ARMOR

january-february 1977

XM-1 SELECTED!

US Army Armor School

Commandant
MG JOHN W. McENERY

Assistant Commandant
BG PAUL S. WILLIAMS JR.

Deputy Assistant Commandant
COL SIDNEY S. HASZARD

Educational Advisor
DR. CHARLES W. JACKSON

Secretary
MAJ WILLIAM A. SCHERR

Command Sergeant Major
CSM WILLIAM R. PRICE

INSTRUCTIONAL DEPARTMENTS

Automotive
COL JAMES L. MARINI

Command and Staff
COL CORWIN A. MITCHELL

Leadership
COL ADDISON D. DAVIS III

Weapons
COL JAMES W. BOOTH

DIRECTORATES

Combat Developments
COL JIMMY L. PIGG

Support
COL WALTER L. WATKINS

Training
COL DAVID R. HAMPTON

Training Developments
COL HERMAN J. VETORT

Evaluation
MAJ (P) PAUL E. FUNK

UNITS

The Lightning Brigade
COL HARRY E. B. SULLIVAN

"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."

Cover

The cover art for this issue depicts the Chrysler ***XM-1*** which has been selected as the U.S. Army's new main battle tank. Other pictures and a detailed description of the ***XM-1*** appear on pages 30 through 32. The art is taken from an original etching by *Armor's* art director, Karen Randall.

January-February 1977
Vol. LXXXVI No. 1

ARMOR

the Magazine of Mobile Warfare

ARMOR Magazine is published bi-monthly by the US Army Armor School at 4401 Vine Grove Road, Fort Knox, Kentucky 40121, to stimulate interest in, provoke thought on, and provide an open forum for decorous discussion of professional matters. Unless otherwise stated, material does not represent official policy, thinking or endorsement by any agency of the US Army. Use of funds for the printing of this publication have been approved by the Department of the Army, 23 December 1975.

SUBSCRIPTION RATES: Individual subscriptions to ARMOR are available through the US Armor Association, Post Office Box O, Fort Knox, Kentucky 40121. **Domestic:** $8.00 one year, $17.00 two years, $20.00 three years. **Foreign:** $10.00 one year, $18.00 two years, $26.00 three years. Single copies: $1.50.

CORRESPONDENCE: Address all correspondence to U.S. Army Armor School, ATTN: ATSB-MAG, Fort Knox, Kentucky 40121. (Telephone: Autovon 464-2249 or Commercial (502) 624-2249).

POSTMASTER: Application to mail at controlled circulation rates is pending at Louisville, Kentucky.

ARMOR may be forwarded to military personnel whose change of address is caused by official orders (except to APO addresses) without payment of additional postage. The subscriber must notify the postmaster.

LETTERS

FROM THE EDITOR

This LETTERS section belongs more to the reader than perhaps any other section of *ARMOR*. It is an open forum for discussion of informed viewpoints or opinions, but without the reader's continued support, this section will fail. LETTERS is the most accessible format in *ARMOR* for the reader to make his views known. If you find yourself strongly agreeing or disagreeing with *anything* you see in *ARMOR*, write us a letter. Without this feedback, we won't know if *ARMOR* is accomplishing its mission.

Boudinot

Credit Where Credit Is Due

Dear Sir:

As a long standing member of the Armor Association I look forward to the receipt of each issue of Armor. I have always found its contents to be both interesting, informative and in the best traditions of the combined-arms concept. Currently being in Korea I do not receive my copy of *ARMOR* in a timely fashion, conseqently this letter to the editor is a little tardy. It is hoped however that this will not prevent its use to correct an inaccuracy contained in the 1976 July-August issue.

The inaccuracy to which I refer pertains to the article in the Forging the Thunderbolt section entitled a "New Subcaliber Device." The article is very accurate in all of its description of the device, (operation, cost savings possibilities, etc.). However the article credits the soldier technicians of the American 2d Infantry Division as being the developers of this device, and this portion of the article is incorrect. Personnel of the 2d Infantry Division observed Republic of Korea Army (ROKA) Armor Units using a similar device on their 90-mm gun tanks. They then requested the 19th Support Brigades' Camp Carroll Materiel Support Center (CCMSC) to develop for them a similar device which could be utilized in the 105-mm gun, and be fired electrically as opposed to the manual method used by ROKA.

Based on this request prototypes were developed, tested and fabricated by the Department of Army civilians, soldier technicians, and Korean national personnel assigned to CCMSC, not personnel of the 2d Infantry Division. . .I have attached a copy of the Department of the Army Commendation given to Mr. Hugh P. Adkins, the DAC most responsible for this significant development effort.

This information is provided not to belittle any of the 2d Infantry Divisions efforts in this project, but rather to give credit to the 19th Support Brigades' role in this combined team effort to provide a significant training aid which enhances not only the training efforts of the 2d Infantry Division, but hopefully for all tankers, as a copy of this subcaliber device was provided to the Armor Center by the Camp Carroll Materiel Support Center for further testing and evaluation. To date CCMSC has not however received any feedback information on the subcaliber device.

RANDELL G. ROUTT
Lieutenant Colonel, ORD

Korea

Dear Sir:

The July-August issue of *ARMOR* carried a "New Subcaliber Device" item on page 7. Having been "on the scene" during development and testing of the device I was rather upset to note the failure to provide a credit line in the article to the folks who really developed, fabricated and tested the device as a result of a request from personnel in the 2d Infantry Division.

The 19th Support Brigade was responsible for the actual development of the device, following a request from the 2d Infantry Division. It should be noted that a model was in fact sent to the Armor School.

ROBERT W. FISHER
Colonel, Armor

Ft. Lee, VA 23801

"Writing a Readable OER"

Dear Sir:

Colonel Bahnsen and Major Highlander's article, "Writing a Readable OER," in the July-August issue gives good examples of poorly written OER's, but falls short of stating how a good OER should read.

It is very important that the rater and reviewer make their choice of words and phrases with the intended audience in mind. Use catchy words and phrases to draw the reader's attention, but clarity must not be sacrificed in order to "grab the reader's attention"—i.e., He's a REAL STUD!

The authors point out that inflation has rendered the numerical score of the OER nearly useless as a discriminator, but they fail to mention that the English language is subject to a type of inflation. With a Thesaurus available to the rater and reviewer, any officer can be forthright, shrewd, knowledgeable, or even unflappable. Strong words can quickly lose vigor and freshness, thus losing the power to command attention.

The OER should reflect the different accomplishments among the individuals concerned. As stated in AR 623-105, "describe striking examples of professional competence and commendable application, or shortcomings, incompetence, or negligence. To elaborate upon significant professional aptitudes or performance factors deserving of further comment."

An OER should contain the appropriate "Thesaurus" words, but by all means state what makes the individuals different—their specific notable accomplishments.

ALLEN L. LUTZ
Second Lieutenant, Armor

APO NY 09411

Hit Simulator

Dear Sir:

I suppose this letter should properly have been addressed to some other office but since it concerns *ARMOR* and I have your address from your command's magazine, it seems to be a good point at which to start the handling of an unsolicited suggestion.

