ARMOR

The Magazine of Mobile Warfare

September-October 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

Infantry fighting in the desert not only battle the sun and the heat, they must also combat a resourceful enemy. Major Ozolek's article on page 26 details many of the unique tactical problems associated with desert warfare from high-speed maneuvering to close-in defensive tactics.

LETTERS

Italian Armor History

Dear Sir:

I would like to add something to Lieutenant Colonel Pasqualino Verdecchia's article, "Italian Armor, Past, Present and Future" that appeared in the May-June 1983 issue of *ARMOR* Magazine.

The Italians were the *first* to use armored vehicles. These were the *Isotta-Fraschini* and *Fiat* armored cars used in Tripolitania in 1911-1912. They were successful, and were the foundation for the continued use of armored cars by the Italians.

During WW I, the Italians used armored cars, notably the *Lancia IZ* originally designed in 1914. Some of these armored cars saw service early in WW II.

Following the first use of tanks on the Western Front in 1916, the Italians were very interested in securing some for their own army. The French gave them a Schneider *CA-1* to test early in 1917. In May, 1918 the French gave the Italians four Renault *FT* light tanks with more promised. However production never exceeded French army requirements and the Italians did not receive any more *FTs*.

The Italians, meanwhile, had begun a tank production program of their own and by June 1918 had completed two of the six 40-ton *Fiat 2000s* they produced during the war. When tested against the Renault *FT* (at 6-tons) it was decided that the FT would be the more useful tank. They, therefore, produced the 6-ton Fiat *6000* just after the end of the war. One hundred were built and an improved version was produced in the late 1920s.

Around 1930 the Italians produced the 8-ton *Ansaldo* turretless tank in small numbers and in 1933 they made the 4-ton *CV* "tankette" series. These very small, turretless tanks were made in large numbers in the mid-1930s and served in the early days of the North African campaigns in WW II.

In 1939 the Italians began to produce the 11-ton *M11/39*, which was a fairly modern tank for its day.

There is another salient point that should be mentioned here. The frugal Italians retained every piece of serviceable ordnance they had procured in the breech-loading era up to WW II, and when they expanded their army, they issued every piece, including cannon from as far back as the 1890s, rifles from the same era, machineguns from WW I and all the tanks and armored cars from the interwar era. However, they had been careful to keep the number of cannon and small arms calibers to a minimum, so this issuing process worked.

A U.S. observer from the Ordnance Department in North Africa, before the U.S. was in the war, commented: "The Italians have been making fine weapons since the 16th century—you can tell, they are using them all . . . "

In WW II, the Italian army was continually frustrated in its operations by its arms and equipment and today's Italian army cannot be faulted for something that neither it nor its predecessor could control.

KONRAD F. SCHREIER, JR.
Los Angeles, CA

Seeks Thesis Assistance

Dear Sir:

I am writing a master's thesis on the effect that brigadier general S.L.A. Marshall had on U.S. Army training and doctrine, with special emphasis on the period 1946-1966.

I would appreciate hearing from anyone who served during this period, including junior officers and NCOs, who felt General Marshall's impact, either in school, by reading his works, or through personal contact.

Confidentiality would be honored if so desired.

I need to hear from both sides as I hope to be as objective as possible.

CAPTAIN F.D.G. WILLIAMS
2214 Engle
Dallas, TX 75224

KERR Advantages Noted

Dear Sir:

The article "British Armour in the Falklands," by Lieutenant Colonel Andrew R. Jones (March-April *ARMOR*) provided a very good insight into British armour in action. Also, the picture of a *Scorpion* and a *Scimitar* equipped with kinetic energy recovery ropes (KERR) was interesting, as was the descriptive use of KERR.

The KERR was tested at Fort Knox during March-April 1980 in support of the Battlefield Recovery and Evacuation Capabilities Study, Phase IA, and a separate report was made on the KERR capabilities by the Armor Board.

Since that test, TRADOC, through the Ordnance Center and School (OC&S) commissioned a KERR concept evaluation program (CEP) at TECOM during July-December 1982. The results were published in January 1983 and the OC&S Proponent Evaluation Report (PER) was submitted to TRADOC in March 1983. Both the test report and the PER were favorable and recommended adoption of the KERR under certain conditions.

At TECOM over 480 recovery pulls were made using various KERR sizes on the *M1*, *M2*, *M60*, *M113*, *M88* and the *M578*. In fact, the *M2* recovered the *M1* (with powered tracks) in just one or two pulls. All other tests were accomplished with the mired vehicle unpowered and full recovery was made by a like or similar-sized armored vehicle in one or more pulls.

The trials and tribulations of armored vehicle recovery are major problems for all operational and training units and the KERR seems to be the first alert recovery method to be actively considered since the advent of the *M88* in 1958 and the *M578* in 1962.

ROBERT A. WEBSTER
Arlington, VA.

Ordnance Corps Has New Magazine

Dear Sir:

The Army Ordnance Corps' new quarterly journal, *ORDNANCE*, began publication in May on the occasion of the Corps' 171st birthday. It will report on Corps activities, present news and feature articles, and provide timely information for military and civilian members of the Ordnance community.

Articles, letters, and photographs may be sent to:

Editor
The Ordnance Magazine
U.S. Army Ordnance Center & School
Aberdeen Proving Ground, MD 21005

STEVEN M. TITUNIK
Major, Ordnance
Editor-in-Chief

Officer Maintenance Course Lauded

Dear Sir:

There is a statement in the OPMS section in the May-June 1983 issue of *ARMOR* Magazine on officer personnel actions which amazed me. It said that it is now Armor branch policy that newly-commissioned officers could be sent to Airborne, Ranger or Infantry Mortar Platoon Officer courses on a voluntary basis, but that the Junior Officer Maintenance Course (JOMC) would be restricted to those officers whose gaining command specifically requested they attend. This implies that the former three courses are considered more valuable to the armor officer than the latter.

I stand incredulous! The armor force cannot accomplish its mission if its tanks don't run. Armor is more vehicle-dependent than any other branch.

The JOMC training I was lucky enough to receive in 1980 has helped me too many

times to recount here. The confidence I gained in being able to correctly maintain the vehicles I would be responsible for was invaluable, both as a platoon leader and as an XO.

Every armor officer should be sent to the JOMC.

On the other hand, I cannot remember a single instance in which knowledge of the correct method of performing a parachute landing fall or planning a long-range, dismounted infantry patrol would have materially helped me do what I get paid to do. Granted, the experience is nice, but how vital is it?

I think that it is just possible that Armor branch has its priorities backward in this case.

CHARLES R. GRAHAM
Captain, Armor
Austin, TX

Disagrees with Soviet Formations

Dear Sir:

The idea that an understanding of Soviet wartime armored organizations helps to explain current Soviet organizations was interestingly displayed in "Soviet Wartime Tank Formations" in the May-June 1983 issue of *ARMOR* Magazine. There are, however, some details that need clarifying.

The basic premise that the Organization Department of the General Staff was the sole, or even the major, agent in determining the organization of an armored force is incorrect. The major decisions affecting the growth of the armored force in the 1930s were made by Stalin as head of the GVS (Main Military Council), in cooperation with the recommendations of various elements of the Red Army. The Organization Department was merely an administrative agency.

The material dealing with the organization of the armored force in 1941 is also incorrect. There was no such organization as a 1940 Tank Corps. The four tank corps which had existed since 1938 were disbanded in November 1939 after the dismal performance of two in September 1939 in Poland. They were initially replaced by four motorized divisions with only 275 tanks. These formations were shortlived as, in 1940, the Soviets decided to reform their large armored formations as the Mechanized Corps. A total of 29 such corps were in various stages of formation up to the outbreak of the war, and they had a nominal table of equipment *(shtat)* of 1,031 tanks and 268 armored cars each. They were not organized on the German pattern, as suggested.

The German intelligence people were not completely unaware of the existence of the *KV* and *T-34* tanks, but, for various reasons, kept the field commanders largely in the dark.

The restructuring of the armored forces took place in July-August 1941 when the Mechanized Corps were disbanded. The tank battalions and tank regiments that existed in this period were merely continuations of the infantry tank battalions and cavalry tank regiments that had been attached for infantry and cavalry support in the pre-war divisions.

There were four TO&Es for tank brigades in the period July 1941-December 1941. The brigades formed in August 1941 had 93 tanks, but in September 1941 were reduced to 67 tanks. In fact, the brigades were often much smaller than the TO&E would suggest.

There were two new tables authorized in December 1941, each with 46 tanks. The infantry tank brigades, intended for support of infantry (rifle divisions) had a mixture of light tanks, medium *T-34s* and heavy *KVs*. The cavalry tank brigades had no heavy *KVs*.

The tank brigades were reorganized three more times in 1942, in February, April and July, going from 27 to 46 to 53 tanks. The table in the article resembles the December 1941 TO&E for an infantry tank brigade.

The independent tank regiments formed in the autumn of 1942 were not "Specifically for joint operation with infantry formations." The independent tank regiment TO&E of September 1942 was authorized as a replacement for the independent tank battalion of November 1941. It was developed mainly to flesh out the new mechanized corps and could be attached to rifle or cavalry divisions. The independent heavy tank regiments, incorrectly referred to by the German expression "independent Guards tank breakthrough regiment," was authorized under the October 1942 TO&E. These units had been formed following repeated complaints from tank brigade commanders that the heavy *KV* tanks were too slow to keep up with the light *T-60* and the medium *T-34* tanks and that they repeatedly caused delays which hampered operations. As a result, the *KVs* were isolated in independent tank regiments and were used to support tank and mechanized corps, or rifle divisions.

The Guards designation was simply an honorific bestowed upon units that distinguished themselves in combat.

The structure of the Soviet armored force had *not* reached its final form in the summer of 1943. Through the fall of 1943 and into 1944, the Soviet armored force instituted many important changes in their units' organizations, most notably the strengthening of the SP artillery of the tank and mechanized corps, introducing the homogenous tank brigades, and considerably increasing the number and type of assault gun formations.

There are frequent references to "armored personnel carriers" (APC) in the charts. There were no APCs in any Soviet TO&Es in the war. Vehicles like the *Bren Gun Carrier, M3A1* scout car and U.S. halftracks were included in TO&Es as armored transporters and were used as command or supply vehicles, or as scouts. They were not used as mechanized troop vehicles by motor rifle formations.

Figure 4 refers to a heavy tank and SP gun regiment equipped with 23 heavy tanks, 21 *ISU-152* and 42 *SU-100* guns. The mechanized divisions, even in 1945, had no *SU-100s*, these were alloted to the Guards SP artillery regiments. Nor did they have heavy tanks except when a heavy tank unit was attached. Their assault gun complement consisted of a heavy SP gun regiment with 21 *ISU-122* or *ISU-152* assault guns, a light SP artillery regiment with 21 *SU-76* light assault guns, and a tank destroyer battalion with 21 *SU-85* tank destroyers.

The notion that Soviet tank armies were homogenous is not correct. While it is true that after the summer debacles of 1942, the tank armies tended to be formed around a pair of tank corps and a mechanized corps, there are many instances where the composition of the various tank armies was different. In many cases, the tank army had only two corps.

For *ARMOR* readers who do not read Russian, articles on the Soviet Mechanized Corps in 1941 by J. Goff have appeared in the Canadian tank newsletter, *AFV News* (Vol. 17, Nr. 4) and recently by Michael Parrish in *Military History*. For a more detailed look at the tables of organization and organizational changes in the Soviet armored force in 1941-45, my article "Organization of the Soviet Armored Forces 1949-45" appeared in *AFV News* (Vol. 16. Nr.2). Also, in February 1984, Arms & Armour Press, London, is planning to release *Soviet Tanks of World War II: The Mechanization of the Red Army 1920-1945*, by myself and Canadian, James Grandsen.

STEVE ZALOGA
Greenwich, CT

Soviet Tank Formations Discussed

Dear Sir:

Having read and, hopefully, understood the article "Soviet Wartime Tank Formations" in the May-June 1983 issue of *ARMOR* Magazine, I wish to raise a few questions and observations concerning some of the conclusions drawn therein.

Although the political ramifications of the Soviet armored doctrine were only briefly considered, I am left with the concept that, per the statement ". . . 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," tactics would have virtually no impact on Soviet armored force doctrine and development. In short, since the Soviets did set about winning WW II against a similarly outnumbered and technically advanced enemy, we would have to fully develop and field a stable of weapons, geometrically advancing the state of the art, in order to impose any form of rethinking on their military scientists and the General Staff. A fascinating concept.

If we accept that as the case and that, as the authors have mentioned, the extreme centralization of the military force structure supports the mathematical solution to *mechanical* (operational/tactical) problems, we could, indeed, assuming a large enough budget and long enough lead times, develop weapons just prior to a war

which would throw their plans entirely out of control. On the other hand, history seems not to cooperate in such a solution.

If we look at the period just prior to and the opening months of WW I, we would find that weapons then considered well advanced—the Skoda 305-mm siege guns, were of practical value in one effort (the German sweep through Belgium), but of limited value shortly thereafter. By the time the battles around Verdun opened, the daily encounters with the smaller field cannon led to a series of tactical and doctrinal changes recognized first by the French, but quickly implemented by the Germans. Specifically, in a move to degrade the effectiveness of artillery fire, the frontline trenches were thinly manned and reserves were placed in prepared secondary positions. By such *tactics,* the prewar doctrine of applying a mathematically calculated number of high explosive rounds per square meter of ground was rendered ineffective.

Failing with artillery to break the German lines, the Allies sought technological solutions to achieving the breakthrough. Tanks were developed and although as effective as the giant Skoda siege guns in their initial use, the Germans quickly developed tactics and weapons to counter this new menace.

I question, then, how much can we count on a weapon design, no matter how advanced and unexpected, to yield a victory in and of itself, if such a technological solution is considered the only other major driving force (outside of political decisions on a strategic level) to an internally-generated change in Soviet military doctrine? As was highlighted, given the number of tactical and doctrinal changes forced upon the Red Army through the years 1941-1945, can we reasonably expect that suggested changes in tactics, either Western or Soviet, prior to hostilities or within the combat timeframe, will have no impact on the development of Soviet armor tactics, doctrine and philosophy?

It seems that the most significant problem met by Soviet military thinkers is the same one constantly met by Western theorists: that *tactics* are an incalculable factor. Tactics are, therefore, the elements that are not only least easily qualified, but least understood. As such, it appears that tactics are the factor most disregarded in the Soviet Union as is morale, as a concept, disregarded here.

I would also question the suggestion that the revolution instilled the need for industrialization in Russia.

Another question concerns the development of the Soviet armor tactical force structure during the war years. While it is noted that the 1942-43 Soviet tank corps was based on the successful tank brigade pattern of late 1941-early 1942, a thought to consider is that Stalin habitually upgraded the formation status of various units. Thus, an antitank gun unit of 24 guns labeled a *battalion* in most other wartime armies, received the title *regiment* in the Red Army. Similarly, a 1942-44 tank *brigade* officially numbered as few as 65 tanks in three battalions of 21 tanks each, while the *corps* contained at most some 200 armored fighting vehicles in the same time frame. It seems, therefore, that it was not so much the *division,* but the *corps* that disappeared in all but name—another political solution.

An interesting point, though somewhat vague, is the discussion of the full motorization of the Soviet Army during the nuclear revolution. My question is whether the authors see the full motorization of the Soviet Army in an *armored format* as a natural progression in Soviet postwar mobile group development, or as a means for the Soviet ground forces to wrest back some greater measure of authority in national defense issues by demanding motorization not with trucks, *per se,* but with specifically designed and designated armored personnel carriers?

Finally, I agree with the authors that the rear area will probably be the point that will break a Soviet offensive. Just as in WW II, the Soviets will know little about where the enemy reserves are if they are constantly maneuvered—and will have little better means to overcome such hard points, especially given the centralization that demands accurate knowledge and planning for such enemy forces. It, therefore, seems most important to suggest once again that if the Soviets may be expected to attempt to locate and identify such reserves, every effort must be made to confuse the situation and the Soviet intelligence elements attempting to trace the strengths and whereabouts of such forces.

JOSEPH R. BURNIECE
Project on Military Procurement
Washington, D.C.

We Must Handle Change

Dear Sir:

In his opening remarks at the 1983 Armor Conference, General William Richardson, Commanding General, TRADOC, spoke of the "awesome impact of change" upon our current systems, doctrine and attitudes. Change is indeed inevitable in a robust organization, but response to it by established groups and institutions is not, however, always painless.

The history of armor points to the fact that soldiers have always sought to have more speed, more shock effect, and maneuver space and time at their disposal. Also, many soldiers of earlier eras were perceptive enough to take the personal and professional chances associated with advocating new concepts. New ideas will always have their advocates, if none other than those who stand to profit in some way by their adoption.

The early efforts at mechanization were slow and haphazard, and tied to the technology of the time. Fortunately, doctrine for the use of these new weapons was limited only by the imaginations of its proponents.

In the U.S. after the WW I Tank Corps was disbanded in 1920, the infantry gained proponency for the tank—a weapon which many then believed to be of use only in support of the footsoldiers. The breakpoint came a few years later as more reliable tank chassis were developed. When cavalrymen finally obtained vehicles which were suited for traditional cavalry missions, theorists could at last field test the ideas which had, before, been only outlined on paper. By the late 1930's, advocates of mechanization within the cavalry and the infantry had seized the initiative from their opponents in what might be best described as a classic organizational struggle within the army.

Overseas, as the earliest foundations for the *blitzkrieg* were laid on Salisbury Plain in England, theorists realized that change was being thrust upon them—whether it had been courted or not. Likewise, in Germany, Guderian and other bright, young officers had to fight their own battles for acceptance. They did, however, have the receptive ears of a number of men who realized that Germany had little to lose by testing in war the radical ideas of integrated land and air operations.

Today, we, too, are faced with an environment of change in which the army is adopting the vehicles, tactics, doctrine and technology with which it will enter the 21st century. Many of us realize that we are at a turning point in the history of our army.

New ideas, should, therefore, not necessarily be rejected out of hand—as were the ideas for new roles for the tank in the 1920's and 1930's. We must simply learn to accept and to adapt to live with change. Given this, we should then learn to *innovate.* As innovators, we should be prepared to make the most out of our resources and we should be prepared to initiate change ourselves and to think about how our weapons and units are to be organized and used. Thus, we must not only accept what is given, but we should consider change for the benefit of the army.

Those who are willing to do this will have the greatest impact upon the army in the future—for they will always be mindful of the premise that they must always seek the best.

EDWARD G. MILLER
First Lieutenant, Armor
Headquarters, II ROTCR

Australian Comments

Dear Sir:

May I be permitted to offer comment on two articles in your March-April 1983 issue?

First, there is an incorrect caption on the photographs on page 41 of Richard Ogorkiewicz's article on the Vickers *Valiant.* The top left photograph is a Vickers 37-ton main battle tank *Mk 3,* not a *Valiant.*

Second, some parochial comments on Lieutenant Colonel Thach's review of John Robertson's *Australia at War* on page 52. The Australian and British forces beseiged in Tobruk were taunted by German radio

propaganda as being penned in Tobruk like rats in a trap. The Tobruk garrison at once began to call themselves *The Rats of Tobruk.*

The *Desert Rats* was the nickname of the British 7th Armoured Division which was raised in Egypt before hostilities commenced in 1939. The name derives from their divisional sign, the Jerboa. Colonel Thach has managed to confuse what are arguably the most famous nicknames to come out of respectively the Australian and British armies in World War II. Notwithstanding these minor points, it is encouraging to see Australian military history being reviewed in your pages.

W.W. HOUSTON
Major, Armour
Australian Armour Centre

(The cutline was misleading. As stated in the article, the Valiant design is based on that of the Mk 3. Ed.)

Tank Table VIII—A Rebuttal

Dear Sir:

Having read Major L. Blackburn's article, "Tank Table VIII Needs to Be Improved" in the March-April 1983 issue of *ARMOR* Magazine, it is one man's conclusion that he belongs to another armor community than mine.

His principal thesis, that "Table VIII is a questionable measure of tank crew proficiency," is a foregone conclusion, immediately conceded by most trainers in the U.S. Army.

Tank crew *battlefield* proficiency, is conveniently defined by the major, as proficiency in the following skills: target acquisition, target identification, marksmanship, tactics, mobility and use of terrain.

Target acquisition and marksmanship are the collective tasks outlined in FM 17-12, *Tank Gunnery* while target identification is an individual soldier skill that is tested during the common tasks phase of the Skills Qualification Test. Tactics, mobility, and terrain use are parts of Army Training and Evaluation Program (ARTEP) 71-2.

The Army's concept of tank crew training includes individual, crew, platoon, and company-level tasks. The culmination of the platoon or tank section training is Table IX and the ARTEP live-fire exercise.

There is and continues to be a critical need for Table VIII with the primary objective being tank gunnery, i.e., *target acquisition,* and *marksmanship.* Major Blackburn, having started with an acknowledged conclusion, has erroneously slandered the importance of Table VIII and the viability of the engagements. It is, therefore, imperative that his arguments be laid to rest.

Why should Table VIII teach target acquisition and marksmanship? The essential element of training obtained from the tables is the *instinctive actions* required to put steel on target. Most of the ARTEP tasks require *deliberate thought:* Should I move my tank down that gully and around the hill? How do I fight this position? Where is the alternate position—wedge, echelon left, line? On the other hand, tank gunnery teaches that when the crunch comes, he who shoots first, skillfully, and accurately, wins. I do not particularly want my crew to think about it—just react. We ain't where we want to be with Table VIII tank gunnery, but we're getting there.

In Europe, tank crew examiners (TCE) no longer point out targets. We may get one flash from a Hoffman device per engagement (not per target) if the thing works. Considering this, target acquisition is alive and well on Table VIII. While my "survival" on Table VIII does not depend upon target acquisition, my qualification does. Quite frankly, target identification (friend or foe) has no place on Table VIII.

In the defense, while I'm in my hide position, the man in the observation post can play target identification games. That's why he is out there. I'll move with the enemy in sight.

In the attack, unannounced friendlies had better watch out. With the adrenalin pumping and the enemy identified to my front... I'll bet my soldiers shoot first and ask questions later.

I also disagree with his engagements. The need for engaging the flank of a moving tank should not be discarded from Table VIII, as the major suggests, just because we do not expect the enemy to frequently offer the opportunity. Using the LASE/LEAD buttons, or the standard mil lead relationship, is an integral skill of tank gunnery that needs to be assimilated as a reflex action.

Furthermore, the current battalion-level defensive tactics encourage the use of battle poslitions that plan for flank shots.

The major proposes a head-on moving tank as a replacement for the flank tank engagement. Mathematically, it can be shown that a head-on tank (defined as $\pm 15°$ from a gun-target line of 0° with the firing tank as the base) would have to travel approximately 100 mph at a range of 3,000 meters for the typical APDS to be OVER LINE, with the center of mass as the aiming point, on flat, level ground. The slope of the ground and terrain features are the real determinent factors. (Pull out your firing tables and try it—or write me a letter for a better explanation.)

I am not clear on the major's reference to the relationship of luck, Table VIII, and ammunition conservation. I do know that skill and professional competence make their own luck. Ammunition conservation has never been a problem throughout the 3d Armored Division for Table VIII. Ammunition conservation as a criteria, however, should be changed.

The most serious, but totally overlooked, result of the present Table VIII structure is a generation of tankers who have learned to "G2" the course and apply precise "solutions" for engaging the targets presented.

Tank crew "G2-ing" is the most practiced art on Table VIII. We have literally educated outselves to qualify on Table VIII. If one target is presented any experienced tank crew can tell you what additional targets make up an engagement. But have you ever seen the result of presenting a machinegun engagement totally unexpectedly? TCs grab for electric switches and main gun rounds frequently fly down range instead of coax fire.

Bottom line: Define all standards of time, re-runs, obscuration, etc. Ensure that the end product provides the desired training to achieve the required proficiency.

I recommend that a totally random scenario be developed that will provide 500 or more combinations or permutations of target arrays and engagement standards. For example:

(Day) TASK: Each tank crew will engage 10 main battle tanks, 1 observation helicopter, 1 moving truck, 2 ATGMs, and 2 infantry squads.

CONDITION: Within time standards set per individual target, any array of any number of targets may be presented.

STANDARDS: 70 percent of the engagement is completed within the combined time limits per target.

We all can't be Butch Cassidys, but we can prepare for the unexpected—that is the goal.

Let's set the standards and train to fight.

MICHAEL A. BURTON
Captain, Armor
HHC, 3-33d Armor

Near Death Experience

Dear Sir:

I am currently engaged in a graduate research study concerning the "Near Death Experience" as it occurs in military combat situations.

I would like to hear from veterans of all branches who have had any unusual experiences during a close brush with death in combat. Information will be held in strict confidence and identity of respondents will not be revealed without permission.

I can be contacted at PO Box 540, Willow Grove, PA 19090, or call me collect at (215) 659-3900.

ROBERT M. SULLIVAN
Captain, USAR (Ret.)
Willow, Grove, PA

The T-64 Discussion Finale

Dear Sir:

I am writing to offer both some clarification as well as some comments with regard to the March-April 1983 issue of *ARMOR* Magazine Letter column.

With regard to Mr. Zaloga's letter, (*T-64* Article Questioned), he failed to discuss one very distinct possibility. While Viktor Suvorov states in *The Liberators* that his unit was the first to receive the *T-64* in 1967, adherence to this year as being the debut of the *actual T-64* is nothing more than speculation. Several sources, including *International Defense Review,* have reported that the predecessor of the *T-64* was identified prior to the first public

appearance of the *T-62* in 1965. This vehicle, the *M1970* or *T-70* tank, has not only been clearly associated with the start of the *T-64* program, but has also been widely displayed by the unclassified press for several years. The available information suggests that the *M1970* or *T-70* was produced in limited numbers during the very early 1960s. It seems quite possible that the Soviets would have had ample time to start production of an improved model of the *M1970* or *T-70* before 1967. Then, is it not possible that this improved model (the *T-64*) was put into production as early as 1966 or even 1965? Is it not also possible that the first batch of *T-64s* were in fact fitted with the *T-62s* 115-mm main gun, until the new *Rapira* 125-mm gun became available and was retrofitted? This theory has been substantiated by several unclassified sources including *Jane's Armor and Artillery 1981-1982* and *The Soviet War Machine.* It appears that Mr. Zaloga may have made the decision to base his theory solely on the information provided by Mr. Suvorov.

