance,* and *Shillelagh* systems.

The AUTOVON number is: 894-6582. A 24-hour answering service is available.

Callers should provide their name, AUTOVON number, unit identification, unit location and a complete description of the maintenance or operational problem.

Historic Flag in Cavalry Museum

An American flag that had been hidden by Filipino resistance fighters during WW II and that was the first U.S. flag to fly over General MacArthur's headquarters in Tokyo after the Japanese surrender, has been placed in the Cavalry Museum at Fort Riley, Kansas. The flag was presented on the occasion of the first annual meeting of the U.S. Horse Cavalry Association held at Fort Riley by Lieutenant Colonel Urcel Bell U.S.A. (Retired).

BOOKS

THE U.S. MARINE CORPS STORY

by J. Robert Moskin. McGraw-Hill Book Company, New York. 1982. 807 pages.

This is a clearly written well organized account of America's premier fighting force. It is not only a story about men in battle and the *espirt* of their Corps, but of their code of comradeship which made them special and drove them to success. It is also a story of America and its rise to power.

The author's central thesis is that US foreign policy has always required a marine force to protect its overseas interests. He maintains that today, with US foreign interest more diverse than ever, the nation still needs a Marine Corps.

Twenty years of research have gone into this book and although the author was never a Marine, he paints a clear picture of the Corps, its intense pride and fierce love of country. He traces the Corps' history from its beginning to the 1980s, and his explicit battle accounts place the reader into the conflict. In looking into the future, the author believes that the Corps "will serve as a corps of expert, volunteer fighters, trained and enspirited to give their lives to take their objective . . ."

This book is good reading for any military buff, but for a Marine, it has a special value.

GEORGE FINNERTY
Captain, USMC
Fort Knox, KY

THE LORDS OF DISCIPLINE by

Pat Conroy. Bantam Books, New York, NY. $3.50. 512 pages.

This is the story of Cadet Will McLean's struggle against a secret society at the mythical Carolina Military Institute in Charleston, South Carolina.

McLean's aid is solicited by the commandant of cadets, one Lieutenant Colonel Berrineau, to ensure that the first black cadet is given a fair opportunity to compete during his freshman year. Berrineau and McLean are principally concerned about a secret cadet organization called "The Ten" and how that group plans to persuade the black cadet to resign.

This potentially explosive situation is not the author's main concern. He has patterned the military school after The Citadel from which he graduated in 1967. His descriptions include even the red checkered quadrangles in each of the cadet barracks. The principal characters in the book are drawn from real personalities at The Citadel during the author's tenure there.

Conroy who also wrote *The Great Santini,* presents a poignant work about a young man struggling within the parameters of a rigid system to become a "whole man." The reader is left to wonder whether or not McLean is an authentic hero in that he achieves the end result of graduating by lying, cheating, and stealing, all of which he strongly opposes as a spokesman of the Honor System.

GEORGE A. CRANE
Captain, Armor
Phoenix, AZ

GEPARD: THE HISTORY OF GERMAN ANTI-AIRCRAFT TANKS by Walter J. Speilberger. Bernard & Graefe Verlag, Munich, Germany, 1982. 222 pages. $39.95.

The German Army was one of the first to appreciate the need for defense against aircraft and *Gepard* is a summary book on the provision of frontline air defense for the German Army. The first half is a brief description of German air defense weapons from 1870 to 1945 and the second half extends from 1955 to 1982, but is mostly about the *Gepard,* the 35-mm air defense gun system used by the West German, Belgian, and the modified system used by the Dutch Army. Also included is some information on the 30-mm *Wildcat* air defense system mounted on the hull of the six-wheeled armored transport "Fuchs" or TPZ-1 chassis, and other recent West German designs for mobile air defense systems.

The part devoted to the *Gepard* is very detailed, has excellent photographs, detailed drawings and clear text. There are a few translation difficulties, but the book is a must for the armor enthusiast.

GERALD A. HALBERT
Captain, USA (Ret)
Earlysville, VA

JANE'S MILITARY VEHICLES AND GROUND SUPPORT EQUIPMENT, edited by Christopher F. Foss, Jane's Publishing Company, Ltd, London, England. $140

The more than 700 pages in this third edition describe all of the ground equipment in use by military forces, except armor and artillery, which are covered in another Jane's volume.

This is a fact book and gives the specifications, variants, production figures (where available) and thousands of illustrations. Obsolete equipment is included if it is still in service, such as the US-built *M4* and *M5* high-speed tractors which are used by Japan's Self Defense Forces.