There has been, and will continue to be, a good deal of discussion on the problems posed by antitank missiles and it occurs to me that there is some scope for the use of deception techniques. I suggest that AFVs and soft vehicles in logistic support could be given some protection against an enemy equipped with ATGWs for a relatively brief but perhaps crucial period if they were to be equipped with some means of simulating the effects of a direct hit; that is, if they appeared to have been "brewed up." In this way, ATGW crews could be deceived into believing that some of their colleagues had taken out the vehicle visible to them and that they should select another target. I believe that the smoke grenades used for dischargers on AFVs do not produce smoke of the color and density given off by a burning vehicle and I suggest that the "brew up"

should be simulated by some device specially manufactured for the task. It must be electrically-initiated and mounted in a disposable cage or cup on at least two sides of an AFV or truck to allow the "hit" to be in the expected place. It could be designed to produce a cloud of dust on initiation to provide a first class simulation and must produce a visible flame at least in the early stages, and for the crews sake, must be non-toxic. I imagine that most ATGW-equipped troops, on seeing a "brew up" would, at least temporarily, direct their attention to other vehicles and thus the "deceivers" would be granted some few vital minutes during which they could destroy their would-be attackers, reach cover or call up additional support. In this event, the situation would be given time to change in favor of the attacked force and the force's operational life would be prolonged for some measurable and hopefully useful period. Since it is likely that, if the crunch does come, we will be both out numbered and overcommitted, any deduction in attrition, even temporarily, will be of great assistance.

MICHAEL TROTMAN
Chifley, Australia

The preceding letter was received by MG John W. McEnery and forwarded to ARMOR for publication.

Fighting Outnumbered

Dear Sir:

I am writing this letter in regards to Lieutenant Colonel Tamminen's article "David and Goliath" in the July-August issue of *ARMOR*. I agree with what he said about fighting outnumbered and taking out the enemy 10 to 1. Our forces in Europe face the armies of the Warsaw Pact who have about 40,000 tanks, 50,000 APC's, tens of thousands of artillery tubes and a manpower force of about 7 million men in the Soviet Union alone. Their aim is to make 80-100 kilometers a day.

Our cavalry troop has made recent terrain recons of our areas. Each *Sheridan* in our platoon (6) was given a certain position and field of fire. Individual tanks or platoons in selected areas could extract a staggering toll of men, machines, and time from the enemy. In some aspects, it would be like the 300 Spartans at Thermoplyae. Trading space for time we could smash them. With those positions and Pact mass attacks, we could inflict staggering losses, maybe up to 15 to 1.

What I mean by a "kill corridor" is narrow valleys, opposite sides of hostile rivers, inaccessible gorges of which there are several in Germany. Also his armor would come across towns, refugee columns, roads jammed with cars, roadblocks and minefields. Once stopped inside one of these corridors, we could ambush him. This conversion would be so great that he would be unable to maneuver properly. By then we could have him by as much as a 12 to 15 to 1 kill ratio.

Several of those ambushes would severely hamper his timetable, plus make him take second thoughts about continuing his attack. I commend Colonel Tamminen's fine article. I will continue to read your fine magazine with interest.

CRAIG C. MOSHER
PFC, U.S. Army
APO NY 09432

Gotcha!

Dear Sir:

In the July-August issue, I read with great interest the article by Lieutenant Colonel Oldinski on the Hammelburg Mission. I was a little startled when he stated that Task Force Baum contained three 105-mm self-propelled assault guns. The adjacent picture was captioned "Assault guns such as this were used during the Hammelburg raid." The picture looks suspiciously like the 75-mm self-propelled assault gun which was standard in reconnaissance units of World War II. I commanded a platoon of these in the run across France in 1944. While I was in the 7th Armored Division rather than the 4th, I doubt that the assault guns were 105-mm.

WILLIAM A. KNOWLTON
General, U.S. Army
APO NY 09224

To Traverse or Not to Traverse

Dear Sir:

In a letter and an article in the May-June 1976 issue of *ARMOR*, N. Ayliffe-Jones and Richard Ogorkiewicz set out the disadvantages and advantages of the *S-Tank*. If the latter is correct in saying that such a vehicle with very heavy frontal armor and a 2-man crew can be produced at a weight of only 25 tons, it would appear to be a far better 'buy' than the lightly armored, fast, agile vehicle also of 25 tons proposed by Colonel Icks in the March-April issue, which I fear would be penetrated by virtually any direct fire weapon it might meet, leading to heavy casualties and mission failures.

Perhaps it is unfair of Ayliffe-Jones to criticize the *S-Tank* for its inability to operate from a dozed weapon slot when its very low overall height makes it really unnecessary for it to do so. Both writers point out that it is through 'reduction in volume' or 'smaller envelope' that progress in tank design will be made, but I suggest that where frontal armor has now reached the point of being many times the thickness of side and rear armor, the reduction of presented frontal area is an even more important objective. This has been achieved by the small *S-Tank* which, lying upon the ground on its variable hydropneumatic suspension, will present a target little larger than the turret of a conventional MBT whose frontal area is now so large that it rightly seeks to conceal at least part of it in the dozed slot.

Assuming the initial cost per ton of an armored vehicle to be roughly constant, a tank unit of 200 trained men may be equipped either with 50 4-man, 50-ton tanks, or 100 2-man, 25-ton *S-Tanks*. By using the 25-ton vehicles proposed by Ogorkiewicz, twice the number of guns will be taken onto the battlefield to engage the enemy who will be forced to destroy twice the number of smaller targets to defeat the unit. Fuel per mile of march would be the same in each case, but bridging and rafting would be at 25 tons instead of 50 tons coinciding more nearly with the weight of accompanying MICVs and SP artillery. These advantages appear to me to be so significant that surely the 25-ton *S-Tank* should be fully developed now even if not committed to production.

In his letter, Ayliffe-Jones insists on a traversable gun and mentions arcs of 90 to 160 degrees. In his article, Ogorkiewicz proposes that the *S-Tank* be compromised by the provision of a limited traverse gun mounting or turret, but does not explain why the traverse should have to be limited and to what arc. Surely if one wishes to equip an *S-Tank*-like vehicle with a traversable gun, one can do so by raising up the gun until it lies above the roof of the vehicle. By supporting the gun at the point of balance, one can elevate and depress it and traverse it through 360 degrees. Such a system would do away with the need to elevate and depress the hull, thus simplifying the suspension, and would allow the gun to traverse independently to engage targets to left or right, allowing the hull to be concealed by the ground or even in the recommended dozed slot.

However, what now needs to be determined is whether the user would be prepared to advance to battle with the gun above his head, above the periscopes of his cupola and above his line of sight to the target. The danger, of course, is that the raised gun would be observed by the enemy without our tank commander being in a position to spot the enemy. This is probably tactically unacceptable and the user will demand that his sight line be raised to a point above the gun. Whether he will be satisfied with a simple rotatable periscope (as proposed by Colonel Peter Hordern in

his article in *Interavia Defense Review* No. 11/1966 'The Main Battle Tank 1975-80' is questionable and it may be that he will demand a sophisticated vision system where a rotating vision head above the gun displays (by day or by night) an image of the surrounding country on a circular screen surrounding his position within the hull of the vehicle.

Ayliffe-Jones rejects the existing *S-Tank* on tactical grounds which demand a traversable gun. Would he accept an *S-Tank*-like vehicle with an externally mounted traversable and elevatable gun mounted above the roof of the vehicle or would he reject it for tactical reasons?

ROBIN H. FLETCHER
Rhode, Co. Offaly, Ireland

Keeping the Scout Alive

Dear Sir:

In the next large-scaled modern war, intelligence information will be highly dangerous to gain through low performance aircraft when the enemy has combat weapons like the *ZSU 23/4* in their forward areas of battles.

In other words, the most effective way to gain intelligence information is through ground reconnaissance.

Being a TC of an *M-113* with *TOW* in an infantry battalion's scout platoon makes me wonder how long the people who design and allocate vehicles and equipment expect me to live in a modern war. Every field exercise that I have been in points out to me the tactical disadvantages of the *M-113* with *TOW* when the scouts are used like they are supposed to be. The only time a scout needs a *TOW* is in a defensive position in flanking security.