Secondly, I would like to congratulate Messrs. Burniece and Hoven on their article "Soviet Heavy Tanks" in the March-April 1983 *ARMOR* Magazine. I would, however, like to add a few comments. The similarities between the British *Chieftan* MBT and the *T-64,* while present to some degree, do not seem to be quite as remarkable as reported. The British influence on Soviet tank design will probably become most apparent with the introduction of the future Soviet tank (FST). The widely reported acquisition of Chobham armor by the Soviets, combined with some of the attributes which had previously been ascribed to the *T-80* MBT, would seem to indicate that a remarkable similarity will exist between the FST and the new British *Challenger* MBT. The *T-64,* on the other hand, appears to be much more closely related to the American *T95* MBT which was developed between 1954 and 1961. The *T95* mounted a variety of smoothbore main guns each firing armor-piercing, finstablized, discarding-sabot (APFSDS) ammunition as well as having the latest form of composite armor. This similaity is indeed remarkable. The ideas and concepts brought out by Messrs. Berniece and Hoven; i.e., the *T-85* with a welded turret (an early look at the FST?), the possible tank mounting of the 130-mm cannon (along with the following possibilities of the 130-mm APFSDS), and the possible role played by the *T-64* in the Soviet tank plan, constitute the type of thinking that is demanded to stay abreast of an ever-changing situation.

JAMES M. WARFORD
Captain, Armor
Fort Hood, Texas

Taking a Byte Out Of Time

Dear Sir:

In the past year articles in *ARMOR* Magazine and other professional military journals have included direct or passing remarks about the use of computers below the division level. This development is worthy of some comment.

First, a little history. The seeds of this supposed development were sown in late 1980 by two events: the introduction of a few early prototypes of the affordable home computer, more or less at the same time as the proliferation to the individual soldier's level of highly-technical military equipment. Soon thereafter an article appeared in *ARMY* Magazine by Lieutenant Colonel Frederick Timmerman who cited the current deluge of administrative requirements—all of which end up being done manually at the undermanned company.

Today, some improvements to this situation may exist. There are word-processors at the battalion level and the TMACS computers at brigade, along with obsolete magnetic-card typing systems, which are also at brigade level. The first two are certainly top-to-the line machines; but are they paying their way? I submit that they are not.

The evidence for this is found in their use. Despite the existence of the word-processors, which are tremendously expensive for their small capabilities, companies are still waiting a long time for their paperwork, or else (heaven forbid!) doing it themselves on the XO's typewriter! The TMACS computer is being put to other uses as fast as home-grown programmers can crack its language manual. Through personal knowledge, or through contact in such journals as *ARMOR,* one discovers that the personal computer is being used to handle not just such sweeping tactical applications as independently-developed fire support programs of USAREUR and the 2nd Infantry Division, but also the personally-written programs helping company commanders handle the planning and administrative functions that cannot seem to get done any other way.

At Fort Benning, GA, programs are being developed to coordinate the use of video discs to simulate situational training. The point is that a huge amount of professional and difficult work is being done by a large number of independent operators and there is, unfortunately, very little coordination between these authors. The following is proposed as a way to help these people get together in their work:

Concept. A clearing house for existing public-domain programs addressing military-oriented applications.

Hardware. Basic-language computers with tape or disc drives. All models to have a video screen and a printer of minimal quality.

Services. Unless someone has more time and money than I have, an electronic bulletin board will not be provided.

Programs. A listing of currently available free programs, all of which have been tested by the service to ensure that they do load and work and to be available at cost.

A listing of commercially available programs might be available, if provided and paid for by the commercial enterprises. These would *not* be guaranteed to do anything unless the company was prepared to provide a sample for testing. The companies would have to be assured that the programs would not be pirated before being returned.

A listing of applications for which requests have been received but solutions were not availabale would be given to programmers on request, at cost, to help them solve problems rather than invent them. The need exists here to determine whether to allow professional programming houses to acquire such lists for their commercial ends and, if not, how to prevent this.

Program specifications. At first, basic programs compatible with machines as listed earlier. Initially all programs would be distributed in the form of listing sheets. Later, disc-loaded programs may be possible, at cost. Programmers would also provide a listing of all variables used in the program to allow local improvements. Finally, all programs will have to be copiable to a reasonable degree—we're talking about a public service. This should also apply to future, commercially, ready-to-run programs, allowing at least limited backups because responsive service to a unit in, say, Korea, is not expected.

In summary, if demand warrants its execution, it is suggested as a public service to all those who spend their home hours working on military business in front of a CRT. Those interested should contact me as the initial coordinator. I will be on TDY much of this year and wish to make it quite clear that there are many others who are more qualified to take charge of this idea. So, if anybody wants to begin, they are welcome. Just let me know. Good luck!

DOUGLAS M. BROWN
Captain, Field Artillery
Fort Benning, GA

Dislikes Deep Thrust Doctrine

Dear Sir:

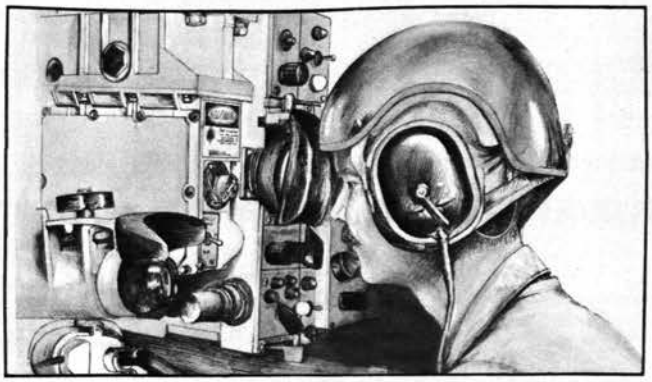
As a combat veteran of WW II and a practitioner of the world's second oldest profession (armchair general), I have been following the current debate over the army's new (?) fighting doctrine that emphasizes maneuverability, mobility and quick counterattack behind enemy lines. That has been the name of the game since ancient armies first developed cavalry. However, it is easier contemplated than accomplished.

General Harmon, in his history of the 2d Armored Division "Hell on Wheels", describes two campaigns with which I have some familiarity. In both, he planned to unleash his armor to sieze a line along the Roehr River and to secure crossings in preparation for a further advance to the Rhine. Provision was made for crossing the Rhine on the run and heading straight for Berlin. Both campaigns proved to be costly failures, despite the fact that we possessed all the marbles.

In the general's words, the 19th Corps was attacking against "second and third rate German troops formed into small combat teams without any thought to overall unit identity or integrity." However, despite the superiority of our arms and the cohesion of our units, after a week of

MASTER GUNNER'S CORNER

Captain Donald J. Burton
Accuracy Studies Team
USAARENBD, Fort Knox, KY



Other Uses of the Accuracy Screen Test

When conducted as part of a tank main gun firing exercise, the Accuracy Screen Test, (AST), as described in TRADOC Training Text 17-12-1, can provide commanders and master gunners with an indication of the unit's maintenance readiness and training capabilities. Originally designed as a deliberate test of the firing system, the AST can also be used to determine crew levels of boresighting proficiency and to validate maintenance procedures.

The purpose of the AST is to identify tanks that do not shoot accurately under the calibration policy procedures. This exercise has an easily recognizable pass or fail criteria and is designed to replace some of the live-fire events typically conducted on Table VI. Since the test is fired against tactical targets at relevant engagement ranges, it imparts confidence and reinforces training to the crew as well as having diagnostic value to the trainer and maintainer. Tanks that pass the AST continue to be used for training. Tanks that fail need to be evaluated by a team designated by the commander, including the unit's master gunner and senior turret mechanic, to look for inadvertent crew error or evidence of mechanical defect. Once the fault is corrected, the crew should refire. Tanks that fail the AST are probably not capable of firing combat rounds well and the number one priority is to find the error and correct it.

The U. S. Army Armor and Engineer Board's Accuracy Studies Team has designed a program that uses the reporting format from the TRADOC Training Text 17-12-1 (Annex G) as input to monitor initial unit experience under the revised tank main gun calibration procedures. Unit or local commanders can observe a training or maintenance problem while conducting the AST and take steps to correct it before the unit completes the test. Master gunners can be better employed on tank ranges as gunnery and turret maintenance experts instead of spotting rounds through a BC scope. For example, if a well-maintained tank with a well-trained crew is consistently shooting poorly, the master gunner may be the only person on the range to recognize the cause of that problem. Simple faults like a loose periscope head or a faulty computer card, may allow the tank to pass prepare-to-fire checks and this can cause a crew, using correct gunnery techniques, to fail the AST. With the program, USAARENBD can track the pass or fail rate of a particular system and can observe training or maintenance problems army-wide.

Initial analysis of returned Annex G reports has revealed that 50 percent of the tanks that fail the AST failed as a result of crew error. The other 50 percent has been attributed to mechanical fault. Some common crew errors that cause tanks to fail include the failure to correctly place the correction factor on the gunner's primary sight, improper boresighting, and failure to update the boresight a minimum of three times daily. This should be done morning, noon, and just before last light. Reboresighting throughout the day helps account for the movement of the gun tube as a result of the tube unevenly warming from sunlight. This maximizes the accuracy potential of the firing system. TRADOC Training Text 17-12-1 also contains an appendix for each tank type titled "Armament Accuracy Checks." Conducting the checks *before* occupying a range will result in fewer tanks failing the AST due to mechanical fault.

At Fort Knox, a widespread training or maintenance shortcoming can be corrected with increased training by the proper departments within the Armor School or by developing new equipment or techniques to correct the problem. USAARENBD plans to provide commanders down to battalion level with a copy of the program's results twice a year, so that units can ensure that proper training and maintenance are conducted before occupying a range. Substantial savings in range time and ammunition gained by changing to the calibration policy can be increased by correcting common training deficiencies and identifying potential maintenance problems early in the gunnery cycle. This results in more resources available to train by live fire or in the reduction of time needed to prepare a unit for combat. Careful analysis of AST reports, coupled with good gunnery and maintenance training, provide commanders and master gunners at all levels with a useful tool to gauge a unit's performance on the range and their readiness for combat.

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 44)

The Division Commander's Eyes and Ears

by Major Robert P. Bush

Considerable concern has been generated in the armor community by the Division 86 cavalry squadron operational organizational (O&O) concept which was approved by the Army Chief of Staff in August 1980. This O&O concept deletes the missions of *guard* and *cover* from the repertoire of the Division 86 cavalry squadron and includes the following:

- Detailed ground/air reconnaissance *within*, and to the front, flanks, and rear of the division.
- Command and control liaison.
- Line of communication surveillance (assist troop movement).
- Screening.
- Internal surveillance to facilitate rear area protection (RAP) operations (rear area combat operations (RACO) and area damage control (ADC)).
- Emplacement and monitoring of remote sensors.
- NBC reconnaissance.[1]

Of all missions and tasks, its primary function is detailed ground and air reconnaissance *within* and to the front, flanks, and rear of the division. This was the primary reason the chief of staff approved removal of tanks from the squadron's table of organization and equipment (TO&E). Another factor influencing the chief of staff's decision was the limited number of tanks and personnel available to equip the required Division 86 force structure.

Given the absence of tanks in the Division 86 cavalry squadron, the purpose of this article is not to argue the pro's and con's of tanks in that organization, although there is actually sufficient historical precedent to present good arguments for either position. Rather, my purpose is to explain to field commanders of all ranks how the Division 86 cavalry squadron may be used to its best advantage. The Division 86 cavalry squadron remains a very flexible, highly mobile, and durable asset that possesses a significant amount of fire power. This asset, properly used, greatly increases the chance for success on the battlefield of the late 80's and 90's. It's organization was specifically designed to be effective on Day 6 or 7 of the next war, as well as Day 1 or 2. The Division 86 cavalry squadron is shown in figure 1.

In order to accurately discuss the Division 86 cavalry squadron, a short discussion of the Corps 86 armored cavalry regiment (ACR) is necessary. Just as the principal mission of the divisional cavalry squadron is reconnaissance, the principal mission of the armored cavalry regiment is to provide the corps commander a self-contained *economy-of-force* unit for covering force missions,[1] which will attack, defend, or delay to provide battlefield reconnaissance and part of a security "umbrella" under which the corps commander may thrust and parry as he moves divisions in order to clearly establish superior combat power against the enemy's first- and second-echelon divisions. The corps security "umbrella" will also include intelligence information from echelons above corps and national assets. Additionally, the ACR may be used as a self-contained force to strike

deeply into the enemy's rear areas. The ACR is not able to provide the corps constant 360° combat security. This limitation and the corps commander's need to be able to quickly mass and disperse divisions clearly establishes two essential requirements. First, the corps commander must seize the initiative early by taking calculated risks and making justifiable trade-offs resulting from experienced, astute risk analysis as he literally and intuitively "sees" the battlefield. Second, divisions (as a whole entity) must be able to move rapidly as well as quickly mass and disperse their brigades and battalions laterally, forward, and rearward. These are not new requirements, but within the context of the modern, lethal, and highly-mobile battlefield, their relative value and significance is greatly increased. The current operational and organizational concepts of cavalry resulted largely from these premises.

Historical Background

The division restructuring study (DRS) of 1976 was the first step of the force modernization effort that resulted in the design of a force capable of success on the battlefield for the last 10-15 years of the 20th century. Structuring for the conflict in Vietnam caused the army to miss a modernization cycle. The most recent army reorganization had been in the mid-1960's as a result of the reorganization objective army division (ROAD) study. The Division 86 project was initiated in September 1978 by General Donn A. Starry, then Commander of U.S. Army Training and Doctrine Command (TRADOC). Division 86 was not only intended to define and develop a remodeled mounted division, but to institutionalize a process to conduct periodic force reviews and design the needed changes of major division components. This process is a continuing function of TRADOC schools today, and just as the DRS of 1976, its purpose is to determine the best use of new weapons to fulfill the tactical goals of achieving maximum firepower at the critical place and time on the battlefield.[2]

The current O&O concept for the Division 86 cavalry squadron evolved as a result of the years of study described above. Combat organizations and tactics are basically functions of evolving technology and the enemy's organizations, tactics, and evolving technology. B. H. Liddell Hart was years ahead of his time in 1928 when he wrote:

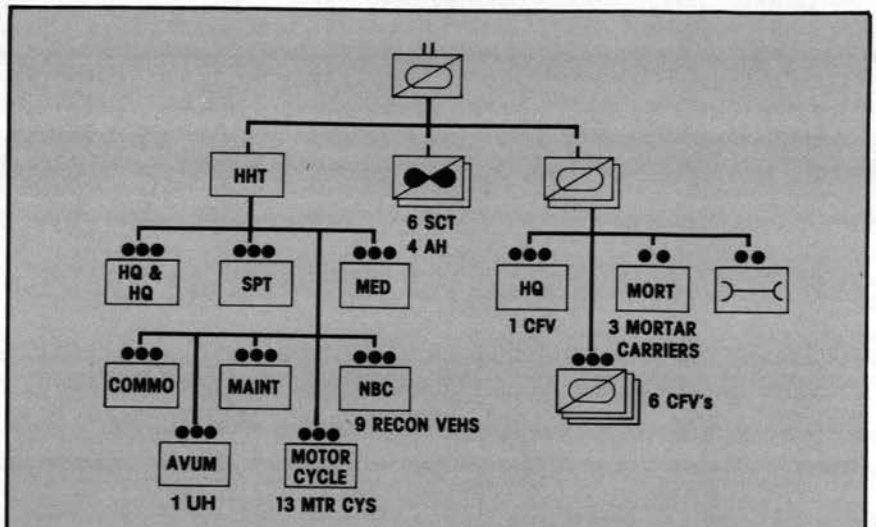


Figure 1. Division 86 Cavalry Squadron

"The infantry is the arm for fixing the enemy and the cavalry for the decisive maneuver—because of its natural suitability for rapid out-flanking movements, the devastating momentum developed during its charge, and the demoralising influence its furious onset inspires in exhausted or shaken troops.

"For in fulfilling its historical functions cavalry has assumed many different types and patterns.

"The deduction is that tanks are not an extra arm, or a substitute for infantry, but the modernised form of heavy cavalry."[3]

The logical conclusion is that the heavy cavalry formations of Gustavus Adolphus, Napoleon, both armies involved in our Civil War, and the U.S. in WW II have evolved into our current armored cavalry regiments and armored brigades.[4] Divisional cavalry will be employed more efficiently on future battlefields as the *eyes* and *ears* of the division commander. While many cavalry formations of recent and distant history engaged in major fights, these were, in almost every case, very large, heavily armed units organized around thousands of men and major com-

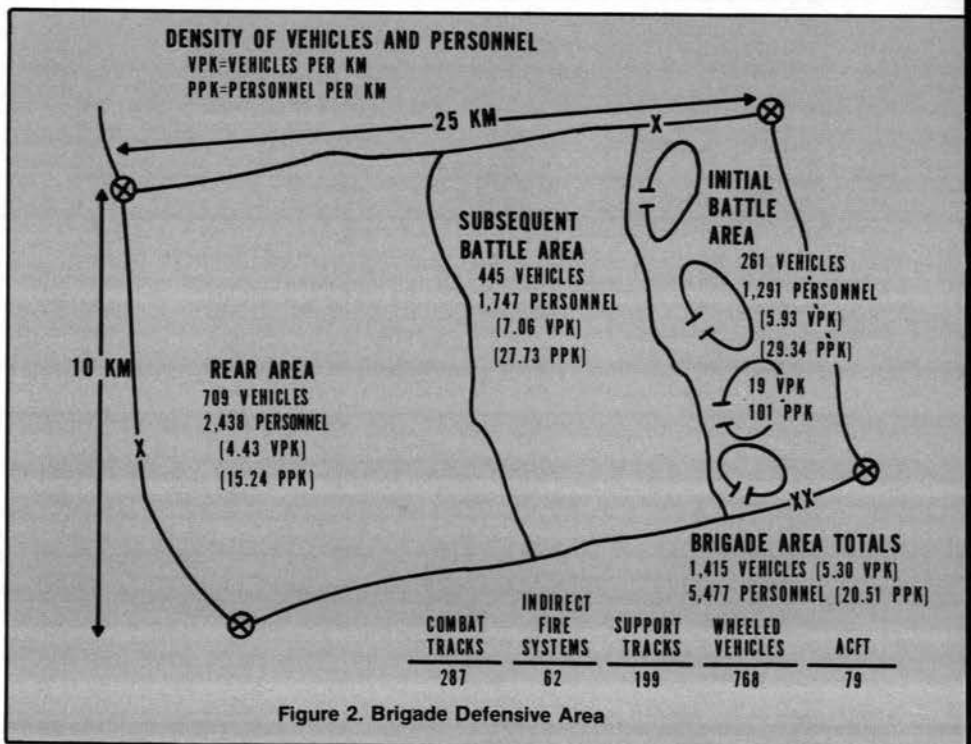


Figure 2. Brigade Defensive Area

bined arms formations. These were usually called cavalry regiments, groups, divisions, or corps. Our Division 86 cavalry squadron enables the division commander to maneuver his heavy cavalry i.e. his armored brigades, rapidly and accurately, to the decisive point on the battlefield — the enemy's flanks and rear.

FM 100-5, *Operations*, June 1944, directed that all operations should be designed to destroy the enemy through aggressive, offensive action by rapid, deep, and violent attacks into the enemy's flanks and rear.[5] Our current FM 100-5, *Operations* expresses exactly the same philosophy as the field manuals of WW II.[6] At that time mechanized cavalry was primarily a reconnaissance unit.

> "Mechanized cavalry units are organized, equipped, and trained to perform reconnaissance missions employing infiltration tactics, fire, and maneuver. They engage in combat only to the extent necessary to accomplish the assigned mission.
>
> "Reconnaissance units on reconnaissance missions contribute to the security of the main force by reporting the locations of enemy forces and by giving timely warning of ground and air attacks. Information and warnings are transmitted directly to units whose security is threatened and to higher headquarters. When opposing main forces close, mechanized cavalry may be employed on reconnaissance missions toward an exposed flank, used to maintain liaison with adjacent units, or placed in reserve."[7]

The Battlefield

The technologically sophisticated, highly mobile weapon systems that are being fielded will drastically change the conduct of future warfare, much like that which occurred when armies of the past abandoned their horses for mechanization. The impact of these systems cannot be taken lightly; the capability to move rapidly across terrain at high speed while simultaneously acquiring and accurately engaging targets places greater demands on the skill of maneuver commanders. Military operations, which previously occurred over days, weeks, or months, will now be completed with decisive results within a matter of minutes, hours, or days.[8]

We must be prepared to fight battles of considerable movement, with violent and intense volumes of fire, which are increasingly accurate, sophisticated, and lethal. Opposing forces will *rarely* fight along orderly distinct lines. *Rapid movement* to *concentrate* and *disperse* will be the key to achieving superior *mass* at the *decisive point* on the battlefield. Distinctions between rear and forward areas will be rare. Air and ground maneuver forces; conventional, nuclear, and chemical fires; unconventional warfare; active reconnaissance, surveillance, and target-acquisition efforts, and electronic warfare will be directed against the forward and rear areas of all combatants.[9]

In order to win on the modern battlefield, division commanders' decisions must be quick, correct, and rapidly disseminated. The reconnaissance and surveillance systems of modern cavalry must be capable of collecting and reporting critical information faster and more accurately than ever before. Battlefield reconnaissance cannot be sacrificed for the unwise or improperly-timed decisive engagement of the division cavalry. The modern division commander must possess the mental clarity to use his cavalry appropriately to help him see and control the battle's ebb and flow. He must then rapidly deploy his forces accordingly. A significant battlefield decision that is withheld for a few hours may cause disastrous results when a force is opposed by an enemy commander who possesses the ability to quickly assess the battlefield and rapidly employ the mobility and firepower of his force.

The problem of command and control on the modern battlefield is greatly exacerbated by what is currently labeled "battlefield clutter." As can be clearly seen by views of the same brigade defensive area shown in figures 2 and 3, rapid movement of even a company-sized unit forward, laterally, or rearward through this brigade area would be difficult at best. Movement priority on routes and at checkpoints must be enforced, accurate navigation must be insured, and obstacles and fire plans must be coordinated. One possible solution to movement control problems for the division commander is using his cavalry squadron as guides, traffic control parties, liaison, and to reconnoiter and monitor routes within the division area.

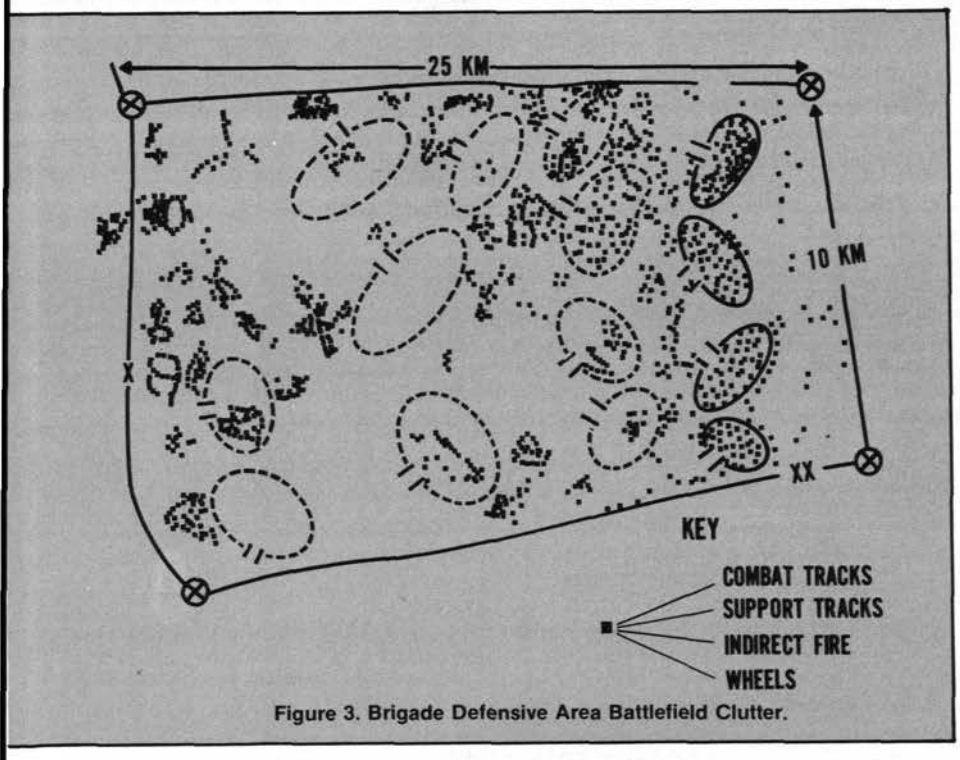


Figure 3. Brigade Defensive Area Battlefield Clutter.

Employment

The (O&O) concept for the Division 86 cavalry squadron is a very appropriate and precise explanation of how the division commander should employ his cavalry squadron. However, some of the concern voiced in the field regarding its use may be the result of incorrect extrapolation of peacetime training experiences to war. One significant example is the REFORGER exercise. It is a fact that peacetime constraints of money,

training areas, control, civilian population and traffic, maneuver damage, and time force the battlefield to be relatively linear and within strict lateral boundaries. The exercise is extremely valuable in many respects, but to a certain degree, battle outcome is the result of the skillfully applied art of gaming, whereby units are funneled into an artificially defined and controlled area to ensure that local friendly combat power surpasses the enemy's. The problem here is not really to find the enemy, nor to outmaneuver him, but within a division sector or zone, to defeat him in spottily isolated platoon, company, or battalion engagements by carefully using the rules of the game. The REFORGER scenario has not yet been redesigned to provide for utilization of a Division 86 cavalry squadron on a *dynamic*, wide, deep, and extremely violent battlefield. Division commanders really haven't needed its reconnaissance or command and control liaison capability, particularly, after several days or weeks of heavy fighting. As a result, squadrons have, *in recent history,* been primarily used as division minicovering forces, and to add significant localized combat power once a major decisive battle is joined. In some cases, the divisional cavalry squadron is apparently directed to engage in decisive combat because it seems to be considered a prefabricated combined arms battalion or task force.

On the "nonlinear" battlefield, division commanders will use their cavalry squadron to find enemy flanks and rear support areas. While this is not a *new* mission, within the context of Division 86 it has very high priority. The squadron air scouts will help locate gaps, or seams, between enemy first echelon divisions laterally, and between first and second echelon regiments in depth. The air scouts will be able to identify locations of specific elements such as battalion or regiment centers of mass, command support elements, service support units, etc. The air scouts and ground scouts working together will reconnoiter the width, trafficability, and utility of a seam between enemy units, and very precisely guide maneuver battalions/brigades to the enemy's flanks and rear. This capability requires light, mobile, reconnaissance-oriented forces that will make every effort to avoid decisive engagement. However, they must be able to kill tanks in self defense and provide rapid fire suppression for security purposes. The *M3* cavalry fighting vehicle (CFV) with its TOW and 25-mm automatic cannon fulfills these requirements.