Types of equipment included are: armored engineer, recovery, wrecker, bridging, transportation (tracked and wheeled), construction, mine warfare, NBC and miscellaneous items such as portable roadways, signal shelters, assault boats, generators etc.

This is an invaluable reference volume for the serious student of military equipment, but the price tag may deter its purchase.

FRED W. CRISMAN
Major, Ordnance
Fort Knox, KY

OBSERVER'S DIRECTORY OF MILITARY AIRCRAFT by William Green and Gordon Swanborough. Arco Publishing, Inc., New York. 1982. 256 pages. $46.95.

It is one of the most up-to-date general references to military aircraft in service with countries throughout the world. This fact-filled volume . . . provides a concisely written review of information on the entire spectrum of military aircraft. The data includes general aircraft descriptions, performance data, history of development, production rates and development schedules. Multiple photographs and three-view silhouettes . . . contribute significantly to the presentation.

A super reference for the personal libraries of military aircrews and those interested in military aviation.

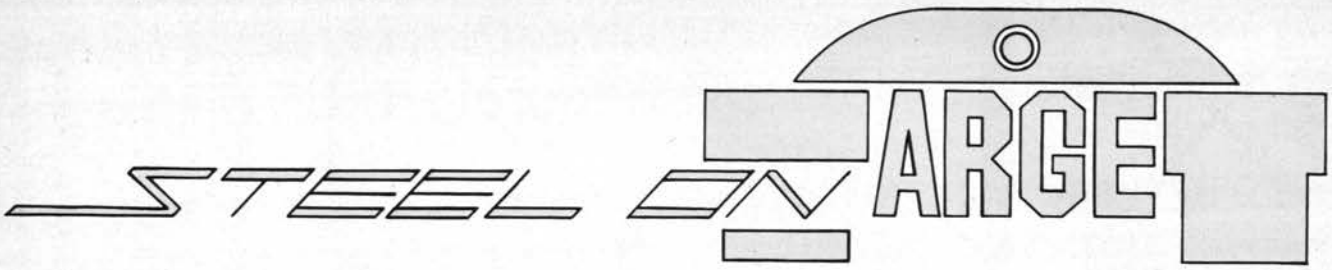
INSTRUCTOR STAFF
USAF Fighter Weapons School
Nellis AFB, NV

THE WARSAW PACT: ARMS, DOCTRINE AND STRATEGY by William J. Lewis. McGraw-Hill Publications, New York. 1982. 471 pages. $29.95.

This is a current and comprehensive survey of Warsaw Pact forces. It should be required reading for U.S. military professionals.

The author provides a detailed, well-written, and informative book. The book provides background information on the Warsaw Pact Treaty Organization and discusses each of the armed forces of the countries in the Warsaw Pact, including weapons and equipment and tactical doctrine. Numerous photographs and a host of graphics are included such as; organizational charts, comparative tables, maps and weapon system characteristics. A colorful display of Soviet/Warsaw Pact forces uniforms and rank and insignia badges is in the appendices.

JAMES B. MOTLEY
Colonel, USA
Atlantic Council of the US



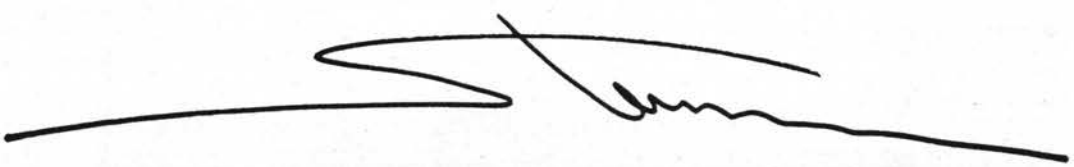
Since 1888, the Cavalry Journal, along with ARMOR has been the focal point of professional writing by armor and cavalry leaders. In those pages past, great debates were joined by the giants of our branch. Names like Chaffee, Patton, Clark, and Abrams have bylined dozens of articles. Their contributions added much prestige to our journal. Yet, as significant as their professional thinking was, the principal part of the professional writing published by our journal was contributed by hundreds of lesser-known authors. Their obscurity in no way diminished the quality of their commentary. On the contrary, the seeds of change were often sown by these writers.