In a reconnaissance movement, the *M-113* with *TOW* is not effective enough to accomplish the mission because of it's extreme large size and noisiness among other things. It is just too big to hide, let alone find cover for.

Now is the best time to put in a gripe about my lifespan in the next war. Equipping scouts with *TOW's* has its benefits as well as disadvantages. In a scout's role however, those disadvantages outweigh the advantages. Firstly, the system requires too much space, whereas without it you could have a much smaller vehicle and a smaller target. Secondly, when you fire, you have just given away your position. For example, let's say you are in a position and you spot an enemy tank platoon at about 2,500 meters to your front. After sending in your spot report, you engage with your *TOW*. So with no problem you knock out one tank. But what about the other tanks in that enemy platoon? At 2,500 meters, one tank out of the platoon will probably blow you away due to the time it takes to bring the *TOW* out of the firing position so you can move. It takes about 8-9 seconds for the missile to travel 2,500 meters and a good *T-62* gunner can get a round down range in 4 seconds. This was brought out in an article by Staff Sergeant Peter L. Bunce in the March-April issue of *ARMOR* called, "The Reconnaissance Dilemma." Recon will be so outnumbered in the front lines that the scout has to do everything perfect in order to accomplish the mission and still survive—let alone spend time in little fire-fights.

The solution—go back to the idea of the *M-114A1E1*, but the the *M-113* mechanical ideas and a quieter track suspension or a solid wheeled type suspension. Also redesign the electrical commander's cupola and add little things like smoke launchers and a 40-mm automatic grenade launcher to be supplementary to the observers 7.62-mm. The scout should only fight when he is backed up to a wall, and even then he should just be laying down a wall of fire so as to keep the enemy's head down while he gets the vehicle turned around or goes around or through the enemy. Incorporating the fire-on-the-move concept is a must for the scout.

In conclusion, I hope the ideas brought out by me, the man who will be the real tester of these so-called combat vehicles in the next war, will help in lengthening the lifespan of the scout in future battles.

GARY CHENEY
Corporal
Ft. Hood, TX 76546

Gotcha Again!

Dear Sir:

I read with interest the article in the July-August issue of *ARMOR* titled "Patton and the Hammelburg Mission." I think this is one of the more definite treatments of a subject that has over the years become cloaked with unwarranted controversy. I note, however, that the photo of the Assault Gun (pg 14) conflicts with the narrative. The picture is clearly that of a Motor Carriage 75-mm Howitzer, *M-8*, which was basically the *M-5* light tank mounting a 75-mm howitzer in lieu of the standard 37-mm gun. (The one depicted is also mounting a hedgerow cutter.) The narrative describes the assault guns in the order of battle of Task Force Baum as 105-mm SP assault guns. These in all likelihood would have been the *M-4A3*-series tank mounting a 105-mm howitzer in lieu of the 75-mm gun. I believe they were frequently used in the assault gun units of armored infantry battalions. This is a minor point and certainly does not detract from the overall excellence of the article; but as an Infantryman, I could not resist the temptation to make a comment.

Historical articles of this nature make not only fascinating reading but are an excellent stimulus to professional thought. Keep up the good work.

HERBERT A. JORDAN, JR
Lieutenant Colonel, Infantry
Patrick Air Force Base, FL 32925

"David and Goliath"

Dear Sir:

There are some disturbing assumptions implicit in Lieutenant Colonel David L. Tamminen's article, "David and Goliath" (July-August) about the "new doctrine." As described, the "new doctrine" seems to be rooted in the assumption that if large-scale war does come, it must come in Europe. What if that war comes on the Sino-Soviet border and, despite all our declamations to the contrary, the United States becomes involved? Those of us with still-vivid memories of Joint Exercise DESERT STRIKE (1964) recall how the would be tank-killers sat on the high ground and watched the tank formations roll by in the far distance. In short, if we become obsessed with a war in Europe we are going to be in deep trouble in a war in which divisions operate on an axis of 50 rather than 5 kilometers.

WILLIAM V. KENNEDY
Colonel, Armor, USAR
Carlisle Barracks, PA 17013

In Support of the Telescope

Dear Sir:

Upon reading Captain Everette L. Roper, Jr.'s article "Revive the Telescope" in the September-October issue, I compared the new reticle with the current model. This new reticle is quite an improvement. If R&D monies are appropriated for a new telescope, I feel that a portion of this should apply to a method enabling the gunner to determine ranges on his own. This could be accomplished by the introduction of either Stadia Lines or a Ranging Chip in the gunner's telescope. This has become a necessity in view of the fact that today's gunner controls his own fire during simultaneous engagements.

LEONARD P. GAGNON
Staff Sergeant, Master Gunner

THE COMMANDER'S HATCH

MG JOHN W. McENERY
Commandant
U.S. Army Armor School

I know you've all been reading the newspapers with interest as to the changes in direction that the *XM-1* program has taken. The choosing of the turbine powered Chrysler prototype, capable of mounting either a 105-mm or 120-mm main gun, represents the greatest single improvement made in any tank over its predecessors in the history of tank warfare. This is great and the way it should be; however, our fascination with the new and exotic tends to take our minds off of reality. The reality is that the *M-60*-series tank in its several versions will be with us well into the next century. In fact, it will be in the majority. At the end of the currently scheduled *XM-1* production, 1990, we will have 3,312 *XM-1s* against a total of 14,982 tanks. The remainder will be *M-60*-series tanks or the *M-48A5,* which, of course, is very similar. Obviously, the need exists to continue to improve the *M-60*-series, especially the *M-60A1.*

What's being done in this regard? The *M-60A1* is currently receiving the reliability-improved, selected-equipment (RISE) engine, improved electrical system, and add-on stabilization. Starting in FY 78, we'll produce the *M-60A3.* Phase I improvements will include a laser rangefinder, a solid-state ballistic computer, and a passive night sight for the gunner and tank commander, plus a passive viewer for the driver so that we're not giving away our positions by the use of the active infrared system. In Phase II, we plan to provide a smoke grenade launcher, an engine smoke generator, and a low profile commander's cupola. We plan to relocate ammunition to reduce vulnerability and to provide a muzzle reference system for constant check of boresight. Most important, we'll replace the passive night vision sight with the tank thermal sight. This will almost double our night capability and enhance our day capability. The passive sight is an image intensification sight which means that the more natural or artificial light you have at night the better you see and without some illumination you don't see. Since the thermal sight works on the temperature differential between the target and its surroundings, no illumination is required. As a bonus, the tank thermal sight in daytime can be used to see through dust, obscuration, smoke, and haze. Other improvements are also under consideration such as an improved suspension system and a higher horsepower engine. These are costly improvements and require extensive qualitative testing.

These are the plans for improvement of the *M-60A1.* They will give us a tank that is significantly better than the current *M-60A1.* But they aren't the complete answer, nor perhaps in the final analysis will we decide to put all of these changes into effect. There is still plenty of room for discussion. We constantly need new ideas from the user and preferably those that don't cost too much. Some that we are starting to look at here at the Armor Center have to do with motor bikes, a directional gyro, assistance in camouflaging, and a way of latching the commander's hatch in the nearly closed position.

The Motor Bike

Why in the world would we talk about a motor bike? Stop and think for a minute about the problems of a platoon

leader and the requirements that we have placed upon him. We expect him to occupy a position with his platoon which may be spread over some 500 meters. We expect him to reconnoiter subsequent battle positions which may be several kilometers away. We expect him to tie in with units on his flanks, and we expect him not to be surprised by the enemy. One solution to this problem is to give him a small lightweight trail bike which would be carried on the rear of the bustle of his tank.