Reconnaissance requires both air and ground scouts as there is a complimentary relationship between these two types of scouts. In those areas where one is restricted, the other is less susceptible to the given restrictive condition. Essentially the strengths of the two systems are the air scout's ability to maximize speed and distance, and the ground scout's ability to provide maximum and continuous surveillance for prolonged periods of time. Each system's strength is its employment at varying distances from the main body. The air scout operates at extended distances and provides early warning, particularly during those periods when a vague enemy situation exists. Further, the air scout is able to find those areas which contain light or no enemy activity at a very low force-commitment cost. This results in a greater number of forces available to the commander for deployment against the critical areas in which the enemy main force is located. As the enemy situation stabilizes, or becomes more defined, the ground scouts work closer to the friendly main body to develop the situation in greater detail.

The Division 86 cavalry squadron readily assimilates combat electronic warfare and intelligence (CEWI) and target acquisition battalion assets to provide accurate, timely, and relevant information to the division commander. *Cavalry can therefore be cued by sensors,* focusing its attention on specific points to confirm or refute the sensor's information and develop it in more detail. Cavalry can cover areas where there are no sensors; or it can be sent, with or without sensors, to particularly critical areas of interest. The motorcycle platoon complements air and ground troops by operating in isolated areas or restrictive terrain where enemy contact is not likely. The NBC platoon reconnoiters to locate, mark, and report areas of NBC contamination. The division can use this information to plan tactical maneuver, decontamination operations, and service support operations more effectively. Aggressive reconnaissance efforts by properly-trained cavalry fulfills the commander's need to "see the entire battlefield."

A current issue that will almost always start a serious discussion is the removal of tanks from the divisional cavalry squadron. This decision was intended to accomplish the following:

- To produce the most efficient combat power from tanks on the battlefield.
- To remove the temptation at all levels of command to readily allow part or all the divisional cavalry to become decisively engaged.
- To help in solving the problem of a shortage of main battle tanks.

Historical studies, studies of recent Middle East experiences, and the Mission Area Analysis (Close Combat, Heavy) all add significant credibility to the first two propositions. The third is intended to insure that *available* tanks are tactically deployed on the battlefield for immediate application of combat power, not diluted to division flank or rear security (screen or guard) missions. It has been found that tanks in a divisional cavalry squadron are employed in a nonfiring overwatch role most of the time. With the capabilities of the *M3* CFV, the requirements within a division for tanks to overwatch scouts during a reconnaissance or screen mission is greatly reduced. In these roles, contact will usually be with enemy reconnaissance elements, and, there-

fore, rapid fire suppression and the ability to kill a tank, should one appear, is required. A cavalry squadron can be reinforced with tanks (attached to or under operational control) if the factors of mission, enemy, terrain and weather, troops and resources available, and time (METT-T) dictate. Air cavalry and attack helicopter units also provide tank-killing and suppressive fires. Within a division, tanks are more efficiently used as offensive, attack systems rather than for overwatch.

An additional factor involved in the tank decision is the intelligence provided by echelons above corps and various national assets. Divisions no longer need layered security forces on the ground in the form of a corps covering force and a division guard force. Large enemy forces can be located and tracked by electronic instruments and this data will be provided to corps and divisions. As described above, much of the security for divisions on the modern battlefield will be provided by dispersion, mobility, and timely intelligence, as well as a finely-tuned command and control system that provides the capability for a faster, more accurate decision cycle.

It cannot be said that divisions will no longer need to employ an economy-of-force element. Since an economy-of-force mission is usually to attack, defend, or delay, it may be that a unit other than the cavalry squadron, such as a battalion task force, will be more appropriate for a specific mission of this type. By definition, an economy-of-force element is "...the minimum force necessary to accomplish a mission. Forces are normally economized to permit concentration of forces elsewhere." If the cavalry squadron needs tanks to perform this or *any* mission, as dictated by the factors of METT-T, the division commander must task organize for that purpose, and trade-off assets as he sees fit. Units should establish a habitual training relationship for this contingency whenever possible.

Another role of the Division 86 cavalry squadron is for command and control liaison and surveillance or control of lines of communication. The environment envisioned for the (division) battle will strain command and control at all echelons to an unprecedented degree. To counter this stress, the Division 86 cavalry concept provides a command and control system that is:

- Personal.
- Responsive.
- Durable.
- Redundant to the inherent division system.
- Capable of continuous operations over extended distances and frontages.
- Very flexible.

When the division commander is unsure of the location or situation of a major subordinate unit (for example, a brigade) the ground or air cavalry troops or the motorcycle platoon can be used to carry the division commander's request for information or instructions to the subordinate unit. On a confused, "nonlinear" battlefield, the cavalry squadron may be the only unit capable of getting a message through, or determining the situation by bypassing pockets of enemy resistance or friendly battlefield clutter. The use of cavalry for this role will be particularly important when the enemy jams command nets or uses chemical or nuclear weapons.

Cavalry can provide more than critical command liaison and messenger service. It can:

- Physically guide maneuver units as they close with the enemy.
- Assist in massing and dispersing maneuver units rapidly.
- Control routes and choke points to insure that navigation is accurate and priorities are properly observed.
- Help control the "battlefield clutter" problem by monitoring (and controlling) the movement of combat support and combat service support elements. *In this regard, Division 86 cavalry is also specially suited for RACO and ADC missions.*

Summary

As new systems on the battlefield become more deadly and mobile, the commander who *first* and *best* integrates these capabilities can expect significant tactical advantage. The cavalry squadron is equipped and organized to aid the division commander in capitalizing on the effect of mobility on the future battlefield. U.S. Army reconnaissance doctrine is based on the requirement of the commander to constantly "see" the entire battle area. The armored cavalry regiment (ACR) is organized to permit the corps commander the means to observe and rapidly influence the corps battle area. The division cavalry orients *within* the division sector whereas the ACR is more heavily equipped to fight decisive battles in the corps area of operations.

In closing, the Division 86 cavalry squadron is specifically designed and equipped and specially trained to conduct reconnaissance, command and control, and limited security functions within, and to the front, flanks, and rear of the division area of operations. Its design is oriented for use on the "nonlinear," cluttered, dynamic, and violent battlefield of the eighties and nineties. It performs its missions very efficiently and without siphoning off division combat power (tanks) that can be better used in the decisive battle. There is no other unit(s) specifically designed for the cavalry squadron's roles; nor is there another unit in the division that can perform these roles with any degree of efficiency without detracting from its primary purpose.

Footnotes

[1] *Operational and Organizational Concept, Division and Corps 86 Cavalry*, pp. 3-1, U.S. Department of the Army, Fort Knox, 1980.
[2] *Division 86 Final Report*, pp. 1-1 through 1-3, U.S. Department of the Army, USCACDA, Fort Leavenworth, 1981.
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Commando Training for French Armor

by Colonel Andre L. Rilhac

"A soldier is someone capable of holding out indefinitely with only some boiled beef and crackers for food; sleeping in the open air in his wet clothes; walking until he falls down exhausted, only to get up again and march into combat."

Marshal Montgomery

Commando training is excellent for highly specialized infantry forces. True, but why commando training in the Armored Corps? Answers to that question can be had by asking yet more questions.

Will the totally reliable, highly sophisticated, effective weapons systems be fully used on tomorrow's battlefield if the soldier does not first master fear and fatigue, and if the leader does not succeed in remaining clear-headed and alert in spite of long hours without sleep?

Doesn't military history teach us that units, outnumbered by their foe in strength and armaments, succeed in winning because they know how to hold out?

"The great battles were always won by tired units."

Napoleon Bonaparte

When undergoing combat training, any army and any branch of service must improve the physical and emotional stamina of its personnel.

Commando training does not seek to replace physical training or sports programs, but rather seeks to complement them. Therefore, due to its nature and attributes, it has held a prime place in the French Army since the creation of the Commando training centers in 1961.

In this article I will explain a facet of a combat training concept—a concept that may seem trite to some, but original to others—and recount my personal experience with this type of training.

And If War Comes Tomorrow...?

In a future conflict, the threat and effects of nuclear weapons employment, the range and accuracy of weapons systems, and the size of engagement areas will, in all likelihood, cause units to become widely dispersed. This dispersement will, in turn, make infiltration relatively easy and will cause forces to become intermingled. Some smaller units may even become completely isolated for long periods. This situation will be worsened by disruption of command and control, subversion, and the enemy's use of mechanized and air mobile units operating in rear areas.

In the combat that will follow the clash of massive armor formations and the attendent proliferation of local small unit actions, the role of the small unit leader and each of his soldiers will take on increased importance because the outcome of the battle may depend on the few survivors.

When faced with the most unfavorable conditions of physical and mental strain, each soldier must steel himself not to succomb to enemy pressure because the survival of the group will hinge on the collective determination of each individual.

Physical endurance, which is essential to withstanding long hours of sleep loss, cold, heat, and poorly-prepared or inadequate food, is not innate. It is acquired through long, hard training. This also applies to the mental toughness that makes it possible for the soldier to think rationally

and perform effectively in a hostile environment where death is ever-present and the unexpected is the norm.

Because it is recognized as a valuable peacetime method for developing the fundamental qualities of physical stamina and mental attitude that are essential in any soldier, commando training has been established as the specific basis for leader education and unit training in the French Army.

Furthermore, commando training gives the soldier the opportunity to surpass himself, discover his true capabilities, and develop his self-confidence. This is done by imbuing him with the *esprit de choc* (spirit of shock) that will enable him to impose his will upon the enemy despite the difficulties with which he is confronted.

This training is for all soldiers of all branches and establishes precise goals that are valid for all formations in peace or war. They are to:

- Always accomplish the mission—at all costs if necessary.
- Foster a sense of solidarity—"one for all and all for one"; team spirit, and common endeavor.
- Become hardened physically and mentally—physical strength and strength of character give self-confidence and the ability to overcome fear.
- Adapt oneself to rapidly changing situations in environments of isolation and insecurity.

Commando training also provides units an outstanding framework in peacetime for preparing for modern combat conditions, and it also creates a physical and mental environment that is favorable for enhancing unit cohesiveness.

Course Content and Objectives

The training level to be attained by any particular unit will depend on the unit's organization and mission; therefore two priorities for Armor Force units utilizing the Commando Training Center have been established. Priority 1 is assigned to divisional reconnaissance units, mechanized companies of tank battalions, and all airborne cavalry units participating in an annual course. Priority 2 is assigned for other tank companies and armored cavalry troops that participate in a commando course every 2 years.

While preparing for and completing the course, units must adhere to a Commando Training Center directive that stresses two basic principles—progressiveness and coherence (interrelationship).

Progressiveness develops the general physical condition and improves the strength of weaker individuals. This progressive training emphasizes long forced marches over difficult terrain under varying climatic conditions. On the psychological and emotional side, the student's confidence is developed by providing him with complete information as to how the tactical training is to be conducted as he progresses through the course, and by having him complete an operational test at the end of the course.

By adhering to the principle of coherence, commanders can take advantage of the wide range of training possibilities offered by the commando training centers to develop logical, well-balanced programs that are suited to the physical training level of their units. In all instances, emphasis must be placed on collective training and activities that cannot be conducted in garrison.

Preparation for participation in the commando training course is preceded by a physical conditioning phase conducted over a 2-month period. During this phase, emphasis is placed on basic physical training such as calisthentics, weightlifting, road marches, and confidence courses.

The course then progresses through a 3-week period in accordance with a schedule developed by each battalion commander based on guidance from the Commando Training Center.

The subjects, taught and performed in a tactical environment during this phase, follow:

Commando March—All personnel must be able to cover 8 kilometers (5 miles) within 1 hour carrying their individual weapon and equipment.

Close Combat Course—The goal is to convince the soldier that he can overcome any opponent using hand-to-hand combat and bayonet fighting.

Commando Run—(individually and by unit)—Its purpose is to develop a "taste of endurance," sense of risk, and group solidarity through self-motivation and intense physical involvement.

Obstacle and River Crossings—includes land navigation and rock climbing—Its objective is to teach the fighter how to overcome obstacles on the battlefield, such as rock cliffs, walls, lakes, and rivers, using light equipment in order to surprise the enemy or to escape from him.

Battle Run in a Built-up Area—This exercise is designed to build the soldier's confidence in his individual weapon and his ability to use it when fatigued, day or night, in a battlefield environment of smoke, explosives, and other distractions.

Demolitions—This segment of the course teaches the technical skills needed to emplace explosives, mines, and boobytraps, and to carry out unit-level demolition of obstacles and targets of opportunity.

Antitank Close Combat—Here the soldier learns to destroy any enemy tank with makeshift devices and boobytraps.

Operations in Urban Terrain—These exercises develop

small-unit immediate response, combined arms techniques, a sense of initiative, and ingenuity in employing all types of fire and tactics in diverse surroundings.

Combat Survival and First Aid—This instruction and a series of exercises accustoms the soldier to living in the wild, and teaches him how to: store water and save food; build a makeshift shelter; combat cold or heat; and how to search for, identify, and cook wild foods.

The commando training ends with a nonstop, 5-day and night field exercise conducted in a realistic tactical environment. It is designed for either a raid or a specific unit mission. If it is conducted as a commando raid, it is focused on performing a mission-type "hit-and-run" attack. The exercise provides practical application of acquired skills and serves as the final test for units completing the command course.

What are we to conclude from the foregoing?

By now readers, whether they be tankers, platoon leaders, or company or battalion commanders, may well be wondering about the interest in or the need for this special commando training. They may also be saying, "Leave this type of training to the infantryman, the paratrooper, and special units. They are the ones who require the ability to walk long distances, dig foxholes, and cross obstacles. As for us tankers, we must know how to get first round hits. That implies that, for our part, we must train to identify, aim, shoot, and move in the shortest time with constant, precise accuracy."

They are right, and I will not contradict them, but I would like to add that to do those things is not enough and invite readers to ponder the question, "What if war comes tomorrow"? Then perhaps the skeptics will agree that the goals of the Commando Training Course correspond exactly to the mental attitude and physical traits that armor crewmen must possess to succeed in battle.

For the past 20 years successive French Army chiefs-of-staff have been deeply convinced of commando training's effectiveness, and have continuously emphasized their desire to make it available to all branches of service. If they ever had any doubts, the lessons learned by the commander of the French Army task force that was part of the peacekeeping organization in South Lebanon in 1978-79 would have confirmed their decision. He wrote:

"Humanly speaking, the ultimate stress of certain situations requires the highest moral qualities in armor crewmen—"cold-blooded reasoning," determination, and courage. These words are not strong enough to describe the exemplary performance of men who must wait until the first RPG is fired at them before firing their weapons. A valuable primary lesson for any type of unit emerges from this report—*The requirement for cold-bloodness.* A man does not fight for long with an overworked, edgy, excited mind. Cold-bloodness is born of training and from a perfect understanding of the mission, courage, and mental physical balance."

A Personal Experience with Commando Training

In conclusion, I would like to add a second testimony as to the effectiveness of commando training for tankers.

While serving as a tank battalion commander, I participated in the final 3 days of the raid conducted by my companies that were completing the commando training course.

I walked alongside soldiers and leaders who were exhausted and emaciated by stress and long periods of strenuous physical effort. But they walked with a radiant pride in having overcome fear and suffering. Every day, these men discovered a little more about themselves by pushing beyond mental and physical limits they believed they had achieved.

In addition to learning technical skills from the course, during the raid they acquired the "winner's morale," and felt the spirit of comradeship, mutual support, and the desire to surpass normal limits and take "first place."

The units, tank companies as well as mechanized companies, came back to garrison fully transformed—they emerged with a feeling of deep cohesiveness and self-confidence.

At dawn, at the end of the raid, when I stood in front of these exhausted, unshaven soldiers and leaders, in their wet and mud-stained battle dress—waiting proudly, but with justified impatience, for the names to be called for awards—a thought I had read somewhwere came to me;

"In a few days we could leave peace and find ourselves in a situation of crisis. Then, we will have to show what we are capable of doing, and immediately obtain the maximum from our men, because on the battlefield, no one cheats. At war, the masks fall away, laying bare and emphasizing human character."

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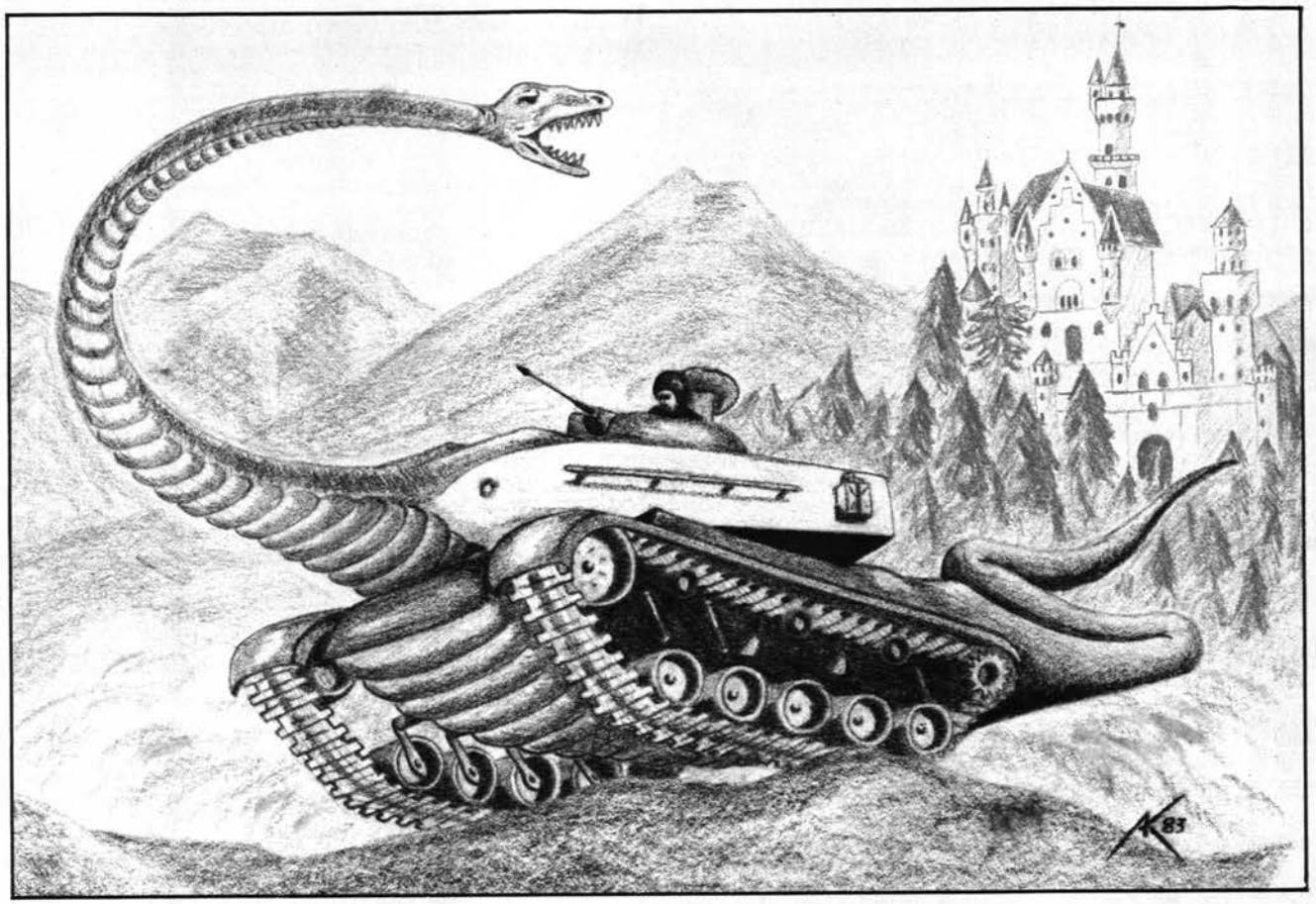


The Dinosaurs Ain't Dead!

by Major James D. Brown and Captain K. Steven Collier

In the summer of 1983 a team of *M60A1's* from the 2-66th Armor Battalion competed against NATO's most modern tanks as the U.S. representatives on the Northern Army Group (NORTHAG) Canadian Army Trophy (CAT) team. These tanks were derisively called *Dinosaurs* by competitors armed with more sophisticated vehicles, and this nickname was adopted with pride by the crews who took them down range.

The *Dinosaurs* emerged as NORTHAG champions in CAT 83, and were third place overall in the competition that included ten teams, bested only by a magnificent performance by the *M1* team from 3-64 Armor Battalion and by a German company armed with the most modern *Leopard* 1A1s.

The *M60A1* scores were made possible by reliance on old fashioned, attention-to-detail maintenance and lots of hard, smart training. We submit these training techniques, strategies, and philosophies as being useful to all tankers, whether armed with the newest *M1* off the production line or the oldest *Dinosaur* in the fleet.

Education

Training teaches *how* something works. We believe this to be differentiated from *education*, which also teaches *why* it works. In the rush toward system-engineered, mark-sense, self-paced, GO/NO-GO training effectiveness, we have at times forgotten that a man can more easily live with a system if he knows *why*, as well as *how*, the system works. The battalion training program thus stressed understanding of the basics of every aspect of gunnery. Turret familiarization was a basic tool. The training value of such basic questions as "what is the function of the ballistic drive?" was multiplied by such follow-ups as, "what does the ballistic drive do when you turn off turret power?" Even as simple a question as, "what happens to the ghost image in the rangefinder as you range out?" uncovers new knowledge when followed by, "now occlude right and answer the question again." Questions like these far exceed the system-effectiveness criterion of minimum essential knowledge for safely operating the system. Nor are they intended to build a body of obscure, useless knowledge that is used primarily to haze new crew members (e.g. What is the thread pitch on a road wheel nut?) Rather, the turret familiarization technique is carefully structured to acquaint the crew member with his tank so thoroughly that he can readily, almost subconsciously, recognize even relatively minor malfunctions. If the crewman doesn't truly know what the tank does when it's working right, how can he recognize malfunctions when it's not working right? Although we espoused this strategy from independent experience, we learned that the Belgians, whom we found to have a greater depth of technical knowledge than any other team in the competition, had arrived at virtually the same conclusions. Like us, they believe that you can never attain consistently high performance without a thorough understanding of the tank.

Although the Belgians did not place highly this year, their high percentage of main gun hits bears a second

The TC of one of the winning M60A1s observes a hit down range.

look. Their impressive and consistent past performmances (three wins, four-time runners-up, and three 3rd place showings in 10 previous CAT competitions) provides some evidence of the validity of their belief in the value of technical competence.)

We believe it is the responsibility of each battalion in the field to turn the *trained* crewmen from officer, noncommissioned officer, and enlisted institutional courses into *educated* crewmen. Because of the time and resource constraints imposed on our institutional training system, the gap between training and education will always exist, and it will continue to be an implied mission of every battalion to fill it.

Maintenance

The crewman is the key to the maintenance of his tank. It is impossible for a mechanic, who may spend only a few minutes each day on the tank (and even these are rarely times when the tank is firing), to be as familiar with the maintenance status of the tank as is the crew. An educated crewman, who understands the importance of an unlaced coupling, or a loose linkage, or a dead switch, is far more likely to demand, and receive, help from his mechanic. We found that the more the crew knew about their tank, the greater interest they took in keeping it in good order.

The new calibration policy in TT 17-12-1 is highly maintenance-oriented. It forces the entire chain of command to concern themselves with maintenance because shortcomings, which could formerly be "zeroed away", must now be fixed. Even though they were preparing for an important international competition, our crew did not zero during their train-up period. Although in the short run it would have been easier in many cases to zero away the symptoms, we found it paid off in the long run to ferret out the problems. As a result, we found maintenance standards improved spontaneously from the bottom up instead of being imposed from the top down.

One of the most interesting aspects of the competition came to light as a direct result of the education and maintenance environment that was built up around the team. It became our practice, on each day of live-fire training, to start with a single round at one of the calibration targets. (Range time and ammunition restrictions precluded a full test.) Peculiarities of terrain and range fan on the practice range, made it necessary to set the panels out at 1,340 meters from the baseline. On an early occasion in our training, the *Rangemeister* inadvertently set up a target that was intended as the near (950-meter) panel of a conventional calibration test. To our surprise, and gratification, 11 of 12 tanks hit the target from boresight! The twelfth tank barely missed the target silhouette and was well on the surrounding 10 x 10-foot panel. This result was astounding to some of our older tankers, who in their younger days had come to expect that a first hit anywhere on a 12 x 12-foot panel at only 1,200 meters was a good performance by an *M60A1*. This initial surprise became normal expectation as training progressed, with hit rates well over 90 percent a usual occurance. In later stages, we experimented with the middle target from the calibration test at a surveyed 1,720 meters and found we could hit it with the first shot from boresight about 80 percent of the time. Indeed, so great was the confidence of our crews in their ability to hit from boresight that most crews had to be persuaded to zero immediately before firing for record.

"The contrasts between education and training do not mean that we can completely replace the latter with the former."

What explains the ability of the old *Dinosaur* to turn in such surprising accuracy? Ammunition like our *M724* has been available for a number of years, and tanks are not known to mellow with age like fine wines. We believe that the combined effect of an educated crew operating well-maintained tanks merely uncovered the potential performance that this tank has always had. If this much heretofore untapped potential has been realized in the *Dinosaur*, how much more lies waiting in the *M60A3* and *M1*?

Training

The contrasts between education and training do not mean that we can completely replace the latter with the former. Proficiency in basic skills and tasks has no substi-

tute. Although our training used the tank itself as the primary training aid, we incorporated several *partial-task* training exercises. The risk involved in such partial-task training is that the crew will learn the device rather than the underlying skill or, even worse, that they will develop bad habits that show up later in live fire. The key to using such training is a careful analysis of what is learned, not learned, or wrongly learned, in each case and to incorporate countertraining in the plan from the start. Such analysis may force a change from the commonly heard, "It's not perfect, but it's better than nothing," to alternatives such as, "It's okay, as long as you do additional target acquisition exercises later on.", or even, "It takes longer to unlearn all the bad habits than it's worth"! This last sentiment, in fact, caused elimination of several time-honored training techniques. Here are some of the exercises we used, along with the rationale for their selection:

Mini-Tank Range (MTR)—This exercise was set up to train crew drill and platoon distribution of fire. An *M16* with .22 rimfire adaptor was set up in a modified *Brewster* mount to shoot into a witness board (something like a *Stout* board) immediately in front of the tank. The object of the exercise was not to hit the target. Since external parallax, ranging, obscuration, target acquisition, tracer intensity, trajectory, time of flight, and observation of fall of shot were so much different than on a live fire range, any results that relied on target hits would have been misleading. Rather, the purpose of the exercise was to test the crews ability to perform all the steps needed to fire a main gun round and to test their ability to execute correct fire distribution in response to a platoon fire command.