The time is ripe for a resumption of the great debates traditional for our calling. The challenges faced by the Army and the Armor Force as we approach the 21st century in a dangerous world, demand a professional dialogue as creative and as thought provoking as that which took place among our predecessors. And the greater part of the professional writing in today's arena will again come forth from the pens of those lesser-know leaders who have something to say and take the time to say it.

The quality of writing is independent of rank. Were it otherwise, the giants of our past may never have risen to their heights for they began their writing careers as junior officers and pursued them vigorously in their rise to stardom. Encouraged by their professional journals, they nurtured their critical thinking and honed the discipline necessary to express it on paper. The sparks of insight which prompted their penmanship were gathered through discussions over coffee in the field mess, during moments of quiet reflection by the fireside, and while reading professional books and periodicals.

All professional journals, including ARMOR, need a constant flow of insightful articles and reader critique. A journal which provokes little reader response to its content is ineffective as a catalyst for professional discussion. Today, as in the past, articles of that caliber require a depth of knowledge of our profession gained through discussion, reflection and reading. And it means taking the time to put the words to paper.

Professional writing brings many rewards, not the least of which is the satisfaction of seeing your words appear in print. But, it has pitfalls too, and is not for the faint-of-heart. Those fearful of criticism need not apply, for the court of review consists of a jury of peers whose judgments may be severe. But, those who survive the test add immeasurably to the wealth of knowledge within our profession. Good Shooting!



Symbolism

The field is yellow for the cavalry and the blue triangle with the sun and three five-pointed stars are from the old flag of the Philippine Insurrection with a change of color. The three stars also represent the three tours of duty in the islands. The blockhouse is the old pride of the regiment, a representation of the actual one taken at San Juan Hill in 1898. The wedge is blue and recalls the fact that the 9th split the Spanish line at Santiago with the capture of the blockhouse when it charged dismounted as infantry. The crest is the well-known Scotch device signifying the alertness of the mounted man, and the arrows are for the Indian campaigns of the regiment.

Distinctive Insignia

The distinctive insignia is an Indian in breech clout and war bonnet, mounted on a galloping pony, brandishing a rifle in his right hand and holding a single rein in his left hand, all in gold, displayed upon a five-bastioned fort in blue edged with gold.

The five-bastioned fort was the badge of the Fifth Army Corps in Cuba, of which the Ninth Cavalry was a part. The yellow outline is for the Cavalry, and the blue for active service in the Spanish-American War. The mounted Indian represents the Indian campaigns of the regiment.

9th Cavalry

We Can, We Will

Lineage and Honors

Constituted 28 July 1866 in the Regular Army as 9th Cavalry. Organized 21 September 1866 at Greenville, Louisiana. Assigned 1 March 1933 to 3d Cavalry Division. Relieved 10 October 1940 from assignment to 3d Cavalry Division and assigned to 2d Cavalry Division. Inactivated 7 March 1944 in North Africa.

Redesignated 20 October 1950 as 509th Tank Battalion and relieved from assignment to 2d Cavalry Division. Activated 1 November 1950 at Camp Polk, Louisiana. Inactivated 10 April 1956 at Fort Knox, Kentucky.

Reorganized and redesignated 1 December 1957 as 9th Cavalry, a parent regiment under the Combat Arms Regimental System.

Campaign Participation Credit

Indian Wars
- **Comanches**
- **Utes**
- **Pine Ridge**
- **New Mexico 1877**
- **New Mexico 1878**
- **New Mexico 1879**
- **New Mexico 1880**
- **New Mexico 1881**
- **Montana 1887**

War With Spain
- **Santiago**

Philippine Insurrection
- **Without inscription**

World War II
- **European-African-Middle Eastern Theater without inscription**

Vietnam
- **Defense**
- **Counteroffensive**
- **Counteroffensive, Phase II**
- **Counteroffensive, Phase III**
- **Tet Counteroffensive**

Decorations

Presidential Unit Citation (Army) *PLEIKU PROVINCE,* **DA GO 40, 1967—for period 23 October-26 November 1965.**

Presidential Unit Citation (Army) *KIM SON RIVER—COASTAL PLAINS,* **DA GO 5, 1969—for period 2-24 October 1966.**

Valorous Unit Award, *BINH DINH-QUANG NGAI,* **DA GO 37, 1970—for period 10-31 October 1967.**

Valorous Unit Award, *FISH HOOK,* **DA GO 43, 1972—for period 1 May-29 June 1970.**

Valorous Unit Award, *VIETNAM—III CORPS AREA,* **DA GO 32, 1973—for period 1 October-31 December 1969.**