Directional Gyro/Compass

Over the past 10 or 15 years, there have been numerous studies and tests of various means of providing directional heading for tankers. The obvious problem is the mass of metal of the tank. We'll continue to look at it, but is there a requirement? I personally think so. I think it would be extremely helpful for the tank commander to be able to be oriented as to direction at all times. I think it would be useful for the commander to be able to tell the driver, assuming the latter had a readout, to steer generally in the direction of such and such degrees and not to have to give him minute directions from the turret.

Camouflage Assistance

The best camouflage for tanks is normally natural material cut from the local area. We can put some around the turret without too much difficulty, but on the sides of the tank we can't and have it stay on when we move. Should we not have brackets that would hold such material? How about lightweight, easily erectable sections of camouflage netting or other material that help break up the outline of the tank?

Tank Commander's Hatch

We'll eventually go to a low profile cupola which will solve the problem, but our current hatch is either in the fully open or closed position. It's either all or nothing. The commander is either completely vulnerable or his vision is severely degraded. How about a quick fix modification to the hatch so that it can be positioned to allow the commander about 11 inches of opening to his front as well as protection from overhead artillery fire?

I've told you what is planned for the M-60-series tanks and a few of the things that we are thinking about here at Fort Knox. We're genuinely interested in what you think and would appreciate very much your sending us your ideas by whatever means you desire. You may want to write to ARMOR Magazine directly, or to me, or the Director of Combat Developments Directorate at Fort Knox, all at Zip Code 40121.

FORGING THE THUNDERBOLT

ARMOR CENTER GUNNERY TRAINING DEVICE STRATEGY, 1976 - 1990

By Major General John W. McEnery and Colonel Luther R. Lloyd

Increasing emphasis has been, and will continue to be, placed on the use of simulation, simulators, and devices in solving armor gunnery training requirements. The initial stimulus for the increased use of such techniques was provided by the realities of diminishing resources available to the Army and a strong desire to be innovative in improving the quality of training.

Today, the demonstrated cost effectiveness and training advantages of such techniques have guaranteed simulators and devices a significant future role in all armor training. With this in mind, the Armor Center has developed a training device strategy which will guide both individual and collective unit gunnery training through the 1980's. Since it is critical to all our future training endeavors, it is important that everyone within the Armor Community should be aware of its existence and understand its primary thrust.

The Armor Center goal is to maximize unit readiness through weapons system effectiveness. In accomplishing this, it is believed that the added emphasis on the use of simulation, simulators, and devices is sound and will permit a beneficial phased *enhancement* of our overall training by the 1990's.

SIGNIFICANT FACTORS FOR ANALYSIS

In analyzing weapons system effectiveness, several key factors were selected for close scrutiny because of the direct impact they had on the unit trainer's ability to maximize that effectiveness and the fact that the Armor Center has a considerable influence over each of them.

Time

Time is considered by many of us as the single most scarce resource within our hostile training environment. Furthermore, the majority of our *units'* gunnery training time is spent on individuals and single tank crews—*not* on collective training for tank platoons and companies. Yet, in terms of fighting that first battle of the next war, our training *must* be designed to maximize the weapons system effectiveness of platoons and companies. With the right development strategy for institutional and unit training, some of the time spent conducting individual and crew training can be diverted to training platoons and companies. In the process, our efforts may well require significant adjustments in existing range complexes and thorough advance planning to ensure range availability when needed. Indeed, we may even be required to develop special, regionally oriented, large scale, armor ranges and maneuver complexes to accomplish some of the training missions required to maximize the weapons system effectiveness of our new *Abrams* tank.

Ammunition

Ammunition requirements are driven by our gunnery manuals and our Army Testing and Evaluation Program (ARTEP). At the Armor Center we do not believe, at this time, that we should ever make anything but token reductions in the new FM 17-12 ammunition requirements because in the 1980's we need to shift the expenditure of all unit ammunition from individual or crew oriented exercises to the platoon and company. Of course, it must be understood that we are contemplating the use of reduced-range training munitions which are currently under development and look very promising. When fielded, this ammunition should assist us greatly in solving many of our anticipated range complex problems.

Devices and Simulators

Used as part of our training strategy, devices and simulators can assist us in shifting the training emphasis to platoons and companies. We are presently fielding subcaliber and laser devices which will allow us to reduce past main gun ammunition requirements for individual training. Our strategy is to field partial and full crew training simulators which will permit us to shift our remaining unit ammunition authorizations to platoon and company gunnery by the end of the 1980's.

As in the case of gunnery ranges, we must carefully analyze and forecast facility requirements in conjunction with the development of each simulator. This will ensure concurrent availability at each location where the simulator is designated for utilization.

Additionally, the use of devices and simulators in the active inventory portends the necessity for identical capabilities in the Reserve Components. This is particularly true of those Reserve units which must be available to expand the training base in time of mobilization.

Training Literature

Our training literature constitutes the cornerstone of all our training programs. We must ensure that this literature is fielded in a timely manner and forces the shift in emphasis

we desire. Each new document published as part of the Army-wide training literature program must contain a "How to Train Section" that guides units down the device and simulator road toward platoon and company live-fire gunnery and battalion-level precision gunnery exercises using tank appended simulators.

Institutional Training

Lastly, partial tank training simulators can be used to improve our institutional output. With the use of simulators such as drivers' trainers, conduct of fire trainers (COFT) and loaders' trainers, we will be able to produce better qualified tank crewmen from our training center. However, we will still have a need to expose our one station unit training (OSUT) trainees and Armor School students to service ammunition firing. At the Armor School, we can use both partial and full crew simulators to show future armor company commanders and platoon leaders how to conduct individual and collective gunnery-oriented training. Once we start sending fully qualified drivers, loaders, and gunners to the field, our units can begin allocating more time to platoon and company live-fire battle-run exercises and less time to training individuals. In essence, the institution will be providing the same type of training as today, while in the field units will be in a better position to concentrate their efforts on the collective aspects of training.

GUNNERY TRAINING—1976

Before discussing the Armor Center's three phased gunnery strategy, we need to take a quick look at today's training. The vast majority of the training that takes place is physically oriented on the tank. The most important gunnery literature is TC 17-12-5, which suggests and recommends the main gun ammunition distribution as indicated in figure

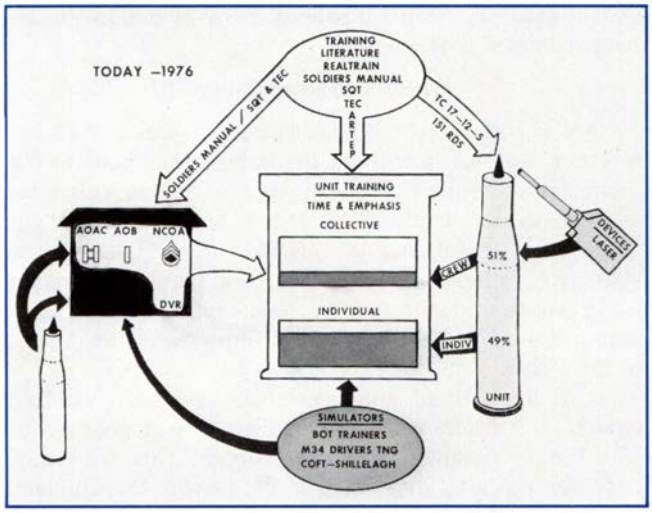


Figure 1.