The witness board has two basic advantages over a conventional MTR exercise. The first and most obvious is that an indisputable record of the results are provided by the impacts of actual projectiles. Unlike exercises in which the scoring evidence is a fleeting puff of sand or an ephemeral laser blip, the crewman knows he will be confronted with lasting evidence of any hasty or sloppy actions on his part. The impact record is used as an adjunct to the debriefing to ensure every target was engaged. (Remember that the goal of the exercise is correct fire distribution, not target hits).

The second advantage of such an exercise is that crews no longer need to develop such techniques as parallax-corrected aimoff or unrealistic applications of BOT in order to beat the MTR. In the past, recognition of the need for such artificial techniques has contributed to soldier dislike for MTR exercises and added to the need for countertraining to correct bad habits. Countertraining in the unmodelled tasks is accomplished by thorough briefings and the pitfalls of the exercise compensated for by full-scale training.

Battlerange Gunnery—A computer analysis early on in training showed us that no single battlesight setting could handle the small targets and large range band with which we would be confronted in CAT. We decided, however, that since every fire control must be at some setting or another, it was better for each tank to carry the exact range to some target rather than the range to an average target. This strategy required a careful reading of the competition rules, and a great deal of familiarity with the range. It may be argued that this technique is too competition-specific to be of general use, but we feel otherwise. This style of range intelligence is merely a substitute for the battlefield intelligence situation that is continually developing to the platoon's front. The platoon leader who directs "Light section, watch the farm house; heavy section, watch the left edge of the small woods; I'll watch the road exit from the woods.", is really directing his platoon to load, lay, and range to the most likely target locations to their front. *(See "Soviet Tank Gunnery Training," Jan-Feb 1983 ARMOR for similar Soviet practice.)* If targets appear elsewhere, the platoon reverts to precision engagement techniques. This important difference between battlerange gunnery and battlesight gunnery capitalizes on some advance knowledge inferred from the current situation rather than dependence on the appearance of the average target.

"A missed shot on a tank range will fall on soil in which thousands of rounds have previously impacted; whereas a missed shot in a tank duel will more likely fall in a forest or barley field which was previously undisturbed."

Single Shot Engagements—The greatest part of crew training consists of those actions necessary to launch the first round. Additionally, the battlefield cues available for sensing fall of shot are very different from those available for sensing on tank ranges. Consider, for example, that targets on ranges do not usually give an accurate hit cue (e.g. flash, burn, or explode), nor do they operate over typical terrain. A missed shot on a tank range will fall on soil in which thousands of rounds have previously impacted; whereas a missed shot in a tank duel will more likely fall in a forest or barley field which was previously undisturbed. Thus, while first shots of training engagements may be fairly similar to their corresponding tasks on the battlefield, we may be fairly certain that subsequent shots on the tanks range will be dissimilar to their battlefield counterparts. Since there is so little similarity between subsequent combat shots and subsequent training shots, it then follows that we ought to devote no more attention to subsequent rounds on training engagements than is absolutely necessary.

"The possibility of a second-round hit is actually detrimental during training, because it distracts one from examination of the possible causes for the initial round having missed the target."

There is a more insidious effect of multishot training engagements which reinforced our decision to minimize their use in our training. If the crew knows they have two shots to hit a target, they will have a very strong tendency to get off a quick first shot, hoping for a lucky hit, and then follow with a more deliberate second shot. Although frequently successful against targets that don't shoot back, this technique is a perversion of the adage "The tank that shoots first usually wins.", which may be more precisely rendered as "The tank that shoots first *accurately* usually wins." The possibility of a second-round hit is actually detrimental during training, because it distracts one from examination of the possible causes for the initial round having missed the target.

Tank-On-Tank Duels—Every crew is faced with the speed versus accuracy dilemma. A shot that is fired too hastily may miss, while a more deliberate shot may arrive too late to save you. Attempts to address this problem with MILES duels have been only partly successful because MILES is not well-suited to gunnery training. Although not a mainstay of our CAT training effort, we found the introduction of live-fire tank duels to be an interesting and instructive adjunct to our stationary ranges. The exercise starts by mentally folding the two-sided duel so that the

CSM McGuire proudly displays the CAT trophy won by CENTAG for 1983.

two competing tanks sit on the same firing line. Two targets at the same range are presented simultaneously; each target representing the opponent's tank. The tank that hits its target first wins, and the loser is declared dead. Short of a real two-sided duel, we know of no exercise that allows the crew to reach a more realistic balance between speed and accuracy.

Dry Firing—The well-known dry fire exercise was run on a ratio of at least one-for-one with live fire. Like the MTR, emphasis was on platoon fire distribution. After each engagement, crews recorded the targets they had acquired and fired on, and the ranges to those targets.

"We found that given a sound understanding of the process, the crews were able to correctly and confidently boresight their tanks in about 4 minutes without supervision."

Ranging Exercises—A set of targets was precisely ranged with a survey instrument and used for ranging drill. Tank commanders practiced ranging for speed and accuracy and then, without time limit, for accuracy alone. Since the largest single error source in an engagement is a result of ranging error, this was an important drill. A computer program was available that translated ranging error into degradation of hit probability. We believe that this sort of near real-time feedback is important for crew motivation and for continuing evaluation of training.

Boresighting—Because of limitations in range time and ammunition allowed under the rules, we trained up for the competition without zeroing. The crews were educated in boresighting theory and thoroughly trained in the procedures. We found that given a sound understanding of the process, the crews were able to correctly and confidently boresight their tanks in about 4 minutes without supervision. This level of performance makes frequent tactical boresighting possible. Our crews now think nothing of reboresighting at the halt while the driver is checking oil levels. We found the Belgians to be similarly proficient (although they were somewhat handicapped by having to pass a single boresight from tank to tank), and to be, if anything, even more insistent than we on the need for frequent boresighting.

Because of the good results we had during training, and in view of the high crew confidence in the boresight-only strategy, we deliberated at some length as to whether to zero for the record runs. The decision finally hinged on the North German summer weather, which was unseasonably sunny. We had found that our tubes, which were the only ones in the competition not equipped with thermal shrouds, were susceptible to solar-induced warping on hot days. This factor, considered along with a brisk but stable crosswind, indicated that we should "zero in" the unique nonstandard conditions that existed. Crews were concerned (and rightly so) that if conditions changed markedly between zeroing and their record runs, they would be stuck with outdated corrections imbedded in the zero. We did take the precaution of calculating the wind correction imbedded in the zeroes (calculations were performed on the range with a programmable calculator while crews were zeroing) and advising the crews on corrections to make in the event the wind died. The entire zeroing procedure was undertaken with the full cognizance that it was a competition technique that would not be practical or achievable in combat.

The Hot Firing Line—Although we pay lip service to the concept that nonfiring crews on stationary ranges will follow the exercise in dry fire, this very seldom actually happens. Crews usually get advanced notice of their turn in the firing order and feel motivated only as their turn approaches. During their allocated firing time, the action is fast and furious and the crew seldom has time to critique

the last engagement before the next one starts. Having had their brief, but exciting, turn at live fire, the crew knows that, their allocated ammunition expended, they will not be called on to fire again. We felt that this cycle, which gives each crew about one-half hour of training in return for a 10-hour range day, was unproductive. We developed the "Hot Firing Line" technique and had good success.

"When pride is on the line for each and every shot, crews simply do not become bored with dry firing, but use the opportunity to ensure that they will register a target hit in the best time of the day."

To execute this, a minimum of two platoons are "bombed up," conduct prefire and communication checks, and are ready to fire at all times. The remaining platoon can be on break, remedial training, breaking out ammunition, or debriefing. The two platoons on line may be called upon as individual tanks from the tower, or the engagement may be passed from the tower to the platoon leader. The tower merely calls "32, watch your front!" and pops a target.

Running a tank table in this manner accomplishes several objectives simultaneously. The most fundamental result is that it provides the maximum possible training value from each round. Additionally, peer motivation is very effectively harnessed in such an exercise. Imagine being a tank commander or gunner facing a single target with a single round knowing that the results of your engagement will be instantly debriefed over the air for all to hear. A crew may have as few as six engagements spaced out through an entire day, but the prospect of being told, on the air, for all their peers to hear, "32, short line in 14 seconds," will insure the crew is giving it 100 percent.

When pride is on the line for each and every shot, crews simply do not become bored with dry firing, but use the opportunity to ensure that they will register a target hit in the best time of the day. In addition to providing more effective debriefing, the deliberateness of this exercise affords the trainer the opportunity to more efficiently monitor each crew for specific tendencies that may be causing poor hit results. After each engagement, the tank commander records on a formatted score sheet the range he determined to his particular target. These ranges have to be recorded because airing them on the firing net would soon give way to crew "G2-ing" as range intelligence is gained. By comparing the tank commander's own scoresheet to the one being maintained in the tower, specific tendencies may be deduced. Obvious ones are consistent short- or over-ranging, but if the tank commander comes up with good ranges and still is not hitting the target, then the most likely cause is gunner error or possible a maintenance problem. At any rate, data are available to address specific crew deficiencies and assist in designing training to rectify these shortcomings. Since the whole line is hot at all times, there is no time wasted with communication checks, with the formalities of asking for, granting, and acknowledging receipt of permission to fire. The only answer needed to the tower's warning is the round heading downrange. We found that firing proceeded much more quickly with no loss of efficiency. Crews even found time to pull after-operation maintenance in the extra time gained and still get some decent sleep.

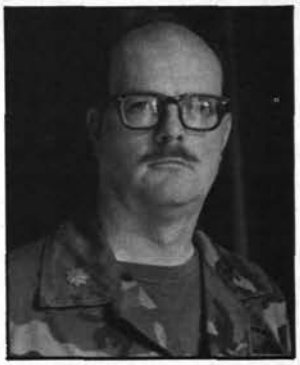
Certainly, training areas, ammunition available, and tank-peculiar factors will influence your training, but the skills derived from practicing random, one-shot, one-target engagements followed by an instant public debriefing should be given serious consideration as a possible alternative to the current Table VI. This same routine can be easily and logically expanded to train two-tank sections or even platoons to engage more complex target arrays. Such expanded training demands not only rigid gunnery skills, but also exacting platoon fire distribution and discipline.

This sort of exercise creates the possibility that an underprepared unit will find itself attempting to run on a main gun range before it knows how to walk. A 2- or 3-week gunnery cycle is simply not enough time to progress from Table VI to platoon gunnery. The coordination necessary for the platoon to respond cohesively, efficiently, and smoothly must be developed at home station with such exercises as the MTR.

Hand-Eye Coordination Training—Although the tank is usually it's own best training aid, there were times in the training week when, because of darkness, inclement weather, or lack of a suitable training area, we were forced indoors. A portion of such time was allocated to structured iterations of selected home video games. Three game consoles were set up in the training room and crew members were required to play for record after strictly limited practice runs. Record scores were posted publicly. Though our conclusions are not scientifically supported, we believe that this sort of training improved hand-eye coordination, conditioned crews to react under stress, and helped instill a competitive spirit.

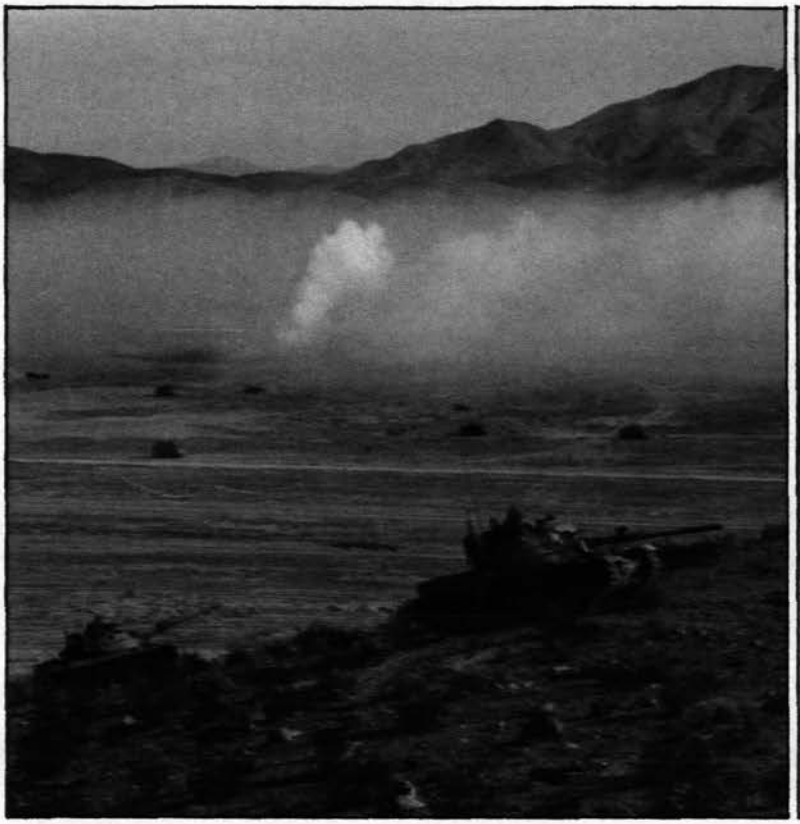
The achievements of the *M60A1 Dinosaurs* in CAT 83 are not presented here as a means of tooting our own horn. Rather, they are intended to draw attention to the lessons we learned in preparation for the competition. We believe that the techniques we developed can be readily adapted to any kind of tank and that the benefits gained will more than repay the effort.

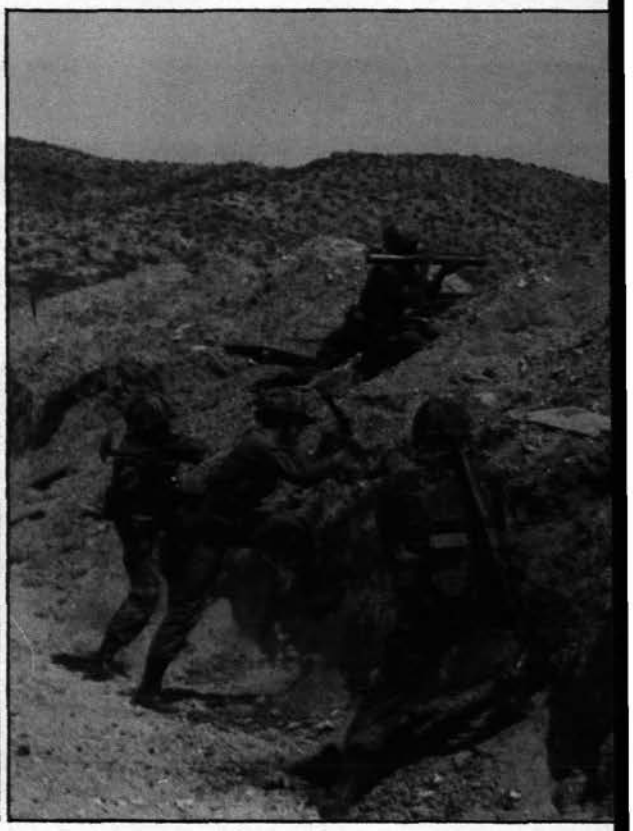
Our *Dinosaurs* performed better than they theoretically should have, and we believe this points to underdeveloped combat power in other tanks as well.



MAJOR JAMES D. BROWN was commissioned in Armor as a Distinguished Military Graduate from the University of Santa Clara. He has commanded tank companies in CONUS and in USAREUR. He served as an advisor in the Mekong Delta and has had two tours in Germany. He is currently S3 of the 2-66th Armor, which competed in CAT 83.

CAPTAIN K. STEVEN COLLIER was commissioned in Armor from the United States Military Academy in 1977. He has served in Armor units in CONUS and over 4 years in USAREUR. He is currently commander of C/2-66th Armor, which competed in CAT 83.





Infantry in Desert

by Major

The desert, with its deep, high-speed avenues of approach and unobstructed fields-of-fire, provides the ideal habitat for the armored task force. But the desert's terrain advantages are neutral, and the force that best develops them while simultaneously denying their use to the enemy is the one that will succeed in accomplishing its mission.

Tactical success in the desert is directly dependent upon the ability of the task force to gain and maintain a *mobility* advantage over the enemy, both offensively and defensively. Although desert operations are normally characterized by greater dispersion between elements and by extended frontages and depth, combat power can quickly be massed over high-speed surfaces, and fires can rapidly be concentrated at maximum ranges. A force held up for even a few minutes by natural or manmade obstacles can be decimated before that unit can identify the situation and effectively react.

Offensive Operations

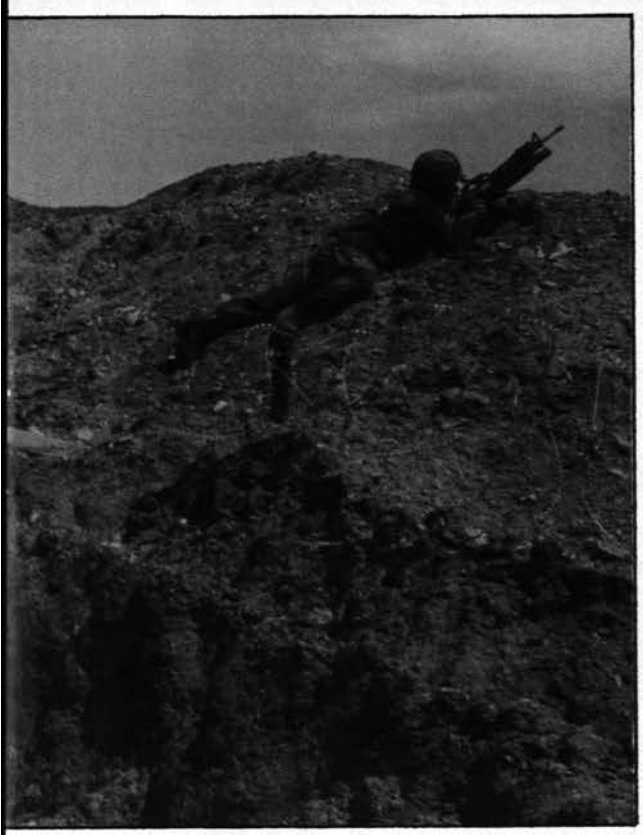
The results of extensive tactical exercises conducted at the National Training Center (NTC) clearly show that only when the armored task force aggressively and creatively employs its infantry assets to increase its *mobility* can it survive and succeed in the desert. The task force that habitually leaves its infantry mounted as part of the armored formation routinely loses it to antitank guided missile (ATGM) and tank fire before it can enter the battle and then find its tanks destroyed quickly and massively at unbreached obstacles or unsecured choke points.

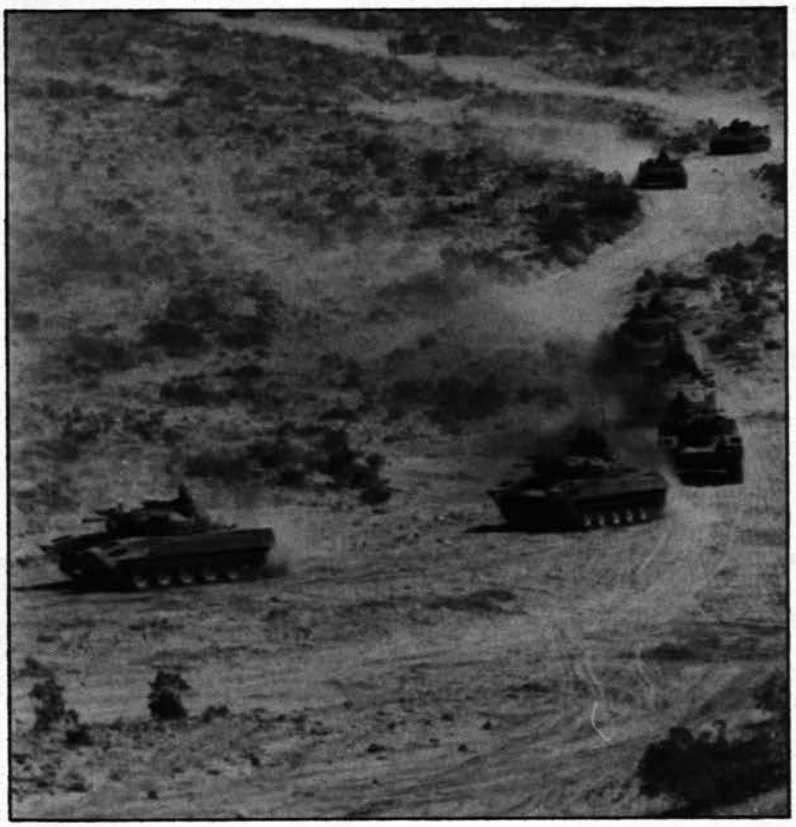
Although the tanks of the armored task force are the key to its mobility and firepower, tanks by themselves cannot gain or maintain a mobility advantage. This mission is best assigned to the attached infantry. Although slower and considerably outgunned by armor, the infantry can greatly increase the mobility and survivability of the tank task force through reconnaissance, obstacle reduction, and preattack raids on enemy strongpoints along the planned route of the armored advance.

Extensive reconnaissance in support of the advance must be conducted during periods of limited visibility before the attack. Depending on the distance to the enemy's forward positions, this reconnaissance can be conducted either dismounted or from the infantry's armored carriers. As a minimum, one patrol from each team-sized element should reconnoiter the team's preplanned route to locate and identify obstacles, passage lanes, or bypasses, and all enemy tank-killing systems between the line of departure and the team's objective.

At the company-team and even task-force level, every effort should be made to develop an intelligence picture in such detail that all enemy tanks and ATGM positions and infantry platoon positions within the sector are identified. To futher assist the team commander in navigation and in identifying known enemy positions and obstacles, the patrol leader should routinely ride in the loader's hatch of the team or task force commander's vehicle during the mounted assault.

Squad-sized infantry patrols with attached engineers are the ideal unit for such reconnaissance patrols. The extended distances typical in the desert between enemy company-sized strongpoints allow small infantry elements to penetrate the enemy's forward defenses and develop an accurate picture of the depth of his defenses. The task force commander and team commanders use the information provided by these patrols to make any necessary revisions to the planned routes to avoid enemy obstacles and to bypass strongpoints, thus enabling the task force to penetrate quickly and deeply to the enemy's rear to destroy reserves, combat support, and logistical assets and to dis-





Armor Operations

David J. Ozolek

rupt the enemy's scheme for reinforcing his defense.

When the reconnaissance effort indicates that bypassing obstacles is impractical or impossible, the infantry, with attached engineers, can begin preattack obstacle breaching under the cover of darkness. These infiltrating elements, either stay-behind teams from the reconnaissance patrols, or separate elements dispatched independently, can effectively reduce obstacles by cutting wire, removing mines or emplacing charges, and creating lanes across enemy tank ditches by filling them in with shovels. When in danger of discovery these elements retire to previously selected concealed positions, and upon the advance of the mounted elements detonate the replaced charges, mark lanes with smoke, pyrotechnic, or other prearranged signals, and guide the armored elements through the passages. When the preattack mission is completed, the troops mount their carriers and travel with the attacking armor, to assist in breaching any undiscovered obstacles deeper in the enemy's defense.

When the enemy has emplaced extensive obstacle systems, which are beyond the breaching capabilities of infiltrating infantry, or when he has developed an insurmountable obstacle security plan, preattack breaching may become impractical. In this case it sometimes becomes more effective to concentrate the infantry's preattack effort on attacking the positions covering the obstacles rather than the obstacles themselves. This allows for the task force engineers to mass their efforts at key locations along the route of advance, breaching the obstacles in the course of the advance while directly supported by the task force's firepower and heavy equipment assets such as blade tanks, engineer vehicles, and recovery equipment.

This attack on positions covering enemy obstacles requires a dismounted infiltration by infantry heavily armed with antitank weapons. The assault on the enemy positions should not be launched until the advancing armor comes almost within range of the enemy's antitank weapons. This delay increases the impact of the surprise assault and acts as a combat multiplier to decrease the enemy's ability to react to eliminate an inferior assaulting dismounted force. The desired result of the dismounted effort is to cause the enemy tanks and ATGM crews to fight for their personal survival with coax machineguns and individual infantry weapons so that they cannot effectively cover the obstacles or engage the approaching tank force with high-volume antitank fire at extended ranges.

Another suitable mission for the infantry of an armored task force is a preemptive maneuver to seize key terrain in the enemy's rear area that is not occupied at the time of attack but, that if occupied by the enemy during the course of the battle, would allow him to reinforce his defending forces along the friendly route of advance. When enemy reserves moving forward or laterally to concentrate along the axis of the penetration are engaged by the infantry, they are forced to deploy from their column and are slowed and attrited. This delay decreases the enemy's ability to concentrate at critical points, denies him terrain advantage, and can be instrumental in disrupting his entire defensive plan.