1. For a unit to fire platoon gunnery today, it must use either "saved" ammunition or ammunition which is currently authorized in the common table of allowances (CTA) as operational readiness training test (ORTT) ammunition. The Soldier's Manuals and skill qualification tests (SQTs) are used by the training center in establishing its program of instruction (POI) and provide direction for individual training in units as well. The training extension course (TEC) program offers an improved method of teaching individual skills and is generally available with a wide assortment of lessons. As far as simulation, substitution, and miniaturization training devices are concerned, very few exist in the units. The only devices that are currently available are the wooden "green hornet" burst-on-target trainers and the *M-55* tank-gunnery laser trainer. Some units have subcaliber devices; others may have Willey burst-on-target trainers. A few have the *M-34* driver's trainer and some units have built mini-range facilities and combat training theaters. For *Shillelagh* missile units, the *Shillelagh* conduct-of-fire trainer is available. In terms of tactical training aids, the REALTRAIN engagement simulation system is available in USAREUR. In terms of alternatives to firing the main gun, very little has changed since the initial testing of subcaliber Tables I, II, and III in 1954. Today our simulators are still on the drawing boards and cannot really influence the transition we need at either the institution or unit level. Service firing is included in both our OSUT and Armor School training courses.

ARMOR GUNNERY TRAINING DEVICE STRATEGY, PHASE I, 1977-1979

With the publication of FM 17-12 and ARTEP 71-2, we start phase I of our strategy. As indicated in figure 2, we begin to see a small shift of the available unit ammunition into platoon gunnery. This ammunition is identified in the gunnery manual and ARTEP 71-2 will require that a platoon gunnery exercise be fired as part of any external ARTEP evaluation. The fielding of our new subcaliber gunnery devices facilitates the shift in the use of main gun ammunition to these types of exercises.

In the next 3 years, several recently developed miniaturization and substitution devices will be available in all armor units. The scaled down range concept with additional subcaliber devices and combat training theaters will significantly increase a unit's ability to train its individuals and crews year round. The full issue and use of REALTRAIN will be accomplished, including the issue of equipment to armored cavalry units.

Also during this time frame, a crew evaluation device and portable COFT should be available. The crew evaluation device is designed to provide the gunner, tank commander, and platoon leader with a simple feedback system to help objectively evaluate the crew's performance during live and dry firing exercises. The crew evaluation device will simply attach to the tank sighting system to record the gunner's sight picture while at the same time recording the time sequencing and voice communication among the crew. It will also give us the capability to measure the complete life cycle of a target, which places added emphasis on target acquisition.

The portable COFT is designed for maintaining gunnery proficiency. It will be a classroom type trainer for use indoors or in a mobile van. It will assist in training the gunner and tank commander without requiring the use of a vehicle or range facility. The COFT will be programmable and provide the capability to evaluate and train gunners in basic and advanced gunnery skills under day and night and other reduced visibility conditions. Terrain and targets will be realistic. Monthly firing of the unit COFT by gunners and tank commanders will be required and *the actual amount of*

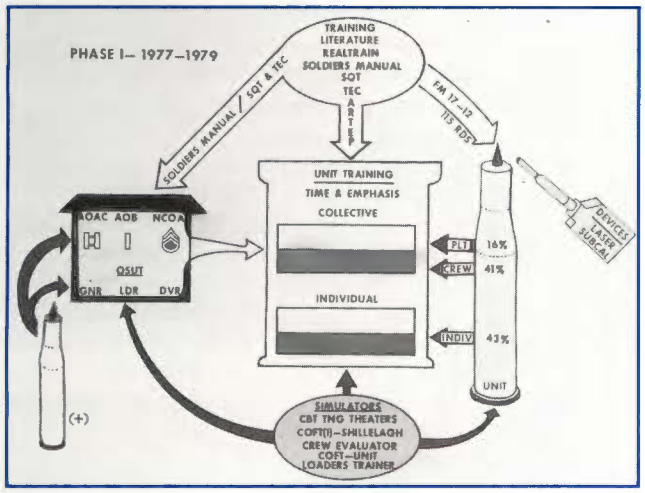


Figure 2.

training will be based on their ability to obtain an acceptable training score. These devices will be located at company level. In addition, the product improved *Shillelagh* COFT will be available and improve the missile training capability of *Shillelagh*-missile-equipped *M-551* and *M-60A2* units. A special 10-station COFT system will be under development for the OSUT training of gunners. Finally, a loader trainer will be available at the institution and unit level. One device per battalion size unit is envisioned. The loader trainer will be a mock-up of the loader station mounted on a motion platform for simulating cross-country movement. The associated gun tube motion, and gun recoil with spent brass ejection will be provided. Loaders will be required to demonstrate their proficiency monthly. As the DA Tank Force Management Group's concepts are implemented at Fort Knox, there will be a temporary surge in the ammunition required to execute planned training within the Armor School and at the one station unit training center.

ARMOR GUNNERY TRAINING DEVICE STRATEGY, PHASE II, 1980-1984

Phase II will commence with a second edition of FM 17-12 and appropriate changes to soldier's manuals, TEC, and ARTEP. In phase II, our intention is to attain a *major* shift of unit ammunition resources toward multiple platoon gunnery

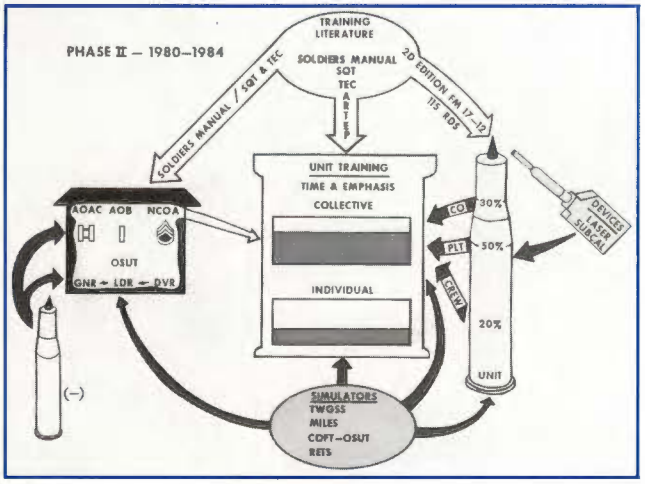


Figure 3.

battleruns involving attack, delay, defense, and movement to contact type of scenarios and a small shift toward company gunnery as indicated in figure 3. The devices distributed to the field by this phase should permit the training of individuals and crews to be entirely simulated through Table VII, as we now know it. With *validated* training transfer effectiveness analysis and unit experience, we should be able to *certify* a device's effectiveness in *replacing* actual live-fire exercises with simulation. Marksmanship and gunnery laser devices should be available in a slightly different form than presently envisioned. The Armor Center is in the process of deleting the current laser requirement as the only solution to building this device and is expanding our investigation to include any acceptable form of technology. The proposed new name is Tank Weapons Gunnery Simulation System (TWGSS). TWGSS is a vehicle-appended *precision* gunnery trainer which will simulate main gun and machinegun firing and will use the remoted target system (RETS). It will fully replace main gun and machinegun firing up through current Table VII. Live firing will begin with Table VIII, but the major emphasis will focus on platoon and

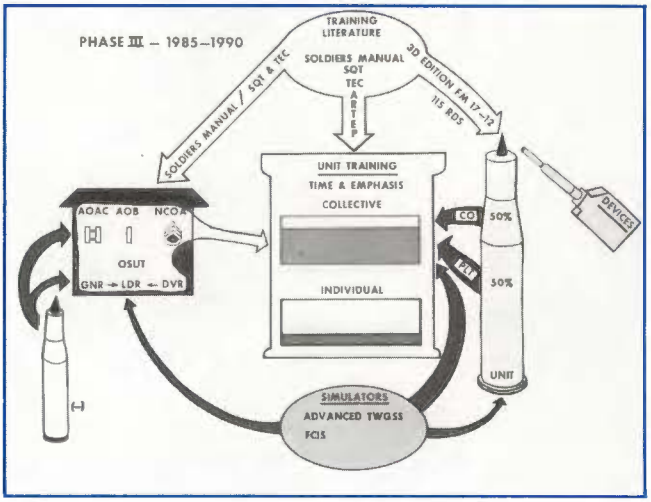


Figure 4.

company tactical gunnery exercises. In addition to REALTRAIN, the Multiple Integrated Laser Engagement System (MILES), a *nonprecision* gunnery device, will be available to improve tactical training at the company and battalion level. The OSUT COFT should also be available during this phase. Concurrently, main gun ammunition requirements imposed in Phase I at the Armor Center should begin to decrease as our simulators are validated and added to the inventory of available gunnery training alternatives.

ARMOR GUNNERY TRAINING DEVICE STRATEGY, PHASE III, 1985-1990

Phase III should witness the *complete* shift in our emphasis from live fire individual and crew gunnery tables to scored platoon and company battle runs and battalion level force-on-force training using tank appended simulators. (See figure 4.) Institutional training will provide qualified drivers, loaders, gunners, and officer and NCO tank commanders to field units. We need to start this phase with a third edition of our gunnery manual and changes to appropriate soldier's manuals, TEC, and ARTEP's. Our goal is to substitute all

individual and crew gunnery training with simulators through Table VIII. All unit ammunition resources will be allocated to the platoon and company battleruns. A full-crew-interaction simulator (FCIS) should be in the hands of field units during this phase. It should provide *the most realistic crew training conceiveable* short of actual combat, enhance the maintenance of individual and crew skills, and, through repetition, permit shorter concentrated periods of actual gunnery training than those experienced today. Units will also have an advanced TWGSS during this time. It will permit simulated *precision* tank gunnery training in a battalion-level opposing force environment. Use of FCIS and TWGSS within the institution will upgrade the institution's product and facilitate the unit commander's training effort by familiarizing all personnel with the simulators.

Further reductions in the main gun ammunition requirements at Fort Knox will also be possible. However, it is not our intent to eliminate all service firing. We believe it is extremely important that each trainee have an opportunity to be exposed to main gun firing before he arrives at a unit, and we must continue to allocate resources for this purpose.

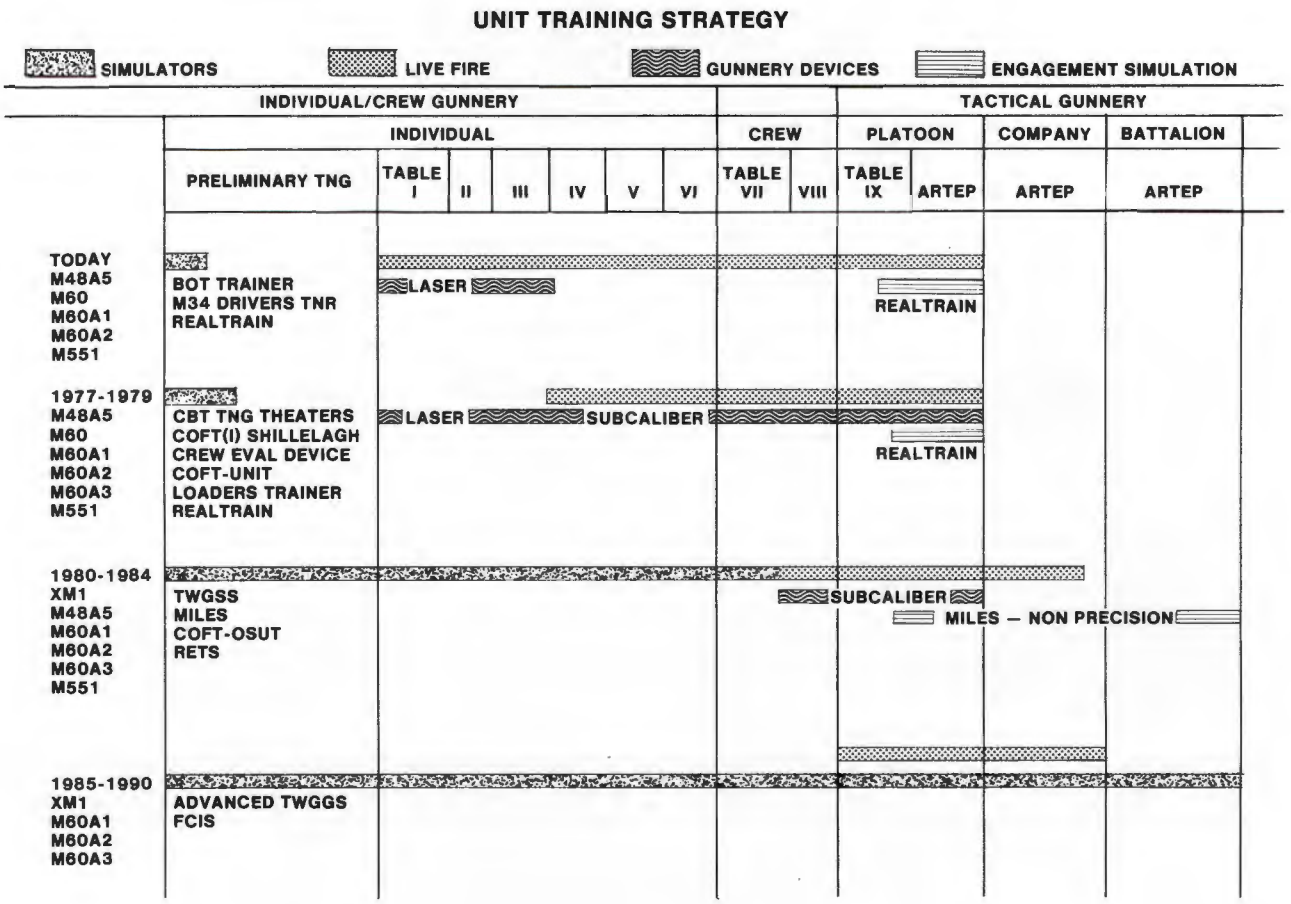
SUMMARY

Figure 5 summarizes the Armor Center's phased gunnery training device strategy and illustrates the increased emphasis on the use of simulators for individual and crew gunnery training, the concentration of all live exercises into a variety of scored platoon and company battleruns, and the ability, using precision simulation, to have battalion-level force-on-force training exercises *anywhere* we desire.

Several comments concerning this figure are appropriate. First, it appears that there is a reduction in ammunition because the length of the dotted line diminishes as you move through the various phases to the 1990 time frame. Since this line represents live fire, it also includes subcaliber firing in the earlier years. Thus, its length covers all individual/crew tables as we know them today. However, as mentioned earlier, no more than a token drop in main gun ammunition allocations, as set forth in the new FM 17-12, is envisioned. Ammunition saved through simulation should be completely expended as the various platoon and company battleruns come on-line.

Second, the devices currently planned for the field in the 1985-1990 time frame would actually permit full simulation of all gunnery training—no matter the level. However, we are firmly convinced that our troops must engage in live fire exercises designed to maximize the weapons system effectiveness of the tank. This can best be accomplished in platoon- and company-level battleruns. On the other hand, when resources *are* reduced, this concept will still permit us an alternative which should ensure our preparedness for the first battle.

Figure 5.



Finally, while we intend our primary training programs to be based on this concept, the devices and equipment developed in one phase will be retained for the next phase. Thus, we will have a number of fallback positions should any portion of our development effort fail to be realized.