Defensive Operations

When the task force assumes a defensive posture, it becomes vulnerable to the efforts of the enemy's dismounted infantry. Soviet doctrine stresses the use of infiltration to conduct reconnaissance, reduce obstacles, and conduct preemptive strikes on enemy strongpoints and to seize key terrain. Denying the enemy the opportunity to conduct such operations requires a detailed effort on the

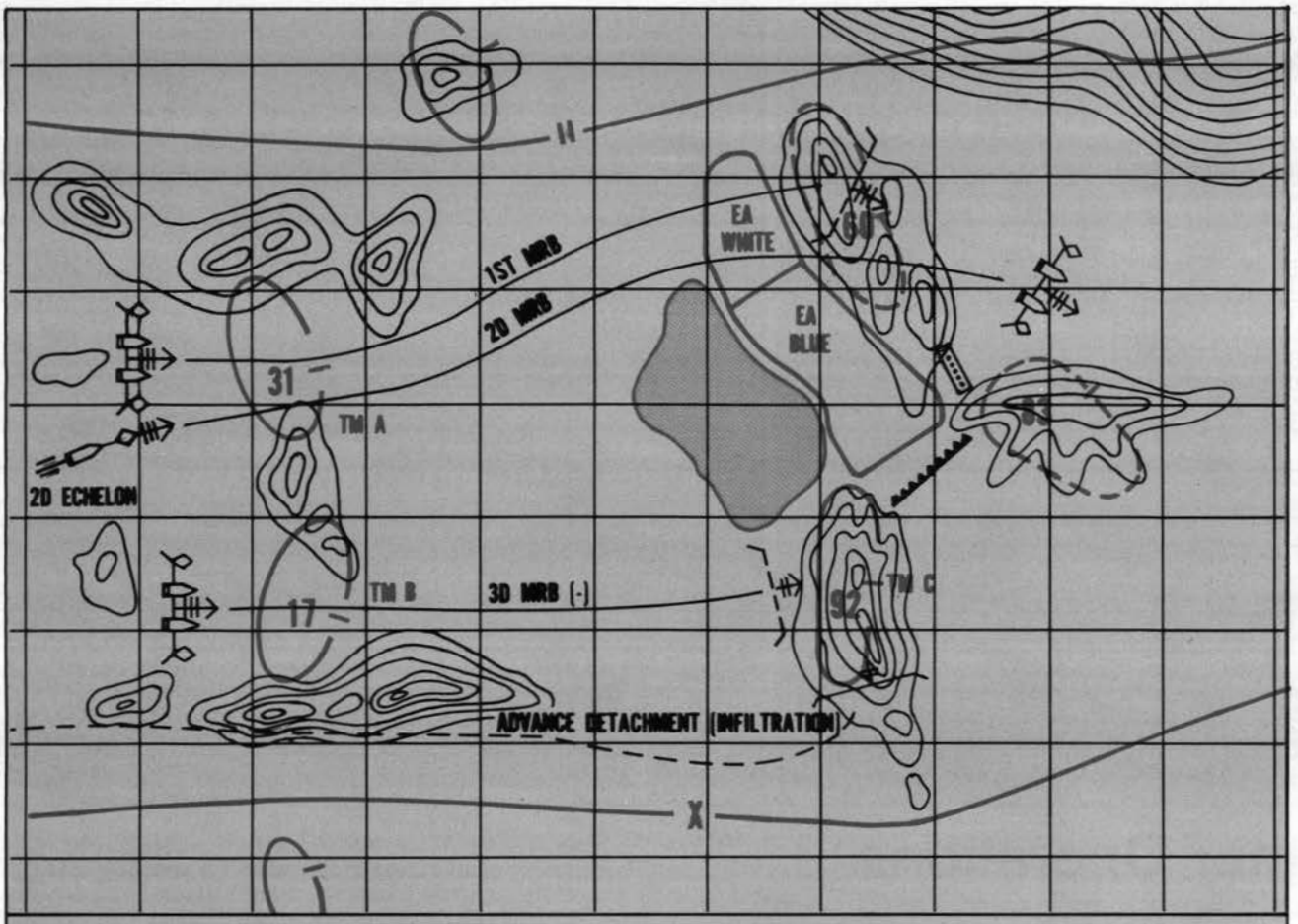


Figure 1: OPFOR Regimental Attack Against a U.S. Task Force

A U.S. Armor Task Force defends in sector with tank-heavy teams occupying battle positions 31, 17, and 92. The task force concept calls for Team A initially to defend BP 31, and to prepare and on order defend BP 60. Team B defends BP 17 and prepares and on order defends BP 83. The TF commander plans to use the dominating terrain from BPs 60, 83, and 92 to channel the OPFOR into Engagement Area (EA) Blue, then to contain him there between the lake and the barriers connecting the battle positions. In EA Blue the remains of the regiment will be destroyed by the concentrated fires of three teams.

The OPFOR commander, having located the teams and the tank ditch through ground and air reconnaissance, has elected to concentrate his main attack against Team A in BP 31. The main attack will consist of two Motorized Rifle Battalions (MRBs) echeloned approximately 3-5 kilometers (9-15 minutes) apart. The 3rd MRB will provide an advance detachment of one dismounted Motorized Rifle Company (MRC) to infiltrate to attack BP 92 from its left and rear to fix Team C and prevent it from displacing to BP 60 or 83 to oppose the main attack. The 3rd MRB(-) attacks mounted in a supporting attack to fix BP 17. The result is Teams B and C being fixed by one MRB, and Team A being attacked and overwhelmed by two MRBs, with the regimental second echelon continuing the attack to successfully envelope the TF northern flank and penetrate deep into the Brigade sector.

A successful infiltration could have been prevented if Team B had constantly patrolled the ground betwen BP 17 and the brigade to the south, and if Team C had provided 360° security for BP 92.

part of the defending armored task force's limited infantry assets.

Local security plans for combat support and service support areas must be developed and strictly enforced. Off-duty cooks, mechanics, and clerks must provide for the security of their elements so that the infantry can be concentrated well forward to interdict or intercept infiltrating enemy infantry. Tank platoons on battle positions must institute surveillance and security plans with at least one crew fully alert on the platoon night battle position, constantly surveying the area with the tank's night vision devices. At least one crew, or a composite patrol from several crews, must patrol the local area to detect any infiltrating elements.

Because of the large gaps between team-sized battle positions, the task force's infantry must be committed to patrolling between strongpoints. These patrols can be a combination of mounted security patrols and dismounted ambushes using night vision devices along likely routes of infiltration. Obstacles between positions must be *physically manned* during periods of reduced visibility. Engineers should be constantly improving obstacles throughout the night while simultaneously providing security to prevent enemy sappers from beginning undetected breaching operations.

Security elements must be placed on all assigned subsequent battle positions to prevent enemy infantry from seizing them before the defending force arrives. Patrols must frequently check each position to insure that the enemy has not silently neutralized the security elements defending them.

The enemy doesn't have unlimited infantry assets either, and an aggressive counterreconnaissance plan, that incorporates small raids and reconnoiting the enemy's forward positions by fire, can cause the enemy to significantly reduce his infiltration effort in order to

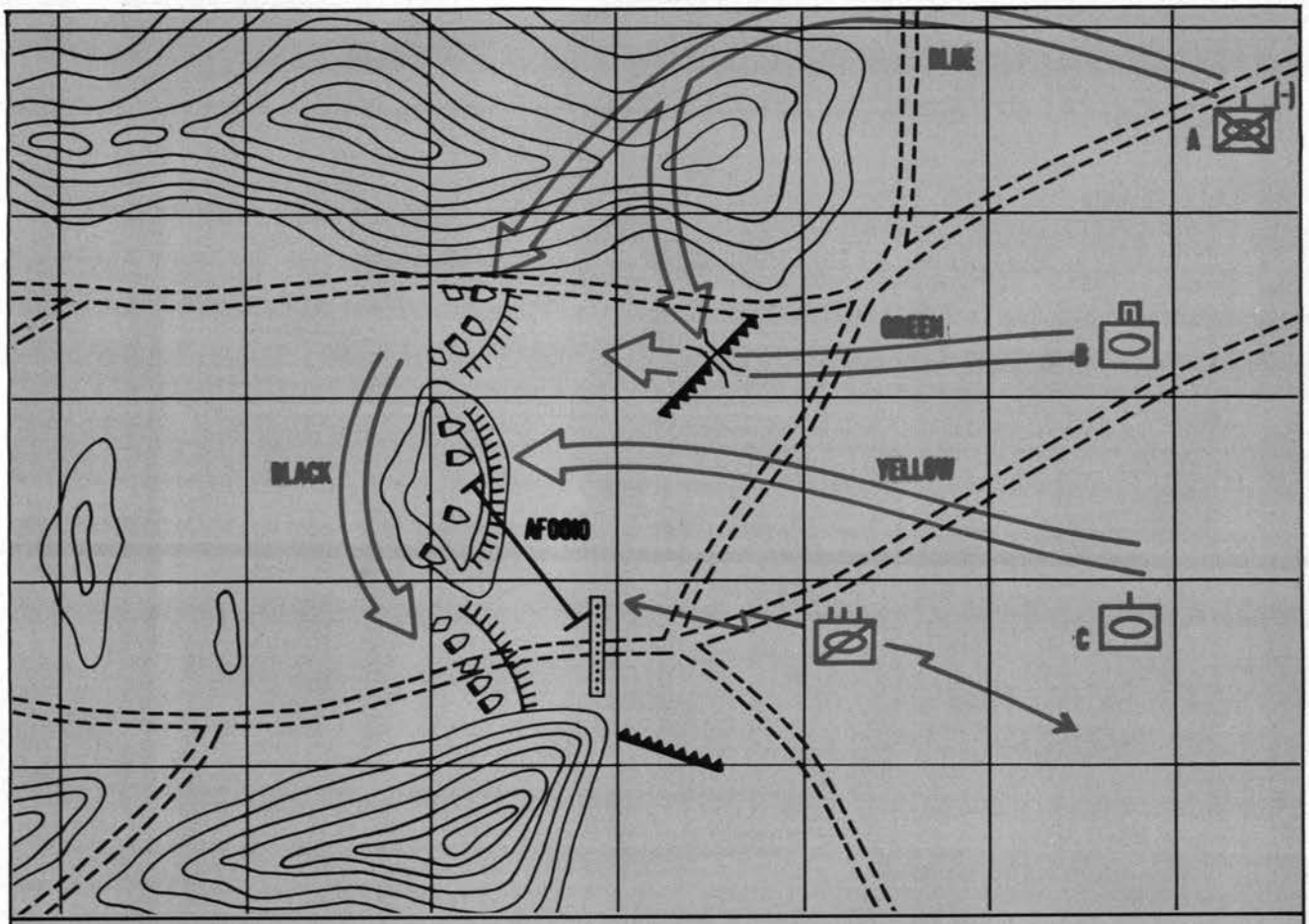


Figure 2: U.S. Armored Task Force Attacks a Defending OPFOR Motorized Rifle Company.

An OPFOR MRC with 10 BMPs and four tanks defends to block a high-speed avenue of approach in a defilade between two high terrain masses impassable to tracked vehicles. OPFOR's defensive scheme is to use tank ditches and an anti-tank (AT) minefield to funnel the attacking task force into the MRC's planned engagement area.

After a ground reconnaissance in which OPFOR platoon locations and the barriers were located, the task force commander decided to attack in a two-phased operation with an infiltration by infantry equipped with two ground-mounted TOWs during the hours of darkness, and a mounted attack at dawn. The infiltration will be conducted by two platoons of the attached mechanized company. The infiltrating element's missions are to conduct a silent breach of the northern tank ditch and any other undetected obstacles along Axis Green, to emplace the TOWs on the dominating terrain overlooking the objective, and to conduct a coordinated dismounted close assault along Axis Blue on the enemy's northern flank simultaneously with the mounted attack. The main attack will be on Axis Green, and will consist of Team B (Company B, one mech platoon, one AVLB, and the engineer platoon (-)). The supporting attack against the center of the OPFOR position will be conducted on Axis Yellow by Company C with one engineer squad. Indirect fires will be used to suppress the center and southern platoons during the assault and to isolate the northern platoon from the supporting fires of the center and south with a smoke screen (Target AF0010). Carrier teams from the infiltrating element will accompany Team B and add additional suppressive fires in support of the main attack. After destruction of the northern OPFOR platoon the infantry remounts and the attack will continue against the remainder of the OPFOR's flank and rear along Axis Black.

increase local security. These raiding parties can be reinforced with tanks and supported with artillery to deceive the enemy as to the strength, composition, and intent of the force, thus further increasing its effectiveness.

In spite of the infantry's limited firepower and inability to keep up with assulting tanks, combined arms efforts are as important in the desert as in any other type of terrain. However, because of the long-range, high-speed fight the armored task force can expect to encounter in the desert, its limited infantry assets must be creatively employed to achieve maximum effect.

The infantry missions described here are practical and are routinely employed by the NTC's OPFOR against visiting task forces. With detailed planning and aggressive execution, they can be successfully employed by any armor-heavy unit.

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He is presently S3, 6th Battalion, 31st Infantry, (Mechanized), Fort Ord, California. He is a graduate of the infantry officer basic and advanced courses.

The Challenge of F

By Colonel John D. Borgman a

The greatest challenge facing our Army in the next several years is the simultaneous reorganization and equipment modernization of its combat forces. For the unit commander, the challenge is multiplied by the need to integrate the Division 86 reorganization and its hardware modernization with the many training and support requirements that are a normal part of garrison existence. For the armored force, it is the most significant advance in combat capability in over 40 years.

Historical Perspective

Many think that Force Modernization is something new to our army. However, our army, like all successful armies, has modernized continuously throughout its history. The reason for modernization is two-fold: to deter aggression or, failing that, to win on the battlefield.

The army's modernization efforts have never proceeded at a smooth pace. We have modernized irregularly during the last century, and technological advances have generally been the catalysts for change. In the past, we have modernized either during hostilities, or under threat of immediate war, and a single new weapon has often been responsible for profound changes at the tactical level.

Today we have entered the latest cycle of Force Modernization, and the *Abrams* main battle tank and *Bradley* fighting system are changing much of the "way we do business" on the battlefield with our heavy forces.

As with the past modernization cycles, this one is driven by the availability of new technology and by the threat posed by potential adversaries. What distinguishes this cycle from others is that we are not only acquiring significant new technology for the *maneuver* forces, we are also placing a much-needed emphasis on our *combat support* and *combat service support* organizations. We are significantly modifying doctrine, making great changes to the organizational structure of our divisions, and we are doing this in a relatively short period of time. Our ability to accomplish all this is enhanced by the fact that we can make this transition while in a peacetime posture. (See table 1 for a more detailed listing of new equipment for Division 86 elements.)

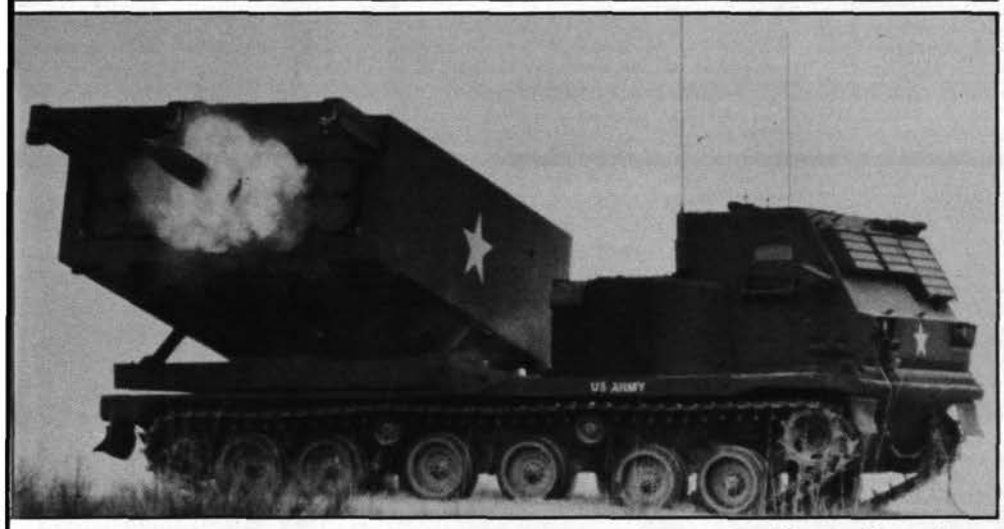
Grass Roots Modernization

Much has been written about the grand strategy of modernization, but relatively little has been done to define the process for the tactical unit commander —on *his* terms. We sometimes forget that hardware modernization alone is *not* force modernization. It is only on part of the process. As an army-wide function, modernization has five key elements:

- Equipping the force .... Equipment modernization
- Manning the force..Attract and retain good soldiers
- Training the force ..... To fight and to maintain
- Organizing the force ..... Division 86/Army 90
- Fighting the force ..... AirLand Battle doctrine

Although this view of the modernization process is valid, it does not address the reality of force modernization to the battalion undergoing transition, nor to the division and installation supporting and assisting in that transition. At that level, it is more useful to refer to the five "Rs" of force modernization.[1] These can be viewed as the unit's mission statement for force modernization:

- Reorganizing the unit



orce Modernization

nd Major Alexander F. Wojcicki

- Reequipping with new or modernized equipment
- Retraining our soldiers to fight and maintain the new systems
- Redistributing displaced equipment
- Readiness

Reorganizing. To meet the threat of mid- to high-intensity combat in the NATO environment, the Army has developed the AirLand Battle doctrine, which is to be implemented by the Division 86 force structure. The major change for the armor battalion is the addition of a fourth tank company and reduction of the tank platoon from five to four tanks. The cavalry squadron undergoes changes that give it two air troops equipped with attack and scout helicopters, and two ground troops equipped with *Bradley* cavalry fighting vehicles. The mechanized infantry battalion has four companies equipped with *Bradley* infantry fighting vehicles that give the battalion 60 25-mm automatic cannon and add 51 TOW launchers for a total of 72 TOW platforms.

Reequipping. Once a unit has been reorganized, it draws its new combat vehicles. This is the last step of a very complex effort on the part of the materiel developer, the personnel community, and the training establishment—all coordinated by the division or installation Force Modernization Office. Items that have to be accounted for *before* the vehicles can be successfully fielded are support and ancillary equipment, including:

- Components; tools; and test, measuring, and diagnostic equipment
- Authorized stockage list, and prescribed load list
- Validated technical, supply, and soldiers manuals, and an Army Training Evaluation Program
- Ammunition
- Training aids, ranges, and range construction
- New equipment training and materiel fielding teams
- Added military and civilian manpower spaces
- Funding
- Military construction requirements
- Documentation associated with the new system

At this stage, *the most critical element is getting an approved modification table of organization and equipment into the hands of the unit at least 6 months before the anticipated reorganization date.*The effective date (E-date) of the implementing orders should match the reorganizing/reequipping date as closely as possible. Should the E-date follow the issue of the major new system by several months, the personnel and equipment requisitioning cycle may not be long enough to get the needed new personnel and required materiel to the unit in time to participate in the retraining effort. (See table 2 for a detailed commanders check list for transitioning to a new organization and equipment.)

Retraining. After it has been reorganized and re-equipped, the battalion enters the most demanding phase of the modernization process—retraining. A new equipment training team (NETT), funded by the materiel developer and manned by the training establishment, teaches the battalion's soldiers how to operate and maintain the equipment. Additional skills are taught to the direct support and general service maintenance personnel who will support the battalion. A new organization training team,

Table 1. Some Major New Tactical Systems Affecting the Heavy Division	
Armor	*M1* Abrams MBT
Cavalry	*M3* cavalry fighting vehicle (CFV)
Infantry	*M2* infantry fighting vehicle (IFV)
	M901 improved *TOW* vehicle (ITV)
Artillery	*M270* multiple launch rocket system
	AN/GSG-10 tactical fire direction system
	AN/GYK-29 battery computer system
	YMQM-105 Aquila remotely piloted vehicle (RPV)
Aviation	*AH64* advanced attack helicopter
	AH1S Cobra (fully modernized)
	UH60A Blackhawk utility helicopter
	CH47D Chinook
	OH58D Kiowa (AHIP)
Engineer	*M9* armored combat earthmover *(ACE)*
Air defense	*M247 Sgt York* division air defense gun
	MIM48 improved Chapparal air defense missile
	FIM92 Stinger manportable air defense missile
Signal	*AN/TTC-41* automatic telephone central
Intelligence	*EH-1H/EH-60 Quickfix* ECM aircraft
	Trailblazer and *Teampack* intercept and direction finding systems
	ASAS (the all-source analysis system)
Common items	*TSEC/KY-57/58 Vinson* speech security equipment
	M977 Series heavy expanded mobility tactical truck (HEMTT)
	M939 Series 5-ton trucks

(NOTT) teaches the leaders how to employ the new organization, and explains the reasons for the new unit organizations. Formal new equipment training is followed by a period during which the unit trains together and develops its skills with the new system and organization. *The entire transition process from turn-in of displaced equipment to completion of training, can take up to 6 months.*

Redistributing. One factor often overlooked in the modernization process is the magnitude of the repair and redistribution effort needed to get the displaced equipment moving to its next destination. This equipment rarely ends up at the property disposal yard. In the case of displaced *M60A1* tanks, there are a number of possibilities. They can go to a rebuild and conversion line for refitting to become *M60A3s;* be sent directly to another active or reserve component unit to become their new tactical system; or be transferred to another service. Depending upon the next destination, the repair and refurbishment effort at the installation can range from turn-in and shipment in an "as is complete" condition to a requirement to bring the tanks up TM transfer standards before shipment. *In any event, without a well-designed plan of action, the unit can suffer through an extended period of repair and turn-in.* Extensive coordination with the logisticians and the installation director of industrial operations is critical. The unit must know well in advance exactly what is expected of it.

Readiness. The goal of the transition is to achieve a state of readiness to fight and win. The sustainment of soldier skills and equipment readiness will continue to be a major challenge, given the increased knowledge required to operate and maintain the unit's new weapons systems. Supervisor shortages, personnel turmoil, and the many training "distractors" we experience will remain a fact of life. *The entire installation chain of command must be committed to reducing the external factors that prevent the new unit from sustaining its new-found skills and capabilities.*

Organize to Modernize

Some form of *ad hoc* staff organization has been established at most installations to oversee the modernization process. These "Force Mod" offices range from a single individual on the G3 staff, or in the operations division of the directorate of plans and training, all the way to complete transition teams working directly for the chief of staff. Duties range from coordination of staff activities to complete responsibility for planning for and executing all modernization actions. The size, source, and duties of these offices are different at each installation.

At Fort Hood, where over 250 new tactical systems or major components are being fielded to III Corps units over the next several years. the modernization process is seen as something affecting all units—and as being affected by all tactical and installation staff agencies. Therefore, the Fort Hood Force Modernization Office is used as the focal point of the modernization effort to *facilitate* rather than *execute* transition-related actions. The Fort Hood modernization program does not employ a large central transition team, but uses a network of action officers throughout the staff instead. The command group provides emphasis to the program, and the action officers and their staff agency chiefs work in close coordination with the Force Modernization Office to anticipate, identify, and resolve problems before they become roadblocks to a unit's transition activities. As an information and action integrator, the Force Modernization Office screens and evaluates the vast amounts of often conflicting information and guidance received by the installation.

A major activity for the Fort Hood Force Modernization Office is *the automation of much of the classified information published in support of the modernization effort by higher headquarters.* This is done with secure microcomputers that execute word processing, data processing, and special applications computer software. This permits a comparison of new distribution information with previous data and analysis of the changes. New information can then be reformatted and provided to each unit on post. Classified word processing permits preparation and updating of the installation Force Modernization Master Plan to provide the latest planning information to the units. The use of electronic spreadsheeting in the classified mode permits easy preparation and updating of the Modernization Resource Information Submission, which is the key fiscal planning document. Access to the Advanced Research Projects Agency computer network, the Army Materiel Data File, Remote Terminal Query Service, the Logistics Intelligence File, the Force Mod Conference of DELTANET, and the Integrated Logistics System Milestone Reporting System has been obtained by adding a computer telecommunications capability. The information obtained from these data bases and teleconferences is critical to keeping our local files accurate and coordinating key modernization actions.

Total System Fielding

Traditionally, the concept of *total system fielding* has been applied to the practice of fielding new hardware in support of the modernization effort. Under this concept, all factors affecting the fielding of a new system are taken into account: TO&E; manuals, support equipment, training, and personnel implications. For some time, the Army has been attempting to change the focus of the total system from pieces of hardware to the "type" battalions that will use the hardware. The term "force integration" is being applied.

This "total battalion" concept indicates a shift away

Table 2. Commander's Transition Checklist

Do I:

- Know when the unit will convert to Division 86 (J-Series)?
- Have a copy of my MTOE with E-date?
- Have a distribution plan of all new tactical systems the battalion will receive?
- Have a clear picture of what the unit will look like after conversion and retraining?
- Have a detailed plan of action for the entire transition process, and is each subordinate leader intimately familiar with it?
- Have an information and education program to ensure that the soldiers really understand what is happening to them?
- Have a materiel fielding plan for each new system I am scheduled to receive?
- Have a detailed displaced equipment plan?

Have I appointed a transition project officer to be the main point of contact for all transition-related actions? Who is my point of contact in the division or installation Force Modernization Office?

What does my unit's training, exercise, and support schedule look like for the 6 months before, and after, conversion? What will be the effect of moving up or slipping conversion by several months?

Have sufficient Force Modernization funds been made available to pay the added costs of the new system?

Will I have barracks or motor pool space problems because of the conversion?

Have I been able to contact the commander of the NETT? Will required TMDE tools and components be on hand prior to start of NET? Will I have adequate numbers of personnel in the right MOS to undergo NET?

Is the initial ASL/PLL for the new system on hand? Am I satisfied with the DS/GS maintenance scheme for my new system? What are the plus-ups in common items (trucks, generators, radios) authorized for the new TO&E, and will I be able to get them?

Do I have sufficient range priority to accomplish needed training? What resources are available to train the leaders on capabilities of the new organization and how to fight it? Will I be receiving qualified soldiers from the training base after conversion?

What sort of personnel stabilization scheme is being proposed to ensure that I haven't lost most of my newly trained personnel within 2 months?

from the over-emphasis on the fielding of *materiel* toward a greater concern for the overall effects of all the changes that are occurring. Unfortunately, neither concept is fully adequate for describing modernization. Each is useful, but each is limited by its scope. The key to successful Force Modernization is a concept of integration that recognizes the hierarchical nature of the task.

We *do* need "total battalion" managers to look at that structure. We also need "total division" and "total corps" managers who are responsible for those levels of command. While a total battalion integrator or manager would focus his attention on a "type" unit (infantry, armor, cavalry, or engineer), the total division manager would look at task forces and their supporting forces (artillery, engineers, signal, and direct support maintenance). The total corps manager would view the general support maintenance capability as well as the critical assets available only at the corps level.

These facilitators would not be theoretical analysts, but practical managers who would translate theoretical force designs into functional organizations by tracking and assisting the transition progress of each of their organization "types." While this is an implied task for all military staffs, their function should be explicitly defined and assigned. *To permit these officers to get the job done, they must be given two tools: a team of staff specialists in the areas of personnel, materiel, and organizational development; and better communication assets.*

The speed with which change has been occurring has made the traditional means of communication less than adequate. Reliance on face-to-face meetings with their significant costs in temporary duty funds and time, slow automatic data information network messages and letters, and telephone calls to conduct much of our business has perpetrated an inefficient, compartmented information exchange mechanism. Industry has been quick to adopt more productive information management practices as the technology of computer networking has matured. Given the present cost of managing the modernization effort, it would seem appropriate to *investigate the effectiveness of computer-based teleconferencing and the design of a Force Modernization Data Base to enhance the ability of modernization managers at all levels to coordinate their efforts.* In this way, many of the planning and execution failures that affect the transitioning battalions could be prevented.

Victory Depends on the Man Behind the Gun

In this age of high-technology weaponry, we often forget that it is ultimately the men and women in uniform who will win our battles. The soldier is the key to success. General Patton said:"Wars may be fought with weapons, but they are won by men. It is the spirit of the men who follow and the man who leads that gains the victory."[2] This applies as much today as it did in 1933, and it helps us put the present modernization cycle into the proper perspective.

Footnotes

[1] The idea for the 5 "Rs" was first proposed as a symbol for unit modernization by Lieutenant Colonel Bill Freitas in January 1982, while he was Chief of the Force Modernization Division, Fort Hood, TX.

[2] General George S. Patton in *Cavalry Journal*, Sep 1933, and *Bartlett's Familiar Quotations*, p. 791.