CONCLUSION

Undoubtedly, there are many who will remain skeptical of this strategy because the majority of judgments presented in developing it have not been validated through test and evaluation. On the other hand, the gunnery training alternatives we possess today are practically nonexistent, even though our technological capabilities make our requirements attainable. We must put aside many of the good training techniques developed in days of plenty and strive to capitalize on the technological opportunities available to us in countering the resource constraints of today and the future. There is nothing easy in this task. Indeed, there are often more questions than answers. Regardless, the course has been set and each Armor Force tanker and trooper, be he private or general, will have an important role to play in its ultimate success or failure. Yet we believe such efforts can, and will, be successful in satisfying the gunnery training dilemma of the future. If they aren't, the bottom line could well be that the first battle of the next war...

★ ★ ★ ★ ★

BORESIGHT AND ZEROING TESTING

Several recent sources of data collected at Fort Knox and elsewhere question the demonstrated level of proficiency displayed by armor crewmen in the areas of boresighting and zeroing. Observations of one particular armored battalion in CONUS revealed that instead of 5 rounds, the unit used 6.36 or 27 percent more main gun ammunition than what is prescribed in FM 17-12 for zeroing. At current costs for HEAT-TPT ammunition, this difference amounts to approximately $8,100 per battalion each time zeroing is conducted. To determine if factors could be identified which might lead to improved ammunition conservation, a team from Fort Knox made further observations of the battalion mentioned above with respect to five different areas: gun tube life, experience of tank commanders and gunners, knowledge and performance of standard procedures, understanding of basic gunnery principles of boresighting and zeroing, and expectations of performance outcomes.

Closer observations of firing performance determined that only 56 percent of the crews hit the zero panel on the round immediately following the warm-up round, and that overall, one out of every four rounds fired during zeroing missed the 8x8 ft. zeroing panel completely. Furthermore, only one of the 34 tanks tested had an initial shot group whose center was within 24 inches of the aiming point. This observation is important from the point of view of estimating the likelihood of obtaining a "silent zero" (the ability to hit within an acceptable distance of the aiming point using boresight alone). Together, these observations are instructive from the point of view of ammunition conservation in that those crews hitting the panel on the first round and those with a high percentage of overall hits in general, used fewer rounds to zero. Since the number of rounds used by a crew to zero was not found to be related to gun tube life or to the degree of experience of the tank commander or gunner, the basis for these hit performances were sought in other areas, specifically the areas of procedures and basic tank gunnery knowledge.

While no *single* aspect of procedures could be shown to account for the number of rounds used to zero, several observations deserve note. The most clearly defined procedural error involved the use of the 1,200 meter aiming point rather than the boresight cross of the telescope reticle during boresighting. The error was noted in 10 percent of the gunners. The consequences of such an error in zeroing, when using the telescope are clear.

An observation having more of an impact upon ammunition conservation involved the use of the established zero. Although the battalion had completed annual tank gunnery qualification 3 months prior to the test, less than one out of three tank crews were aware of the tank's established zero, and an even smaller number were observed to be using the established zero. Within the crew, there was also noted a lack of supervision on the part of the tank commander. Only slightly more than half of the tank commanders checked the lay of the gun, while even fewer checked the gunner's sight picture. In addition, the use of the binocular to boresight presents a problem. Since there is no seal or device to secure the binocular in the firing pin hole, it can easily slip and present an incorrect sight picture and, if not checked by the tank commander, could result in a misalignment of the gun on the boresight panel.

Despite these observations, tank commanders and gunners alike viewed themselves as making fewer procedural errors than the average tank crew. Although this preception of the adequacy of their performance was not shown to be directly related to the number of rounds used to zero, it may indicate a lack of perception by the crew of a need for additional training in boresighting and zeroing.

The manner in which tank commanders and gunners viewed their gun performance must also be viewed in light of the fact that over 70 percent missed over half of all items contained on a test covering knowledge of basic tank gunnery principles on boresight and zeroing. Although gunners scores were related to the number of rounds used to zero, a similar relationship was not found for tank commanders. Overall, for both tank commanders and gunners, knowledge of principles were superior to the application of them.

As a result of the test, several recommendations can be made which should lead to greater ammunition conservation during zeroing. First, make gunners and tank commanders more responsive to the precision aspects of boresighting and zeroing. Next, ensure the correct size zero panel is being used as outlined in FM-17-12—a 12x12 ft. panel. Command emphasis should be placed on the recording of each tank's established zero in the log book and on the newly developed zeroing data plate which is to be installed in all tanks.

While the increased attention given to boresighting and zeroing will result in significant cost savings through ammunition conservation, the more important overriding consideration is that through improvement in these basic armor crewmen skills, we might also expect an increase in the effectiveness of the tank weapon system itself.

THE RISE ENGINE

Many people have asked what the word RISE stands for in reference to the Army's modified tank engine, the AVDS-1790-2C (RISE). These same individuals are often curious about what makes this engine better than previous models.

To begin with, the word RISE stands for Reliability Improved Selected Equipment. This means that certain parts of the older engine, the AVDS-1790-2A tank engine, have been modified to improve overall engine performance.

The addition of the AVDS-1790-2C (RISE) tank engine to the Army's inventory should significantly reduce the time mechanics spend working on engines, and it is a distinct improvement over the AVDS-1790-2A. Some of the more important modifications are:

- The 300-ampere, air-cooled generator has been replaced with a 650-ampere, oil-cooled alternator. The new alternator provides an increased, constant source of power that is not affected by engine RPM. This alternator is connected to the engine oil-cooling system, which replaces the electrical cooling motor which experienced repeated breakdowns.
- A solid-state voltage regulator is provided that is a sealed unit with no external adjustments. This regulator adjusts current automatically.
- The low-voltage protection box replaces the starter relay. This modification prevents damage to the starter solenoid by cutting off power to the starter when the batteries have less than a charge of 12.25 volts.
- The size of the engine and transmission oil coolers has been increased significantly. Engine and transmission overheating problems due to inadequate oil circulation have been reduced.
- An automatic water-draining system has been added to prevent accumulation of water in the fuel system.
- A check valve has been added to the outlet side of the fuel return solenoid to prevent fuel from draining into the intake manifold. This check valve greatly reduces the chances of a hydrostatic lock.
- The oil-filter housing has been redesigned to allow increased oil flow which has greatly increased engine life.
- Injector lines have been made of stronger, more durable material, and fuel injector nozzles have been equipped with stronger springs. These changes have considerably reduced the possibility of fuel leaks.
- Engine disconnects have been located on the top of the engine, making removal easier.
- Extremely efficient top-loading, armored air cleaners lengthen engine life.

The modifications incorporated in the new RISE tank engine make it a more reliable power source for the Army's main battle tank, and it should improve the readiness of tanks Army-wide.

COMPUTER CAMS AND GUNNERY

For some time now, we have been identifying methods for improving tank gunnery through "Forging the Thunderbolt" articles. This article, concerning the overlooked problem of systemizing the installment of ballistic cams in the *M-13*-series computer, can insure that correct firing data and superelevation is being placed in your tanks' fire control system. Since the *M-60/M-60A1* is our most universal main battle tank, this article will highlight the 105-mm cams; however, the information applies equally to 90-mm cams.

The *M-13* ballistic computer, a mechanically operated electrically assisted device, determines superelevation from combined ammunition and range data. The superelevation is then transmitted to the fire control system through the computer output shafts and brings the gun to the proper superelevation angle to strike a target in the gunner's line of sight.