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To the Last Man, To the Last Round—Why?

by Lieutenant Colonel William L. Howard

The German Army onslaught against the Soviet Union was to become one of the bloodiest campaigns in history. Russian military battle deaths alone are estimated at 7,000,000. German losses were considerably less. Most historians will agree that the turning point in the war was the battle of Stalingrad in which the entire German Sixth Army was sacrificed. It needn't have been so.

At 0300 on 22 June 1941, Germany attacked the Soviet Union in Operation *Barbarossa*. The plan called for a 5-month campaign whose objective was the destruction of the bulk of the Red Army in the west to prevent its withdrawal into the interior, then to pursue the retreating Russians to the Volga River along three axes. Army Group North would advance toward Leningrad, Army Group Center would advance toward Moscow, and Army Group South would advance toward Stalingrad and the Caucasus.

The siezure of Leningrad in the north would effectively turn the Baltic Sea into a German "lake" and neutralize the Soviet Baltic Fleet. The capture of Moscow would destroy the seat of communist government and political power. The drive toward Stalingrad would acquire for Hitler badly needed wheat and coal from the Ukraine, oil from the Caucasus, and the industrial complexes of the Donets Basin.

Hitler's generals were of the opinion that the main thrust should be toward Moscow as it was the center of the Russian railroad system and, given its political significance, would be defended by the best Soviet formations. The destruction of the Russian forces around Moscow would be disastrous for the Communists. As it turned out, Hitler's wishes were not those of his generals. The capture of Stalingrad became the focus of his attention.

After initial successes in the summer of 1941, the offensive ground to a halt in the winter, having failed to achieve any of its objectives. On 6 December 1941, the Russians launched a major counteroffensive. The attack slowly pushed the Germans back but ran down in late February 1942, because the German divisions were able to contain the Soviet breakthrough attempts. But the cost in German men and material was high. Both sides had been exhausted in the winter campaign and the spring thaw and mud enforced a general truce until May.

But, Hitler badly needed the Caucasus oil to pursue his aims and decided to launch a summer offensive toward Stalingrad (map 1).

The German Army of 1942, which was to launch this attack, was inferior to the German force that had attacked Russia the summer before. Army Group South had received the only replacements. But, many of its formations consisted of German satellite forces from Italy, Romania, and Hungary, all of questionable reliability. Furthermore, German industry had failed to adequately replace the material losses from the previous winter campign.

The Army Group South plan called

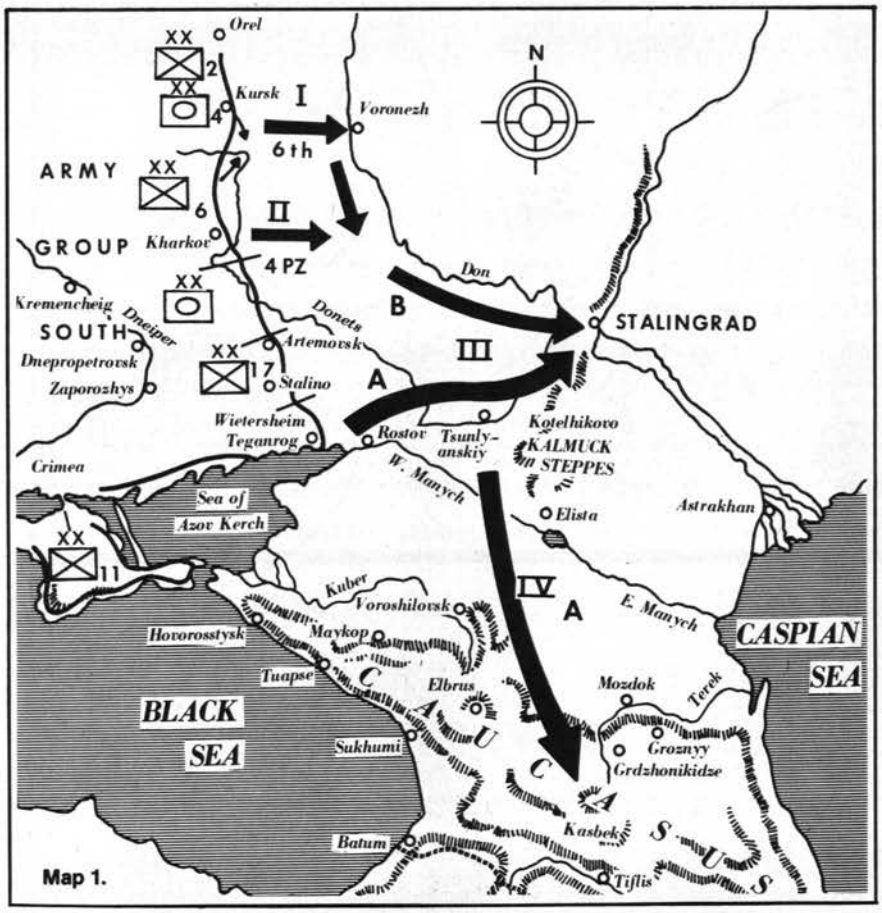
for destroying the Russian forces in the bend of the Don River followed by the seizure of the oil fields and the capture of Stalingrad (map 1). Phase one of the operation cost the Russians 240,000 men and 1,249 tanks. Another 100,000 Russians were lost at Sevastapol on the Black Sea. The poor showing of the Russians up to that point convinced Hitler that his combined operation, Stalingrad and the Caucasus, would meet little opposition despite the fact that the Russians expected them to attack in this area.

The second phase began on 30 June, with the Sixth Army commanded by General Friedrich Paulus advancing along the Don River in the direction of Stalingrad and linking up with the Fourth *Panzer* Army on 7 July. Army group South was now reorganized into Army Groups A and B. Army Group A was commanded by Field Marshal Wilhelm List and was comprised of the Fourteenth *Panzer* Army, the First *Panzer* Army and the Seventeenth Army. Army Group B was commanded by Field Marshal Fedor von Bock and was comprised of the German Second and Sixth Armies, the Fourth *Panzer* Army, the Romanian Third and Fourth Armies, the Italian Eighth Army and the Hungarian Second Army.

Phase three began on 9 July with the attack of Army Group A. The attack was a success with many Russian soldiers deserting and Russian units breaking up. Phase four began on 13 July when Hitler ordered Army Group A to turn south toward the Caucasus and cross the Don east of Rostov. The Fourth *Panzer* Army, minus a *panzer* corps, was diverted from support of the Sixth Army to support Army Group A's drive to the Cacusus. The Sixth along with the remaining *panzer* corps from the Fourth *Panzer* Army was left alone to continue the drive on Stalingrad.

The Sixth Army reached the Volga in September but was not in possession of the city, though its fall was expected. These expectations were not realized. Instead, the Germans found themselves slowly bleeding to death with few replacements coming to the front. The Russians, however, were able to bring up fresh forces from east of the Volga.

In the battle for the city, Stalingrad was reduced to rubble. The siege lasted 66 days. The fighting was hand-to-hand, house-to-house, and day-to-day, with neither side scoring a decisive victory. As the battle for the city was taking place, the Red Army was planning a counteroffensive to secure the Dneiper River line and to



cut off Army Group A in the Caucasus.

The Russian counteroffensive was planned in three phases. Phase one was to be the annihilation of the Sixth Army by attacks against the Romanian-held sectors on the flanks of the Sixth Army. Phase two was to be the overruning of the Italian Eighth Army and then advancing to the mouth of the Don. This would cut off the retreat of Army Group A except by the Kerch Narrows in the Sea of Azov. Phase three was to be the destruction of the Hungarians around Kortoyok, thus opening up the road to the Dneiper River (map 2).

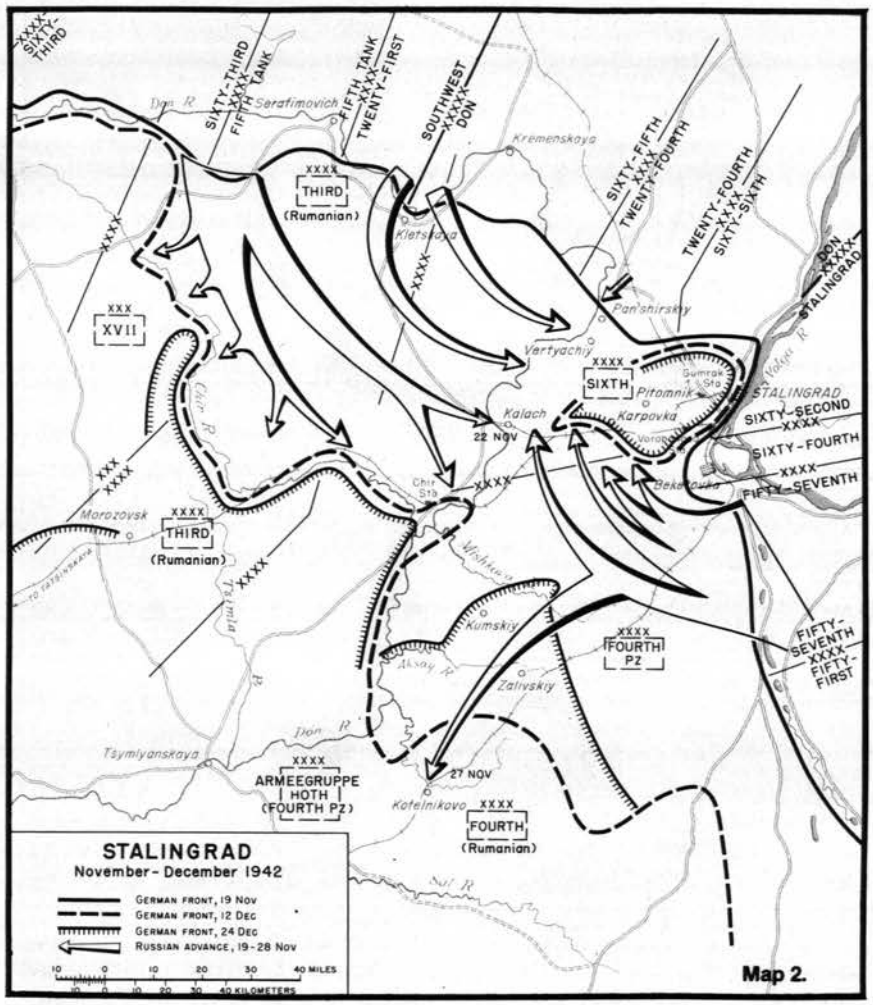
At 0720 on 19 November, Russian artillery fire deluged the Romanian positions and by 0850 Russian infantry surged out of the Serafimovich bridgehead. The Romanian Third Army held until noon but the Russians broke through with cavalry and tanks and headed for Kalach. On 20 November, the Russians struck the Romanian Fourth Army which panicked. The Russians broke through, trapping elements of the Fourth *Panzer* Army. The northern arm reached Kalach on the 21st. By the 23d the trap was closed and the Sixth Army was encircled (map 3).

As the Stalingrad trap was closing, General von Seydlitz, commanding LI Corps of the Sixth Army, worked out, in conjunction with the Sixth Army's Chief of Staff, a plan for a breakout in a southwesterly direction. He held a conference with General Heitz, commanding VIII Corps; General Strecher, commanding XI Corps; and General Hube, commanding XIV *Panzer* Corps. All of the generals were of the opinion that a breakout should be effected immediately and Paulus agreed.

Sixth Army, then issued the "Flower Order" effective on Hitler's permission. This plan was a three-phase breakout that had a 10-to-1 chance of success.

- Troops would be withdrawn from the perimeter and massed in waves.
- The first breakout wave would have 130 tanks, armored reconnaissance vehicles, combat vehicles of the 3d and 29th Motorized Divisions, and 17,000 combat troops.
- The second wave would have 4,000 men.

General von Weichs, commanding Army Group B, also believed it necessary to evacuate the Stalingrad position and ordered Paulus to fight his way out and, if necessary, abandon his heavy equipment. It still remained to be seen what Hitler's decision



would be.

At 0115, 24 November, General Paulus wired Hitler for permission to break out.

At OKH, some 1,400-1,500 miles from the scene, General Zeitzler, recently appointed Chief of the German General Staff, was constantly attempting to convince Hitler of the need to evacuate Stalingrad. Engaging in many heated conversations, many of them in the middle of the night, Zeitzler almost convinced Hitler to allow the breakout. He even took the initiative and told von Weichs, and Paulus to be prepared. The order never came because Air Reichs Marshall Goering promised Hitler that the Luftwaffe would supply Stalingrad by air if Paulus could maintain control of the three airfields at Stalingrad. Goering believed that 500 tons per day (less than was needed) could be supplied by the Luftwaffe but this was impossible, a fact which was not evident when Hitler made his decision. Hitler's intention was that the Sixth Army would stand fast. He intended to supply them by airlift and send relief forces as soon as possible. In the meantime, he designated them "Fortress Stalingrad."

The situation at the front was critical, the Russians having pushed 23 divisions through the Romanian Third Army and had 23 more advancing towards the Chir River. Soviet troops in Stalingrad and to the north of the city were being reinforced from across the Volga. To meet the threat, the Germans reinforced the Don Army Group under Field Marshal von Manstein.

Army Group Don was to consist of the Sixth Army with 22 divisions, remnants of the Fourth *Panzer* Army, and the Romanian Third and Fourth Armies. The Sixth Army was surrounded, low on food, fuel, and ammunition and had little hope of replenishing anything. The Sixth Army holding "Fortress Stalingrad," though subordinate to HQ Army Group Don "on paper," had come under the direct control of the OKH (German High Command, i.e., Hitler).

The Germans fought off the Russians through the early days of December but their semicircle in the city was constantly shrinking. In an attempt to save the Sixth Army, the Fourth *Panzer* Army under the code name "Winter Tempest" attacked from the south in the direction of Stalingrad on 12 December to link up with and relieve the beleagured forces in the city. This attack was to cover 62 miles. Originally the plan called for two relief attacks, but due to the difficulty of bringing up reinforcements this was abandoned. By the 19th the 4th *Panzer* Army stalled 30 miles short of the Sixth Army.

Sensing the gravity of the situation and acting on his own, von Manstein ordered Paulus to prepare to break out. General Paulus refused, claiming his now depleted fuel supplies would permit an advance of only 20 miles, 10 miles short of a link up.

Back at Hitler's headquarters, General Zeitzler was again trying to convince Hitler of the necessity of breaking out of Stalingrad. Hitler finally agreed, providing that the Volga River line could still be held. Word was then received that the Sixth Army lacked sufficient fuel for the proposed breakout. When Hitler learned of the problem, he ordered Paulus to remain in the city since he did not want the stranded tanks to become standing targets in the middle of the steppes.

Conditions within the city were growing worse because the promised 500 tons of supplies per day were not being flown in. Two hundred and seventy-eight transport planes were lost in December attempting to land at the three airfields that were subject to constant artillery fire. Combined with difficult flying conditions were administrative blunders. One such mistake resulted in the delivery of one ton of marjoram (a food seasoning), ten cases of pickles, fifteen typewriters, and a dozen cases of contraceptives.

Most of the artillery and transport horses had been converted to meat and soup. Finally, dogs, cats, and even mice and rats disappeared from the streets.

Elsewhere on the front, the Russians had pushed the Germans back and were preparing for the final annilihation of the Sixth Army. In an attempt to prevent unnecessary slaughter, General Rokossovsky, Commander-in-Chief of the Russian Don Front, sent Paulus a message pointing out that he was surrounded, was unable to receive adequate supplies and could not possible expect to effect a breakout. Rokossovsky called for an immediate cessation of hostilities and promised safety, medical treatment, and food for all who sur-

rendered.

Hitler immediately replied that the Sixth Army was to stand fast, holding to the last man and the last round of ammunition. ("Kampfen bis zum letzten Mann und bis zur letzten Patrone," the message said.)

The Soviet plan of attack to destroy the Sixth Army was to break up the large pocket holding the city into several smaller ones, which they would destroy piecemeal. On 10 January, a 2-hour artillery barrage signalled the approaching attack. At noon the Russians attacked, but due to stiff German resistance, the main aim of splitting the large pocket failed. By 22 January, the German airlift ceased to operate after the airfields had fallen into Russian hands (minimal supplies continued to be delivered by parachute). Paulus' hope for adequate resupply had vanished and he radioed Hitler for permission to breakout in organized groups to the south. This was again refused and by 25 January, the Germans were split into two pockets and 3 days later into three pockets: the XI Corps holding the northern factory area, VIII and LI Corps holding the center pocket, and nondescript remnants holding the area around Paulus' headquarters (map 4).

On 31 January 1943, LI Corps could no longer resist and the central pocket surrendered. In the basement of the Univermag Department Store, Paulus, newly prompted by Hitler to the grade of Field Marshal, surrendered to the Russian generals. On 2 February, the Russians shelled the tractor factory. Russian tanks arrived but were not fired upon since all German equipment had been destroyed and the positions vacated. At 1115, XI Corps radioed the Supreme Command that they had held to the last man. The city of Stalingrad and the Sixth Army were lost to the Germans.

We have seen how the Germans sacrificed the Sixth Army in a futile attempt to capture and hold Stalingrad. Having examined the course of events that led to Paulus' surrender, it becomes impossible to view the battle without forming a personal opinion. Even the casual observer will concede that somebody did something wrong. I believe that that somebody was Paulus and the something wrong was not breaking out of the encirclement immediately, despite Hitler's orders to stand and fight, and later, not seizing on the second opportunity when the Fourth *Panzer* Army fought to within 30 miles of Stalingrad.

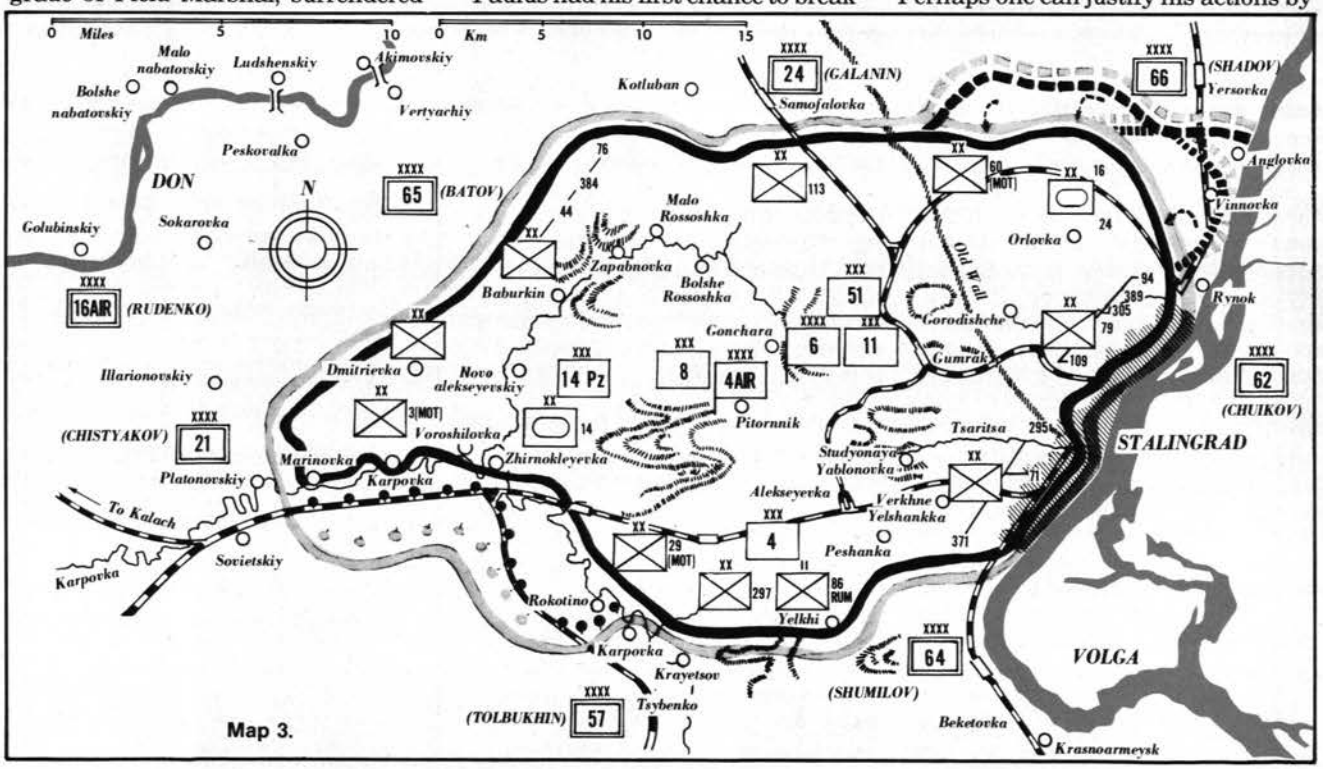
A breakout is not an unsound tactic. The U.S. Army covers this in FM 7-20. It states that units must *plan* for encirclements and must be prepared to breakout if the mission requires. It emphasizes the need to breakout *before* the enemy can organize an effective containment. The breakout should have two attacks: a diversionary attack to throw the enemy off balance and the main attack in the direction of friendly forces.

Paulus had his first chance to breakout when the Russian pincers first closed about him on 23 November. Had Paulus withdrawn his forces from the city immediately and attacked westward he might have saved his army from eventual defeat. A decision such as this would of course have to be based on an estimate that the situation would get worse as time went on.

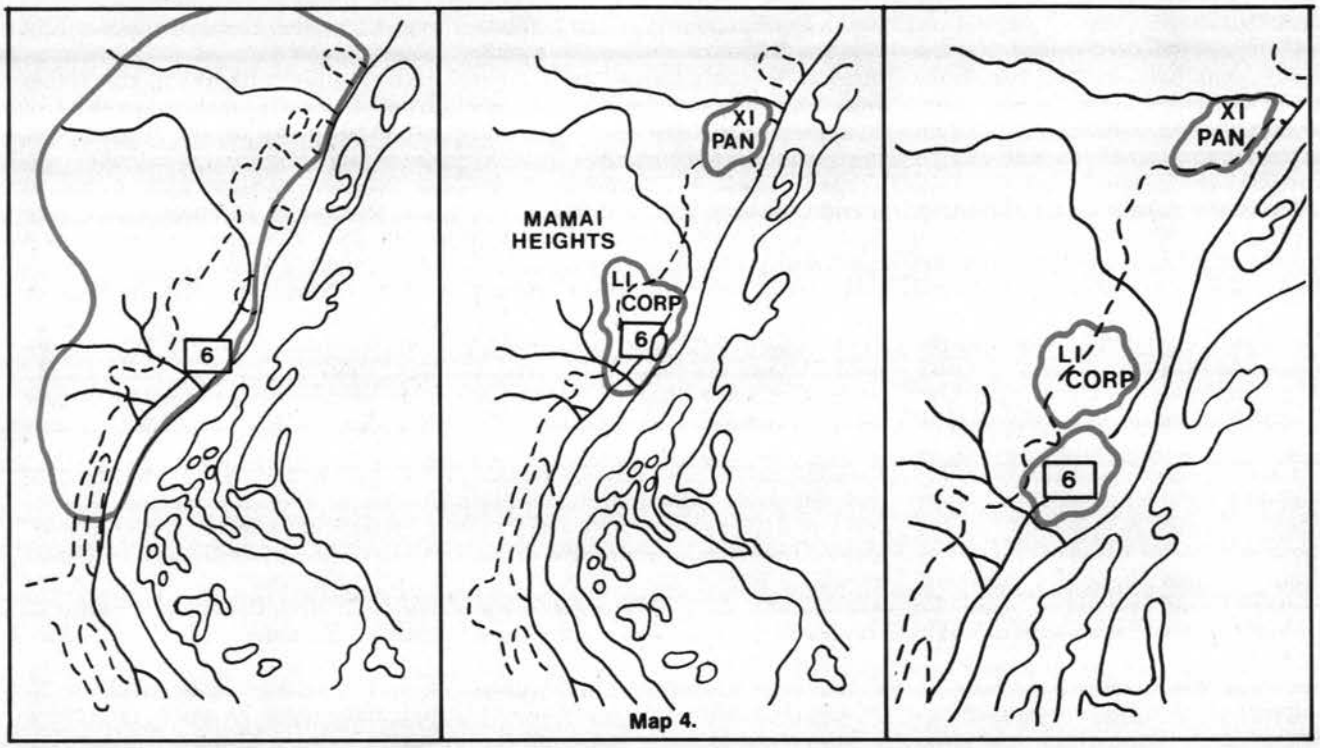
On 24 November, after the Russian pincers first isolated the Sixth Army, the conditions were ripe for a breakout. Paulus and his subordinate commanders had planned for it, and issued the "Flower Order." Army Group B had ordered him to break out. Yet, in the face of the Russian onslaught, Paulus *requested OKH for permission* to execute the operation. Also, General Zeitzler at OKH, had taken the initiative and alerted Army Group B and Paulus to prepare to execute the plan.

Paulus' request to Hitler for permission to breakout was an error in judgment since he knew of Hitler's strong feelings about defending Stalingrad. In the end, of course, Hitler refused.

At this point, Paulus should have seized the initiative, and presented the High Command with a *fait accompli* since the stage had been set. He had been exposed to enough chaotic blunders to realize *"der Fuhrer"* was not a competent tactician and that remaining at Stalingrad was tantamount to ultimate capitulation. Perhaps one can justify his actions by



Map 3.



Map 4.

saying that he did not realize the gravity of the situation. But surely a man who rises to the rank of general would have the foresight to realize the situation was critical enough to warrant a breakout attempt.

By 19 December, the situation within the encirclement had steadily deterioriated and Paulus was faced with what was to be his last chance to save the Sixth Army. He would link up with the Fourth *Panzer* Army or hold the city to the last man and the last round!

Paulus' offensive power lay in his tanks, approximately 100 of which were still serviceable. Their fuel supplies would carry them only 20 miles, 10 miles short of the relief forces. It was estimated that 4,000 tons of fuel would be required for the 30-mile thrust and it was impossible to wait until this tonnage could be obtained. The Germans hoped that the thrust would relieve the pressure on the Fourth *Panzer* Army, which possibly would be able to advance the necessary 10 miles.

As Field Marshal von Manstein later suggested, Paulus' refusal to attempt a breakout at that point was based on valid reasons. But given that this was the last reasonable opportunity for a successful breakout, it was Paulus' duty to his troops to try and save them from eventual disaster. He should have sacrificed some of his offensive tank power and used the fuel thus saved to enable the remaining tanks to cover the 30 miles. The loss of offensive power could have been balanced by an increase of combat troops who would have been fighting for survival. The fact remains that Paulus did not attempt the breakout and the Germans lost four corps headquarters, 13 infantry divisions, a rifle (Jaeger) division, a Croatian regiment, three *Panzer* divisions, and three motorized divisions.

Prussian military training forced Paulus to obey Hitler's orders. If this is so, then we can "pass the buck," and blame Hitler. Hitler spent WW I in the trenches. WW I was a position war and the abandonment of terrain was rejected because it would lower the morale of the defending forces. Writing in 1937, General Balck of the German Army stated that the principle of defensive war is no longer one of holding of terrain, but the infliction of casualties on the enemy while preserving our own forces. The abandonment of shell-torn positions was better than sacrificing men and material to hold them.

Stalingrad was such a position, and the attempt to hold it cost the Germans 30,000 men and their equipment. General Balck was not alone in his opinions and the new concepts of defense were available to Hitler before the war.

Assuming that Hitler was aware of these new concepts, it then becomes evident that the decision to hold Stalingrad was to further his personal goals, an unpardonable mistake on the part of any military leader.

No matter whose fault it was, it still remains that the decision to hold Stalingrad "bis zur letzen Patrone" (to the last bullet) cost the Germans Stalingrad, and the Sixth Army.

LIEUTENANT COLONEL WILLIAM L. HOWARD was commissioned into ordnance from the Citadel in 1964. He is a graduate of the tank-automotive maintenance officer course and the CGSC. He served as a commander, 11th Military History Detachment in France and with the Combined Material Exploitation Center in Vietnam and, later, as a company and battalion commander at Ft. Polk, LA. In 1973 he transferred to armor and was an instructor in all phases at the AOAC. He was employed by Battelle Memorial Institute as a consultant on Soviet armor and antitank weapons.

The T95: A Gamble in High-risk Technology

by Captain James M. Warford

The use of high-risk technology, in the design and development of armored vehicles can be defined as the employment of any technology of unproven design or capability. The fielding of a weapon system incorporating this type of technology would clearly be regarded as a gamble, or high risk. The decision to take this gamble, or not, thus becomes very important to the future of any armored vehicle program.

In 1954, a series of design studies was begun to develop a new family of armored vehicles of the medium or main battle tank (MBT) class. One of the resulting designs, the *T12,* was accepted and moved into the development phase and redesignated the *T95.* It was intended to make extensive use of innovative, unproven technologies. The specific purpose of the *T95* is not very clear. Some sources state it was intended to fulfill the missions of both the *M48* MBT as well as the M103 heavy tank. Other sources, however, disagree, and refer to the *T95* as primarily an experimental vehicle; intended for testing all of the recently available technologies. No matter what role the *T95* was intended to perform, it was clear from the beginning that it was to be a truly revolutionary tank.

The innovations built into the *T95* were included in all three of the basic tank design criteria: firepower, mobility and protection. The main armament fitted to the *T95* pilot model was the *T-208 smoothbore, 90-mm gun,* carried in the *T191* non-recoiling mount. This new, fixed gun mount had several advantages over the conventional recoil system. First, it eliminated the weight, complexity and cost of a recoil system. Second, it reduced the turret opening required to mount the main gun. Third, it reduced the amount of space needed inside the turret to allow for the gun's recoil. Although the smoothbore gun and its rigid mount were very innovative, the most important feature of the tank's firepower was its ammunition. This was an armor-piercing fin-stabilized, discarding-sabot (APFSDS) round, with a 37-mm tungsten-carbide penetrator. The round had the penetrator centered in the cartridge case and supported by a forward discarding sabot at the mouth of the case and looked much like the current 105-mm APDS round. The muzzle velocity of 5,000 fps and the low drag projectile were expected to produce target effects similar to those currently achieved.[1] The *T95E1,* mounted the same main gun as the pilot model, but in a conventional recoiling mount. The following models were fitted with a complete turret from the *M48A2;* the *T95E2* was fitted with the *T140E1* 105-mm smoothbore gun. The *T95* was also fitted with a developmental turret from the *M60A2* program. This latter modified *T95* was used to successfully conduct the first cant-angle firing of the *Shillelagh* guided missile. Finally, the British 120-mm rifled gun which was then being considered as a replacement for the *Centurion's* 105-mm main gun was considered for use on the *T95.* As for secondary armament, the *T95* and the *T95E1* were both equipped with a .30 caliber coaxial machinegun and a .50 caliber cupola-mounted machinegun. Personnel armament included a .45 caliber submachinegun and a .30 caliber *M2* carbine.

Another important aspect of the *T95's* firepower can be found in its various fire control systems. While some models were fitted with conventional range finders, such as the *T57* coincidence type, a very innovative system was used on the pilot model. Another rangefinder, known as the *T53* Optical Tracking Acquisition and Ranging (OPTAR) system, was tested on the *T95* from 1955 to 1957. The *OPTAR* system consisted of a light-beam transmitter, a receiver unit, and an offset sighting system. The transmitter, and receiver were located on the right side of the turret, pro-

tected by a large, armored blister. The system was designed to enable the tank commander to lay the rangefinder on a target; and by pressing a button, fire a *single pulse light beam.* This beam would reflect off the target and return to the receiver. The data would be processed and given as a range readout. Since the OPTAR used a noncoherent beam of light, the beam had a tendency to scatter, resulting in multiple returns to the receiver. The tank commander was required to visually estimate the target range and determine which of the beam returns was correct. Despite this problem, the OPTAR was a major breakthrough that would prove to be the forerunner of today's laser rangefinders.[2]

The *T95's* mobility was also given a high priority, and the most important item in this area was the powerpack. This was a Continental Model AOI-1195-5 engine coupled in Allison Model XTG-410-1 manually-controlled, full-torque-shifting transmission. Power was supplied by the 8-cylinder, 180-degree *horizontally-opposed,* air-cooled fuel-injected engine that delivered 560 gross horsepower at 2,800 rpm. This gave the *T95* a power-to-weight ratio of 13.5 hp/ton and a maximum speed of 35-37.6 mph. Other engines were also tested. There was an engine with its cylinders arranged as an X, as well as a commercial diesel engine that was mounted in the late model *T95E8.* Finally, in March 1961, a *T95* was displayed at the Pentagon with a Solar Saturn 1,100 hp *gas turbine engine*[3]

As for running gear, the tank was fitted with a flat track suspension system without support rollers. The track was carried on the top of the five large-diameter dual road wheels that were suspended on torsion bars. Each of the road wheel hubs was fitted with a transparent plastic plug that allowed visual inspection of the hub lubricant level. Many different running gear systems were tested on the *T95,* ranging from a variable height *hydropneumatic suspension* to a new type of titanium track mobility trials pitting a *T95E2* against an *M48A2* from June, 1957 to September, 1959. Two hulls were used logging a total of 3,774 miles and it was determined that the *T95E2,* with its decreased weight at no sacrifice in armor protection, in most cases exceeded or equalled the *M48A2* in performance.[4] The final trial report recommended that the *T95* tank chassis, after modifications for improved mobility on muddy terrain and component reliability, be strongly considered for future MBT production.[5]

Since WW II, there has been a concentrated effort to provide tanks and other armored vehicles with some degree of protection against high explosive antitank (HEAT) ammunition. Early ideas ranged from simple spaced armor to an asphalt and pebble composition known as HCR-2. These early designs, however, did not provide a workable solution. As a result, the Continental Army Command requested the initiation of a program in 1952 to develop an armor that offered built-in protection against shaped-charged projectiles, without sacrificing protection against kinetic-energy projectiles or increasing the vehicle's total weight. This armor development program was combined with the *T95* program and resulted in the construction of 36 siliceous-cored *T95* turrets and hulls. While it is true that most of the *T95s* were built with conventionally armored glacis plates and turret fronts, these specially armored turrets made the *T95* the first American tank model to be fitted with *composite armor.* The armor consisted of an outer layer of about one inch of cast armor, an inner layer of about two inches of cast armor and a center layer of about four inches of fuzed silica. Silica, or glass, was chosen for the armor because it does not "flow plastically" after an impact as does steel. Silica, instead, rebounds after the shock wave and radially bombards the oncoming shaped-charge metal jet particles and disrupts the jet's shape.[6]

A series of ballistic tests were conducted on composite-armored *T95* turrets and hulls from 1 June 1958 to 1 August 1960. The purpose of the tests was to confirm the effectiveness of the composite armor against currently fielded antitank weapons. The following projectiles were fired: 12 rounds of 90-mm HEAT, 33 rounds of 3.5-inch rocket, 54 rounds of 105-mm armor piercing (AP), 24 rounds of 120-mm high explosive (HE), 12 rounds of 105-mm HE, 1 round of Soviet 100-mm armor-piercing, high-explosive (APHE) and 64 rounds of 106-mm HEAT. The most interesting result is clearly that of the Soviet 100-mm APHE round. The round was fired to impact on the upper glacis plate, which was sloped at 65 degrees. The round displaced a piece of armor from the cast armor outer layer measuring 38½ inches by 14½ inches, and caused several outer layer cracks. No damage was classified as a protection, partial penetration (PP-P).[7] The entire area from the inner layer of the glacis plate to the rear of the hull was undamaged. However, despite the effectiveness of the fuzed-silica composite armor, it's design had some severe limitations. First, upon impact by either a shaped charge or an AP projectile, an undetermined amount of fuzed-silica would be pulverized. This would occur whether or not the round defeated the armor. Second, upon impact from nonpenetrating AP projectiles, the cast armor could be severely damaged. The amount of damage could vary from displacement of a piece of outer layer cast armor (as above) to large-scale silica pulverization and inner layer cast armor bowing. In either case, the effectiveness of the armor against a subsequent projectile impact would be greatly reduced. Even so, it was determined that fuzed-silica composite armor provided superior protection

Table 1.

Physical Characteristics

Weight
- Combat loaded, 83,471 lbs.
- Crew, 4
- Fuel Capacity, 220 gal.

Dimensions

Length (travel lock)	31' 1½"
Length (Gun frd)	33' 9½"
Height	9' 5"
Width	10' 4½"
Ground Clearance	1' 1¾"
Ground Pressure	11.3
Hp per ton ratio	11.0

Engine: Continental, Model AOI-1195-5, (8 cyl. horizontal opposed, air-cooled)

Transmission: X-Drive, *XTG-410*

Steering: Clutch Brake and Geared Steer

Suspension: Torsion Bar Flat Track

Tracks:
- Double Pin-Rubber Backed *T115* Steel, *T114* Rubber

Electrical System: 24 volts

Final Reduction Planetary Concentric Ratio, 5.4:1

Ft/Rev 6.38

Sprocket Pitch Diameter 22.19"

Armament

Main Gun
- 90-mm Gun, *T208*
- Elevation, 20°
- Depression, 10°

Secondary:
- 1 Cal. .30 MG
- 1 Cal. .50 MG Comdr's
- 1 Cal. .30 Carbine, M2
- 1 Cal. .45 SMG

Ammunition
- 90-mm, 50 rds
- .50 Cal. 1500 rds
- .30 Cal. 4500 rds

Fire Control
- Periscope, *T50E2*
- Gunner's Telescope, *T171E1*
- Comdr's Telescope Ord #8289340
- Quadrant, *M13* Elev.
- Range Finder-Optar
- Indicator, Azimuth *T28E1*

Performance
- Maximum speed, 35 mph
- Cruise Range, 150 miles
- Maximum Grade, 60%
- Trench Crossing, 8' 6"
- Vertical Obstacle, 36"
- Fording 4'

against shaped-charge HEAT projectiles, and at least equivalent protection against AP projectiles as that of an equal weight of solid steel armor.[8]

In 1961, after Congressional criticism and the appearance of several problems during its development, the Army decided to halt the *T95* program in favor of a product-improved *M48*. The *T95* program was widely regarded as a failure. It ran for 7 years and cost $26.6 million. In spite of all the time and money spent on the project, no new tank entered the service. The program experienced many problems that ranged from the fact the *T95* did not comply with the Berne International Loading Table because it was 1 inch too wide,[9] to the fact that the nonrecoiling main gun mount transmitted too many G-forces into the turret structure.[10] However, these limitations must be kept in perspective, If the innovative technology of each of its subsystems is examined individually, the *T95* does not appear to be such a failure. A high-velocity smoothbore main gun firing APFSDS ammunition, a light-beam, or laser, rangefinder, a powerful diesel or gas turbine engine, and composite, or special, armor, are almost mandatory characteristics of the modern main battle tank.

It is hard to say what the exact impact of the *T95* would have been had it been fielded. Perhaps the best way to determine this impact is to compare the *T95* to a tank that also made extensive use of high-risk technology, the Soviet *T-64*. In spite of numerous reported problems, it was put into production and service in the mid-to-late-1960s. The similarities between the *T-64* and the *T95* are surprising. While the 125-mm smoothbore gun and its APFSDS ammunition, as well as the probable mounting of a newly-developed laser rangefinder are well known, the engine and armor protection fitted to the *T-64* are still surrounded by speculation and concern. The *T-64's* powerplant is a 750 hp diesel engine that represents a drastic change from conventional Soviet designs: being a flat, five-cylinder design, with *horizontally opposed* pistons.[11] The performance and reliability of this new engine has been under close examination by the west for some time. Some of the most recent information indicates that this engine has been plagued by problems. The Soviets, however, seem to be pleased with this innovative engine and, according to some sources, have incorporated an uprated version of it into the *"T-80"* MBT.[12] Some reports indicate that the *"T-80"* possibly incorporates a *T-64* hull fitted with a *hydropneumatic suspension system*. The smaller roadwheels on the *T-64* (as compared to those fitted to the *T-72* MBT) would be more applicable to such a suspension system.[13]

The *T-64's* armor has been the subject of much speculation in the west. When the tank first appeared, it was widely assumed that the design could not incorporate any form of advanced armor because of the use of a cast armor turret. This assumption, however, now appears to have been in error. As details of the *T-64's* frontal armor package became available, it has been determined that it is, in fact, protected by at least a first generation of *advanced* armor.[14] The deployment of this tank, with its innovative frontal armor, caused the west to make urgent plans to counter this new threat. These efforts were primarily concerned with the development and deployment of enhanced capability HEAT warheads, like the improved TOW and TOW 2 antitank missiles. These two systems were needed because of the obvious requirement to knock out a *T-64* from the front. It had been determined that the standard TOW missile (with its conventional HEAT warhead) was suddenly faced by a threat that it not only could not kill from the front, but might only cause significant damage to (the) *T-64* sights, tracks and running gear; and, if appropriate tactics are employed, cause outright kills if fired against the tank's side, rear or top armor.[15] While the determination of the effectiveness of the *T-64's* frontal armor was being pieced together, very little information concerning its exact composition was available. It had already been proven, however, by the design and testing carried out on the *T-95*, that a cast armor turret could be fitted with composite armor. The type of frontal armor fitted to the *T-64*, although not necessarily a duplicate design, is most likely of the same (primarily) HEAT-defeating family as that composite armor employed on the *T95*. Thus, the impact of the *T-64* can be measured by the massive reaction it caused in the west; a reaction that is still being felt today. A comparable reaction might well have swept through the Soviet Union had the *T95* been fielded.

It seems very clear that the most important lesson that can be drawn from the *T95* program, is that the time spent waiting for the ultimate in tank technology is in fact time wasted. The innovative, high-risk technology incorporated into tanks like the *T95* and *T-64* will certainly cause them to experience initial teething problems; problems which can, however, be dealt with and temporarily accepted. Once such a design is fielded, it can be modified and upgraded as necessary. Today's technology, even if it is classified as high-risk, must be put to use *today*. If it is not, and our capabilities are kept from the field to be fine-tuned, the tank technology that has been developed for so long will finally reach the field as nothing more than a workhorse from the past.

Footnotes

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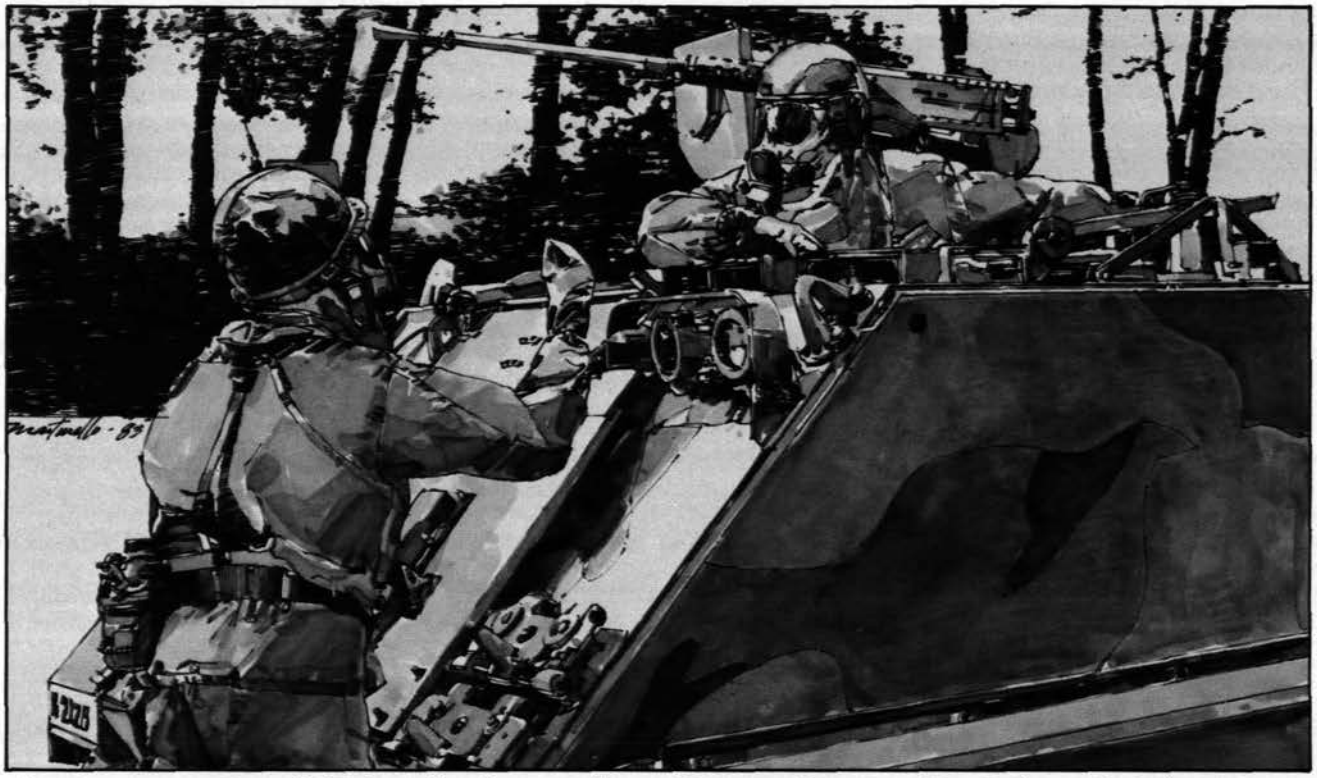

Integrated Training in Combat Critical Tasks

by Captain John P. Marinari

Training in a combat critical task (CCT) is currently *isolated* from the training exercises rather than being *integrated* as a viable and interrelated part of the whole training process. A CCT is that task or mission most likely to be undertaken in combat and, therefore, is trained for in peacetime. Such CCT training is usually sequenced as follows:

- A perception of a unit's weakness in the performance of a CCT (usually by higher command).
- An announced evaluation of a unit's performance in this CCT (again by higher command).
- And, finally, the evaluation and critique.

Usually, the training in the CCT stops here; for, by now, a new item of training importance has reared its ugly head. The quarterly training objectives of a unit might vacillate from nuclear, biological, and chemical (NBC), to individual/crew gunnery, to tactical maneuver—but in most cases, training in any one CCT is performed in isolation from others.

If a leader (squad, platoon, company, etc.) initially integrated quarterly training objectives into a basic, multiple training packet, the cumulative end result would be more interesting and realistic, and result in true-value training—both to soldiers and leaders. Conversely, isolation-type training in CCTs usually results in a lower probability of mission accomplishment due to a trade-off of competent execution in one CCT at the expense of another.

Following is an example in which the three platoons of a mechanized rifle company independently executed a training exercise called NBC/T. NBC/T was designed to place an element into a scenario where mission accomplishment hinged on integrating NBC training and tactical application with proper tactical maneuver. *It should be noted that prior training was not intensified for either CCT.* The scenario began with the following oral fragmentary order (FRAGO).

> "Enemy forces have been observed moving through an area that has received heavy enemy indirect fire—some rounds impacted without flash detonation. Company C will move along route SKY to occupy defensive positions from GN010060, northeast to GN024075. Your mission is to conduct a route reconnaissance and subsequently occupy a platoon defensive position. You will occupy forward assembly area CLOUD and be prepared to begin operations on order. Call all check points upon passage. All company headquarters elements are available in support of this operation. Effect any necessary coordination through the executive officer."

The FRAGO was given in this manner to avoid emphasizing either CCT 1—conduct a route reconnaissance, CCT 2—reconnoiter and move through a suspected contaminated area, or CCT 3—occupy a platoon defensive position. However, the statement concerning indirect fire impacting without flash detonation indicated the possible use of chemical rounds. The Soviets doctrinally mix chemical rounds in with high-explosive concentrations. The platoon leaders were aware of this doctrine, and in fact their squads were earlier evaluated on a squad proficiency live-fire range (range 24, Grafenwoehr major Training Area, Federal Republic of Germany) which incorporated this doctrine. Also, the last statement of the FRAGO offered use of the headquarters element which, by company standing operating procedure (SOP), signaled that the platoon could request that an equipment and personnel decontamination site be set up. In combat, the company commander probably would have directed the exact procedures to be implemented, but for the sake of training, the platoon leader was deliberately left to execute the mission in his own manner.

tion whenever necessary. If a vehicle commander is working out of his field for any length of time, or when improvements and modifications to the systems or the vehicle are made, retesting must take place.

Following the administration of this large and expensive training program for combat vehicle commanders, how do we ensure that this certified operator is retained in that MOS and, even more importantly, that he is recognized for his contribution? In the same way that we maintain the strength of airborne and aviation positions. With certifications and assignment to a vehicle commander's slot comes additional pay for additional responsibility.

For example, with certification and occupation of position as commander of an *M1* tank (a $2 million vehicle) a 19K SSG demonstrated competence and increased responsibility is recognized by awarding him an additional amount of money every month.

At this point, the choice between tank commander and assistant operation's sergeant becomes more difficult. Where previously the latter came with several incentives (not the least of which may be a stove on which to heat coffee) the former now has tangible recognition for the increase in responsibility.

The final step in this equation for improvement is the difficult decision to declare any vehicles non-operational when a certified vehicle commander is not available.

An interesting parallel may be made between these vehicles and our aviation assets. Take a brigade commander's *OH-58A* normally flown by a warrant officer first class. When the pilot is sick, the crew chief does not step into the cockpit and fly the colonel away.

No, that piece of equipment must be operated only by a currently rated and licensed pilot. Yet an *M1, M2,* or *M3,* all of which are much more expensive than the $300,000 *OH-58A,* is "piloted" by the next-most-senior soldier whenever the assigned vehicle commander is not present —his experience level with that vehicle notwithstanding.

It follows that an integral part of this development is the declaration of vehicles without commanders as non-operational on unit Readiness Reports.

General Westmoreland once made the comment that the fundamental difference between services is that the Navy and the Air Force are services of machines that are operated by men, whereas the Army is a service composed of men assisted in their mission by machines. As we rapidly progress in the technological development of our combat weapon and carrier vehicles, this difference becomes significantly smaller. Furthermore, if our present system of commander substitution is allowed to continue in its present form without certification, retention, or recognition, the combat potential of our fighting vehicle fleet will continue to decrease.

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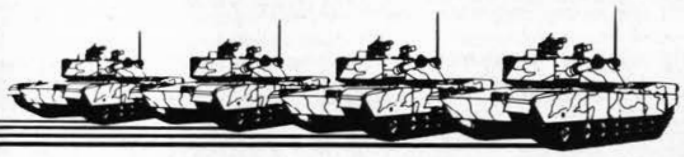

The Top Ten Hits

After 3 years of headaches and hand cramps, moaning those weekly training schedule blues, raising crop after crop of young soldiers who couldn't get excited about individual training, much less stay awake through one training extension course tape, and disgusted with a host of unmotivated non-commissioned officers uninterested in training their soldiers, I finally said to heck with the *status quo* and launched into an innovative individual training program I'd like to share with you.

I hoped it would bring that warm feeling of professional satisfaction back into my working days, but most importantly, that it would develop quality NCO trainers, and soldiers who had mastered their MOS at their skill level. It accomplished both.

My program is dubbed the "Top Ten Hits" and consists of five components:

- A monthly task list
- Resource centralization
- End-of-month sampling
- NCO scoreboard
- Performance counseling and incentives

I used this program in an armored cavalry troop, but it can perform good service in any organization. Here, I'll narrow it to 19D scout training, although it was similarly conducted for 19E, 11C, 17K, and seven other MOSs in the troop.

The Monthly Task List

The squadron commander and S3 reviewed every task in all the Soldiers Manuals and discovered that many tasks were of no value to our soldiers in Europe or, in other words, we don't need 'em, so why waste our precious time? Train like you're going to fight. Those tasks were discarded and the CO and S3 came up with what was called an Edited Task List (ETL) that was simply a list of those tasks in each MOS that applied to our men and that they had to master.

From this ETL, I posted a list of ten tasks (the monthly "Top Ten") on the training room board on the first of each month. Seven were Skill Level 1 and three were Skill Level 2/3. These were the only tasks I expected the 19D scouts to master that month. I selected the tasks to reinforce the individual skills that would enhance collective performance in some future training event; i.e. maneuver/communication tasks before an upcoming platoon ARTEP.

Resource Centralization

Once I had hung the monthly Top Ten on the board, our training NCO reviewed the reference or training aid notes for each task in the Soldiers Manual and acquired all the training materials a sergeant squad leader would need to adequately drill those tasks into hard heads with short memories. When the squad leader was ready to begin the training, he had only to gather all the training material he wanted to use to get his point across.

End-of-Month Sampling

At the end of the month, I selected one soldier *at random* from each scout squad, for a total of 15 19D10s. In addition, I selected *at random*, one sergeant or staff sergeant from each of the three cavalry platoons. They had to complete one or two of their assigned tasks, to standard, in front of me. (Our first sergeant sample-tested all 19E tankers and common tasks.) This latter was a great tool because you soon knew if the soldier was trained, ignored by his sergeant, or could give a darn anyway.

The NCO Scoreboard

Hanging in the training room for all the world to see was the NCO scoreboard. Down the left side all the squad leaders and track commanders were listed and the months were listed across the top. Here's how it worked:

PFC Billy Joe Waldarusiak walked into my office or motor pool bay at the end of the month. I handed him a flag set and tested him on communicating by using visual signals, using *his* 19D Soldiers Manual as the basis. If he got a GO, I handed him a blue permanent marking pen, and, usually with a broad smile on his face, he walked over to the training room and drew a big blue star by his sergeant's name. *His sergeant got the star*, and the soldier got a slap on the back, a day off, and the respect of his peers and subordinates. He knew that part of his job and just proved it in front of the Ol' Man.

PFC Joe Snuffy walked in next, grabbed the flag set, and invented his own flag signals. I handed him a red permanent marking pen, which he reluctantly accepted, and slowly walked over to the Scoreboard and drew a big red goose-egg by his sergeant's name. The soldier had failed to learn, or the sergeant had failed to teach, one or the other. The NCO scoreboard vividly portrays those noncommissioned officers that are doing "sergeant business" and those that aren't.

Performance Counseling and Incentives

The NCO scoreboard is an easy, permanent record of a sergeant's training performance. If the soldiers in Sergeant Smith's squad posted two red eggs, back-to-back, the first sergeant brought two men in for performance counseling — Sergeant Smith and his *platoon sergeant*. The platoon sergeant, by the way, had the biggest stake of all in the outcome of his platoon's training performance for if a platoon sergeant had three goose eggs in a row, I wrote a special adverse EER on him to ensure that his inability to motivate and train soldiers was not overlooked by a promotion board. Then I'd consider administrative reduction. Fortunately, most sergeants got on board, and end-of-month sampling created a training room full of competitive squad leaders and platoon sergeants.

Two blue stars got your squad a four-day pass, three blue stars got your platoon a five-day pass, and so on. Use your imagination, but don't go overboard. Keep the rewards within reason. When EER time came around for those guys, the words came easy, supported by high numbers.

Now, I'll hit you with the punch line. *Not one class was ever scheduled on a weekly training schedule.* I told the sergeants, "I don't care where or when you train, that's up to you. You manage your own time, train at your own opportunity. But train. I'll check to see if you did at the end of the month."

Why did I adopt this attitude? Because I was sick of scheduling page after page of classes and getting 60 to 70 percent attendance. I saw little value in having one or two sergeants, who know what they were talking about, teach 95 percent of the classes. I was tired of classes being cancelled or interrupted by a phone call to clean up the motor pool or send a six-man detail to the sergeant major, *now*. I wanted to quantify the training performance of sergeants. I wanted this program to produce good soldiers who knew their business, and sergeants who knew how to teach and make it stick.

Did it work? You be the judge. In one calendar year, 19D SQT test scores rose over 15 percentage points with an average of 90.4 percent. *All* scored above 80 percent. The other high-density MOS's posted similar results; 19Es averaged 89.6 percent, 11Cs averaged 91 percent and 17Ks averaged 93 percent. For calendar year 1982, the troop was awarded the Draper Award, presented annually to the finest troop or company in the 11th Armored Cavalry Regiment. The "Top Ten" program had a lot to do with that.

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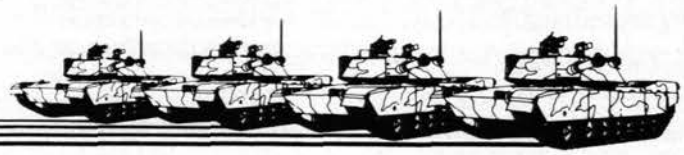
1st Squadron, 11th Armored Cavalry



The Role of Disobedience in War

Historically, obedience has been regarded as one of the supreme military virtues, second only to valor. Yet a close study of war reveals that obedience has played a disturbingly large role in bringing military catastrophe down upon the heads of many of its most devoted practitioners.

Furthermore, there are a significant number of cases where *disobedience* brought resounding victory.

Perhaps we should put aside our prejudices against willfull military disobedience, examine its role in military history objectively, and decide if perhaps there should be a place in our doctrine for this odd beast.

Perhaps the most famous incident of disaster-by-obedience was the charge of the British Light Brigade at Balaclava. Another example was Pickett's charge at Gettysburg.

More recently there is the case of the German Sixth Army at Stalingrad. How differently might the war have ended if Field Marshal Paulus had defied Hitler and broken out to link up with other German forces, instead of allowing his army to perish miserably and uselessly in a hopeless battle. What then did Paulus lack—courage, wisdom, spirit? Probably he lacked none of these things so much as he lacked a code of military honor that would permit him to contemplate such a clearcut act of disobedience. Not all German generals had this failing. SS General Paul Hausser defied a 1943 Hitler order to hold

Kharkhov at all costs—and saved two *Panzer* divisions plus the *Grossdeutschland Panzergrenadiers. (See "To the Last Man and Last Round" this issue. Ed.)*

Perhaps the most famous example of victory owing to military disobedience occurred during the naval battle at Copenhagen in 1801. At the critical moment, Nelson's nervous superior signalled him to withdraw. But Nelson clapped his telescope to his blind eye, declared "I do not see the signal" and continued the fight to win a clean and decisive victory.

It is important to note that some of the most prestigious military thinkers have taken account of the importance of judicious insubordination and have given it a hallowed place in their philosophy.

The Chinese military theorist Sun Tzu repeately stressed that a general must be ever ready to disobey the orders of the emperor, since the emperor cannot possibly foresee the circumstances the general will face.

In the U.S. Army, the necessity of allowing subordinates ample flexibility to meet local conditions and unforeseen circumstances has been recognized. This is reflected in the practice of emphasizing mission-type orders.

Yet we do not go far enough. At some point specific instructions must be given. And at some point, somewhere, sometime, there will be a situation where an officer must decide between obeying an order that will result in disaster, or disobeying at severe risk to himself—and perhaps, unknowingly, to others.

Since such dilemmas will exist, and since it is inevitable that military people will from time to time take matters into their own hands, it behooves us to study the issue objectively and establish some guidelines to help soldiers decide when such a course is permissible and when.

What we seek is three-part guidance covering policies, procedures, and disciplinary measures for such disobedience. While a formal study by experienced combat leaders, followed by detailed coordination and approval, is necessary to establish acceptable doctrine on these issues, perhaps the following ideas might provide a starting point for discussion:

Policy

Criticality. Obviously, military success demands obedience by far the greater part of the time. Obedience preserves the dependability of an army's plans, upon which operations depend for success and other soldiers rely for their lives. Willfull disobedience must be an extremely rare exception to an otherwise punctiliously respected rule. Disobedience is permissible only to avoid disaster or to exploit clearly self-evident opportunities of unusual value.

Minimizing "collateral damage." Soldiers contemplating disobedience must not fall victim to tunnel vision. What may look like a boneheaded plan to someone at the local level may make sense from the larger perspective; it may support larger plans that fully justify the risks and costs. Disobedience must be resorted to only when it will not undermine the overall plan or impact adversely on other friendly forces and their operations.

Minimizing divergence. When a soldier does find it necessary to disobey orders, he should minimize the degree of his divergence from those orders. The extent of disobedience should be the minimum necessary to achieve the legitimate purposes of the disobedience.

Procedures

Maximize flexiblilty. To minimize the need for disobedience, our current emphasis on mission-type orders should be reinforced. Leaders at all levels must be allowed maximum flexibility to react to local conditions and unforeseen circumstances.

Communicate. Leaders at all levels must be told how their actions will support the overall plan, how critical their mission is to fulfilling that plan, and what form their mission accomplishment must take to support the plan. The main burden for communicating is on the one contemplating disobedience: he must make the maximum feasible effort to secure information on the progress of the overall plan, to ensure that his action won't hurt someone else.

Give ample warning. Whenever possible, a leader who decides on disobedience must inform his superiors of the decision promptly before the action is taken and before the force is irretrievably committed to the disobedient action. Obviously, a commander who is truly convinced he is right will be understandably reluctant to tip his hand too soon, lest he be relieved before he has a chance to implement his own plans. Nevertheless, while it will sometimes necessitate some very delicate timing, consideration for the safety of other units and the overall success of one's forces demands that the disobedient soldier give a reasonable amount of notice concerning his intentions.

Disciplinary Measures

Unfortunately, it is necessary to ensure that even honorable, prudent, and successful disobedience does not go entirely unpunished. The general principle of obedience is so crucial that it must be upheld even when the special exceptions render it unjust to do so.

It is ironic and painful to consider punishing a good soldier for a disobedient act which contributed to the success of the operation. Nevertheless, there is precedent for punishing and honoring soldiers for one and the same deed.

Obviously, the penalties for justified disobedience should not be harsh or unreasonable, both as a matter of simple justice and to avoid terrorizing our soldiers into the very rigidity we are striving to avoid.

Cases where disobedience was manifestly the only useful and honorable course, e.g., aborting an artillery barrage or bomb run because the target appears to be swarming with friendly civilians, refusing to send troops against impregnable defenses, etc., should be punished only with informal oral or written reprimands, or not at all.

At the other extreme, clear abuses—cowardice, incompetence, treachery, or personal ambition—should continue to merit strict criminal action, by court martial.

But in the majority of cases, involving a reasonable judgment that disobedience was necessitated by the tactical situation, the most appropriate disciplinary measures would consist of career penalties such as relief from command, formal reprimands, or adverse comments on evaluation reports.

Such penalties should suffice to uphold the sanctity of the principle of obedience and to discourage frivolous abuses of that principle. At the same time, they would avoid the kind of harshness that would unfairly ruin the lives of dedicated soldiers and unduly discourage them from exercising the disobedience option when it is truly appropriate.

Would not Field Marshal Paulus seem a much greater soldier—and a much greater man—if he had promptly ordered his army to break out of Stalingrad, taken the first plane to Berlin, presented himself to Hitler and reported: "I have disobeyed your order. I did it to save my army and my country. Now I stand ready to accept the penalty for my disobedience. I am willing to die for my country and my soldiers, even if I must perish at their own hands."

Should not any military officer be willing to say as much?

American officers need not jeopardize their lives or the safety of their families for judicious disobedience. The penalties Americans would face for well-intended violations of orders certainly would seem minor compared to the sacred principles of country, humanity, and military honor we are dedicated to defending.

Just as we provided our soldiers with a code to guide their behavior as prisoners of war, so let us provide them with better guidance on the permissible limits of disobedience. Thus can we show them how to exploit their native American blessing of initiative.

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Westland, MI

STANO Devices: Benefactor or Millstone?

The Army's program to "see the battlefield" has undergone a rapid growth in the development and procurement of surveillance, target acquisition and night observation devices (STANO) for the combined arms team. Although these devices cost around $25,000 each (more than $1,000 per pound), they give the combined arms team the ability to see the battlefield under conditions not previously possible.

The long range of the new thermal imaging STANO devices — *AN/TAS-4* TOW night sight, *AN/TAS-5 Dragon* night tracker, and *AN/TAS-6* night observation device — have expanded capabilities over previous STANO devices. Although these new items have definite limitations they can be overcome with proper planning, good training, and high motivation. If leaders at all echelons, platoon through brigade, recognize both the benefits and limitations of new devices, the STANO devices can be that combat multiplier and benefactor that will tip the scales toward success instead of a millstone around the neck of the user.

Benefits. Command and control of tactical operations can be considerably enhanced by innovative use of the STANO devices. Some innovative uses are:

- Ease of vectoring personnel
- Unit identification
- Distribution of platoon fires
- Hostile target identification
- Indirect fire coordination
- Personnel selection

Another benefit observed in testing is that the new STANO devices have a greater observation range than the effective range of the complementary system. Therefore, a gunner could be viewing a target before it comes into strike range; for example, 1,000 meters in the case of the *Dragon*.

With the advent of the fire support team concept the forward observer (FO) has the capability of viewing the battle as never before. The FO can bring in the indirect fires under many kinds of reduced visibility.

Limits. Use of the new devices can be degraded by improper planning. Some possible millstones include logistical support, maintenance support, training, utilization in a single role, and distribution in the squad/platoon.

In terms of training, the number of vision-enhancing aids available at platoon level (e.g., thermal sights, starlight scopes, infrared devices, tank searchlights, platoon early warning system (PEWS), and binoculars), the leader of the combined arms element has a problem of what to use, when to use it, and how to use whatever device he chooses in combination with other devices. It is one thing to say it is easy for experienced officers, and quite another thing to say it's easy for the officer with the basic course and 6 months experience to employ these devices imaginatively. The point is that the aid is only as good as the imagination of the operator, or the immediate supervisor.

Lessons learned. There have been many lessons learned and most likely relearned. The lessons fall into three broad categories: equipment-oriented, human-oriented, and management-oriented.

In terms of equipment-oriented lessons, the soldiers using the TOW night sight (TNS) and *Dragon* night tracker (DNT) have the moderately difficult task of disengaging the lens cover on the eyepiece and viewing the terrain while wearing an *M17* protective mask. Proficiency is gained by practice.

In terms of human-oriented factors, the 2d Armored Division's surgeon, has provided some very useful recommendations for the TWO/*Dragon* gunner's visual adaptation in the use of the night sight during daylight hours:

"Once an observation is begun, the gunner stays continuously with the sight. If the eyes must be rested, close them, but the gunner should stay in position with his eye against the eyepiece. He should not take his eye away from the sight and look around.

"For prolonged use of the sight, a cravat bandage or other opaque material should be used to cover the left eye so that it can be left open. This will relieve the strain of holding one eye closed and prevent bright lights in the left eye from destroying the gunner's adaptation to the dark.

"To facilitate the TOW/*Dragon* gunner's rapid adaptation to the sight, one possibility would be for the gunner to wear red-lensed goggles or glasses before and after using the sight."

In terms of management-oriented factors, leaders often make the mistake of operating all or none of the available devices at one time. A more prudent approach would be if, for example, there are four STANO devices in a platoon and enemy contact is unlikely, assign a 15- or 20-minute surveillance time to each device. The first watch is with no overlap and the second watch with a 5-minute overlap. The platoon leader should judge the enemy contact condition and the degree of overlap desired.

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Major, Armor
USA MILPERCEN

REGIMENTAL REVIEW

New Camouflage for UK Berlin Vehicles

A distinctive new style and color camouflage has been applied to British Army vehicles in the Berlin sector in an effort to make them less visible in urban areas. Replacing the standard black and green camouflage used by all other British vehicles in NATO, is the distinctive white, light grey and black checkerboard pattern shown above. A newly camouflaged *Chieftan*, hidden in a Berlin area, was harder to spot from a helicopter than a black and green camouflaged tank. (Photo courtesy British Army.)

USAREUR Armor Unit First In Regimental System

The 2d battalion, 37th Armor Regiment, 1st Armored Division, became the first armor unit in Europe to be incorporated into the regimental system when it exchanged its colors with those of the 3d battalion, 34th Armor Regiment on 25 Feb 1983 at Ferris Barracks in Erlangen, Germany.

The 2d battalion, 37th Armor (Co B, 37th Tank Battalion) was the spearhead unit of the 4th Armored Division that relieved the 101st Airborne Division at Bastogne during the Battle of the Bulge in WW II.

New AMTP Training Products on Line

The Armor Center at Fort Knox, KY, is phasing in a series of training products designed for trainers at all levels from platoon to battalion. They are called ARTEP Mission Training Plans (AMTP).

The new AMTP provides trainers with a descriptive training program for each level and provides samples of *one* way to train, though not the only way. The AMTP places far more emphasis on leader training and how to conduct training and includes working sample training exercises and provides *specific* information on training requirements for the level being trained. It is self-contained in one book, thus reducing the quantity of training products needed.

The tank platoon AMTP was first printed in draft in January 1983 with the company team draft AMTP printed one week later. Both books have undergone almost constant revision and have been incorporated into the officer and noncommissioned officer courses at the U.S. Army Armor School. Also draft AMTPs are available for the scout platoon and the tank battalion/task force.

Copies may be obtained by writing to:
ATTN: U.S. Army Armor Center
ATZK-TD-CT, Fort Knox, KY, 40121.

Armor Officers Selected as Olmstead Scholars

Two of the three Army officers selected to take part in the Olmstead Scholar Program this year are Armor officers. They are: Captain Jeffery W. Long and Captain Peter A. Henry. Another Armor officer, Captain William Anders, was among the four Army officers selected as alternates by the George Olmstead Foundation's board of directors.

Two officers from each of the service academies and one officer from each service who was commissioned through ROTC or OCS are selected for the program annually. They have the opportunity to study at a foreign university for 2 years and at an American university for 1 year for the purpose of obtaining an advanced degree.

Captain Long is attending the Field Artillery Officer Avanced Course at Fort Sill, OK. He is a 1978 graduate of the United States Military Academy (USMA). He will study political science at the University of Paris.

Captain Henry is attending the Armor Advanced Course at Fort Knox, KY. He is also a 1978 USMA graduate, and will study international relations at the University of Tubingen.

USMA Distinguished Graduates Awarded Cavalry Sabers

One hundred and fifteen cadets of the Class of '83, USMA, were commissioned into Armor on 25 May. Two of this group were presented cavalry sabers in the name of the Armor Association in recognition of their academic excellence. They are: Second Lieutenant Brian J. Butcher, and Second Lieutenant Alan W. Avery. Avery graduated fourteenth in his class and Butcher graduated fifteenth in class standing. This was the 51st year that the Armor Association has presented sabers to distinguished USMA Armor graduates.

BOOKS

ABOVE AND BEYOND by Wilbur H. Morrison, St. Martin's Press, N.Y., 1983, 296 pages, $16.95.

This, the final volume in Morrison's trilogy on WW II aviation, is an authoritative account of the U.S. Navy's carrier war in the Pacific. His previous volumes, *POINT OF NO RETURN* and *FORTRESS WITHOUT A ROOF* detail the Army Air Force's actions in the Pacific and European theaters.

ABOVE AND BEYOND presents a good in-depth study of the navy's carrier war in the Pacific; how such ships and their tactics evolved; the rivalries between the men who fought for and against them; accounts from the Japanese side of the struggle, and the sacrifices made by the Navy and Marine pilots and aircrews—the men who did the shooting.

A good bibliography complements Morrison's credibility. This book is well worth the military historian's procuring for his personal library.

ARMOR STAFF
Fort Knox, KY

Price Correction

The quoted price of $46.95 for *OBSERVER'S DIRECTORY OF MILITARY AIRCRAFT*, as carried in the May-June issue is incorrect. The correct prict is $16.95.

STRATEGIC MINERALS: A RESOURCE CRISIS, published by the Council on Economics and National Security, Washington, D.C. 1981. 105 pages. $5.95.

This concise book focuses on a variety of issues and problems bearing on the "resource crisis" or "resource war"—terms used to describe the overdependence of the U.S. upon unstable foreign sources of vital or strategic minerals and the ever-present danger of their interruption by hostile forces.

For most readers, this book will reveal that the resource crisis/war is a frightening reality. For example, of a total of 62 individual minerals or groups of minerals defined by Congress as "strategic," i.e., essential in the event of a national emergency, 36 are indispensible to the functioning of the U.S. industrial base and of those, 20 must be imported.

The strength of this book is its educational value in addressing a complex national security issue which may in time be one of the most serious problems confronting U.S. policymakers. The serious student will find it a very interesting and informative book.

JAMES B. MOTLEY
Colonel, USA
The Atlantic Council of the U.S.

ANTITANK: AN AIRMECHANIZED RESPONSE TO ARMORED THREATS IN THE 90s, by Richard E. Simpkin, Maxwell House, Fairview Park, Elmsford, NY. 1982. 300 pages. $45.00.

In this, his third book, Richard Simpkin provides a timely and fascinating look at the conduct of armored warfare as he projects into the end of this century. His analysis begins with technically excellent definitions and descriptions of likely, future armored vehicle characteristics and proceeds into similar reviews of methods of attack including chemical, electronic and nuclear warfare threats, as well as conventional chemical and kinetic energy mechanisms. Means of munitions delivery are considered, then incorporated into discussions of entire weapons systems, both land and air. From this firm background, he smoothly evolves in detail an antiarmor-capable air-mechanized division of the future with truly revolutionary potential for rapid delivery of intense firepower and having unmatched agility.

The book provides educational and fascinating reading for the interested civilian as well as the professional soldier and is highly recommended.

DONALD J. BUTZ
Battelle Laboratories
Columbus, OH

RETURN TO FREEDOM, by Samuel C. Grashio and Bernard Norling. MCN Press, OK. 1982. $14.95.

This book records the experiences of then lieutenant Samuel Grashio who was an Army Air Corps fighter pilot at the time of the fall of the Philippines. He went through the "Bataan Death March" and after a year in prison camp he and nine others escaped and fought with the Filipino guerillas until 1943 when he was taken by submarine to Australia and then returned to the U.S.

The book provides insight into survival as a POW and notes that Japanese treatment of POWs was of a random nature, not the calculated demoralization practiced by the communists in Korea and Vietnam. The techniques of "escape and evasion" and of working with guerillas are noteworthy.

A. HARDING GANZ,
Associate Professor, History
Ohio State Univ., Newark Campus

LOST VICTORIES by Field Marshal Erich von Manstein, Presidio Press, CA. 574 pages. $18.95

Von Mainstein's war memoirs document the ebb and flow of WW II on the German southern flank in Russia and direct the reader's attention to the path of final defeat taken by Hitler. Von Manstein's unique place in the chain of command, his access to Hitler, his military experiences, and the loss of his son in Russia, all give him unique qualifications to write this book.

The author does not dwell on politics nor Hitler's inner circle unless they overflowed into military operations that should have better been left to the field commanders. He covers his experiences as a *panzer* corps commander in Poland and France and continues to the Russia campaign. The major actions on the Russian southern flank are analyzed with clarity and honesty. New insights are gained on the battles of Kharkov, Kursk, the Dnieper Bend, and others.

Von Manstein's narrative underscores the reasons for Germany's defeat in Russia and provides added background for our modern struggle with the Soviets.

ROBERT P. ARNOLDT
Evanston, Il

RE-ENTRY: TURNING MILITARY EXPERIENCE INTO CIVILIAN SUCCESS, by Keith O. Nyman. Stackpole Books, Harrisburg, PA. 164 pages. $9.95.

As an Army officer, I frequently talked to prospective reenlistees. Many of those whom I wanted to remain in the service were seriously contemplating "re-entry" into civilian life. Although my advice was not as thorough as the first nine chapters of this book, I believed in it and strongly expressed a condensed plan with emphasis on chapter 15. The remaining chapters were very enlightening to me as a retiree who planned a transition to starting a small business from a hobby.

Re-entry is a must for all military and should be on the reading list for career counselors, and officers and senior NCOs in career progression courses.

WARREN H. SHIROMA
Major, USA (Ret)
Guston, KY

STEEL ON TARGET

While walking by the Golden Dome enroute to a class on a cold, overcast South Bend winter morning many years ago, it occurred to me that if I wanted to live a meaningful life, then spending it in the company of men like my ROTC instructors would be a good way. One college and two high school reunions have come and gone and I have not changed my mind.

Reunions are revealing experiences. The contrast between soldier and civilian is remarkable. Physical differences are most apparent for few middle age civilians meet the minimum physical conditioning standards demanded of soldiers. But the fundamental differences are more profound and call to mind the impressions those officers and NCO's at Notre Dame left with me.

Unlike many with whom I grew up, those men in uniform had a global perspective. Most had served in Europe and many had served in Asia in peace and war. The tales they told of far away places were of actual experiences, with real people, during events which most of us knew of only from the news.

They lived life with gusto. While highly disciplined in many ways, they relaxed with the air of men sure about themselves and of the role they played in society. And, they were enthusiastic about their work. They liked soldiering and soldiers. They treated us like men—up front and eyeball-to-eyeball.

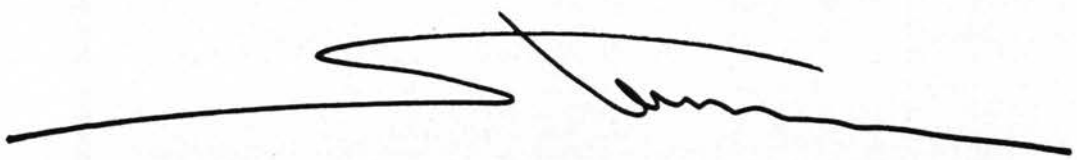
Not all officers and NCO's I've met over the years have measured up to those standards. Human frailty is a condition which no institution can entirely eliminate. But those who failed the test in one way or another were few and far between and not without some redeeming qualities.

Looking around today, the names and faces have changed but the qualities of those men I admired as a cadet are still displayed all about me. In the officer and NCO Corps are countless enthusiastic men of global perspective, proud of who they are and what they do. Ethical men, up-front men, men unlike any which a totalitarian society could ever turn out.

Standing in my high school gym a few months ago making small talk with former classmates, I realized how far I and others who had joined up had come. We were fit and trim and the stories we told of far away places were of actual experiences, with real people, in events of which most of my civilian counterparts only knew from the news.

Some of our soldiers plaintively cry their dissatisfaction with their chosen way of life. Others harbor a nostalgic attraction to return to the old neighborhood that offers the security that comes from being among family and friends, and from familiar surroundings, sights, and sounds. But when they do return and look about, most of them realize that there is nothing to equal the intensity and variety of experiences encountered in the normal course of soldiering. But most of all they realize there are few other professions that provide the opportunity to live such a meaningful life in the camaraderie of so many outstanding men and women. We are, indeed, fortunate to serve.

Good Shooting.



Symbolism

Black and gold have long been used as the regimental colors. The buffalo has likewise been the emblem of the regiment for many years, having its origin in the term *Buffalo Soldiers* applied by the Indians to Negro regiments.

The regimental badge, in lieu of a coat of arms, is used as the crest on the organizational color.

Distinctive Insignia

The distinctive insignia is the badge of the regiment.

10th Cavalry

Lineage and Honors

Constituted 28 July 1866 in the Regular Army as 10th Cavalry. Organized 21 September 1866 at Fort Leavenworth, Kansas. Assigned to 1st Cavalry Division 13 September 1921-18 December 1922. Assigned to 2d Cavalry Division 24 March 1923-15 August 1927. Assigned to 3d Cavalry Division 15 August 1927-10 October 1940. Assigned 10 October 1940 to 2d Cavalry Division. Inactivated 20 March 1944 in North Africa.

Redesignated 20 October 1950 as 510th Tank Battalion and relieved from assignment to 2d Cavalry Division. Activated 17 November 1950 at Camp Polk, Louisiana. Inactivated 1 May 1958 in Germany.

Reorganized and redesignated 25 June 1958 as 10th Cavalry, a parent regiment under the Combat Arms Regimental System (Headquarters and Headquarters Company, 510th Tank Battalion, redesignated as Headquarters and Headquarters Troop, 10th Cavalry).

Campaign Participation Credit

Indian Wars
- Comanches
- Apaches
- New Mexico 1880
- Texas 1880

War With Spain
- Santiago

Philippine Insurrection
- Without inscription

Mexican Expedition
- Mexico 1916-1917

World War II
- European-African-Middle Eastern Theater without inscripton

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

Decorations

None.