There are presently six different models of the *M-13* computer in the Army inventory. Any model, with minor modifications, can be installed in any *M-60* or *M-48* tank. Since the ballistic (ammunition) cams are interchangeable, it is possible to mix 90-mm and 105-mm cams in any one computer. For example, a rebuilt computer mounted in an *M-60*-series tank could, through an oversight, contain a HVAP 90-mm cam instead of the correct APDS-T 105-mm

cam. When firing at 1,000 meters or less, no noticeable difference in superelevation and accuracy will be apparent. However, as target ranges increase, the greater the superelevation error becomes, and a first round hit becomes almost impossible. Therefore, tank crewmen must verify that the cam corresponds to the cannon.

The best method of verifying the computer is the "computer check" found in change 2, para 3-268, TM 9-2350-215-10 *(Operator's Manual M-60 Tank)*. Using this simple procedure and the firing tables for the appropriate cannon, the gunner can verify cam compatibility in relation to indexed ammunition.

The following charts are provided to conduct computer checks and will be included in the revised FM 17-12, Tank Gunnery.

M-48A1 TANK-MOUNTED COMPUTER M-13

M-48A2 TANK MOUNTED-COMPUTER M-13A1 AND M-13A1C

Ammo	Cam ID	Range in Meters 500	1,000	1,500	2,000	3,000	4,000
APC M-82	8201813	3.2	6.6	10.2	14.1	22.6	32.4
HVAP M-304	8585364	2.3	4.8	7.6	10.7	17.9	
HEAT T-108	8585365	3.3	7.1	11.5	16.5	29.1	46.6
AP-T T-33E7	8585366	2.8	5.8	9.0	12.5	20.2	29.4
HVAP M-332	8201957	1.5	3.6	5.9	8.3	14.5	23.4
HEP T-142E3	8585368	4.0	8.7	14.5	21.7	41.6	
HE T-91	8585369	4.4	9.3	14.7	20.6	34.3	51.6
HE M-71 (REN)	8201820	3.5	7.2	11.1	15.2	24.4	34.9
Mil Tolerance		±0.15	±0.15	±0.10	±0.2	±0.3	±0.5

M-48A3 TANK-MOUNTED COMPUTER M-13B1C

Ammo	Cam ID	Range in Meters 500	1000	1200	1500	2000	2500	3000	3600	4000	4400
HEAT-T T-300E56	8619967	1.9	4.4	5.5	7.5	11.8	17.7	26.8	44.1	61.3	84.2
AP-T M-318A1	8585366	3.1	6.4	7.8	10.0	13.9	18.1	22.7	28.9	33.4	38.5
HE-T M-71	8201820	3.8	7.9	9.6	12.3	17.0	22.1	27.5	34.7	39.9	45.4
Mil Tolerance		±0.25	±0.30	±0.35	±0.35	±0.35	±0.35	±0.40	±0.50	±0.60	±0.70

M-60, M-60A1, M-48A5 TANK-MOUNTED COMPUTERS M-13A1D AND M-13A2

Ammo	Cam ID	Range in Meters 500	1000	1200	2000	3000	3600	4000
APDS—T M-392	D8619776	1.20	2.40	2.90	5.00	7.00	9.70	11.10
HEP-T, M-393	D8620062	6.70	13.20	16.20	31.40	59.30	81.80	
HEAT-T, M-456	D8620978	2.00	4.40	5.40	10.80	21.20	31.10	40.10
APERS	X11727369	9.30	12.60	13.90				
Mil Tolerance		±0.25	±0.30	±0.35	±0.35	±0.40	±0.50	±0.60

Now that the gunner can verify cam compatibility, the problem of cam installation sequence should be addressed. As units now have local SOPs for cam sequence, an Army-wide standard must be established to end confusion and minimize replacement gunner familiarization time.

It is the position of the Armor School that cams for the primary armor defeating rounds (HEAT and APDS-T) be the innermost and the outermost cams. With the ammunition selector handle positioned "all the way in," APDS-T appears in the index window, with the ammunition handle all the way out, HEAT would appear.

With *sabot* pre-indexed for battlesight, this cam configuration allows a rapid change to the secondary armor defeating round. This standard sequence provides the tank commander with the quick ammunition change required to survive in an environment of extremely accurate tank and anti-tank fire.

Recognizing the maintenance problem presented by changing the cam sequence, the Armor School has recommended to ARMCOM and TACOM, that Maintenance Allocation Charts (MACs) be changed to authorize cam installation at the organizational level. However, until such time as the MAC is changed, this responsibility will remain at the DS maintenance level.

Remember—verifying cam compatibility to the cannon, and standardizing cam sequence in the suggested manner will insure a quick first round hit against all battlefield targets with a minimum of gunner familiarization.

DID YOU KNOW?

At one time in the history of the United Stated Army it was possible to serve out an entire 3-year enlistment in only 15 months. By serving outside the continental limits of the United States, one got credit for "foreign service," commonly called "double time."

No doubt the intention of the government in instituting this feature was for the betterment of the condition of the individual soldier, as well as to recompense him for severe service in tropical lands, or in countries where he was more or less isolated. There can be no gainsaying the fact that its effect, on the other hand, was pernicious, so far as the interests of the government itself and the service were concerned, since it lead to a destruction of the *esprit de corps* which, to a marked degree, formerly pertained to a man's troop and regiment; there was a resultant deterioration in the benefit that the government received from such service—the troop or regiment no longer appealed to the man—with him it became simply a question of serving in lands where he may "get in his double time" in any organization that was serving there.

In consequence men were continually transferring from one organization to another so as to accomplish that end. It was eventually determined that a far better method would be to abolish altogether the double time feature in tropical lands or beyond the continental limits of the United States proper; in lieu thereof, the period in which to retire was shortened to 20 years instead of 30, taking away the incentive to leave one's old organization in self-interest.

Officers were never given the benefit of double time toward retirement when serving beyond the continental limits of the United States—and so far as enlisted men were concerned, this feature was eliminated so as to place them on the same status, especially after the number of years in which to retire was shortened to 20 instead of 30 years.

Lieutenant General Donn A. Starry answers some of the questions about Armor's role in the Vietnam conflict in a preview of Chapter IX of the monograph, ***Mounted Combat in Vietnam.*** *The monograph is scheduled for publication and Army-wide distribution in January 1977. — Ed.*

It is always difficult to draw up a list of lessons to be inferred from the experiences of any war. It is even more difficult, perhaps presumptive, to extrapolate the lessons of one war, and invoking some rule of universality, correctly claim their relevance to another war—especially to one in the future. However, having brought the story this far, the author is obliged to at least hypothesize for his readers answers to the obvious questions— *"What does it all mean? . . . So what?"*

The first and obvious lesson is that we don't learn very well from our own mistakes, and even less well from those of others. In the beginning chapter the French penchant for piecemealing their armored units, and how that habit redounded to their disadvantage, were recounted. In addition, cautionary liturgy about not piecemealing armored units has been an important part of U.S. doctrinal literature since the close of World War II. These cautionary words were hard won after a long and bitter internecine struggle between a handful of American cavalrymen, who saw in armored forces something more than just support for dismounted infantry, and American infantrymen, who clung tenaciously to the idea that armored forces were merely support for infantry. But many American combat leaders, both young and old, never heeded these cautionary words—despite hard learned World War II lessons to the contrary. And so in Vietnam we did it again. We did it with air cavalry, ground cavalry, mechanized infantry, tank battalions and other units as well. We simply had not learned our lesson.

In Vietnam, the cost to U.S. forces of doing this was not high, at least not obviously so. However, on another battlefield, against a more powerful enemy—one who could concentrate to capitalize on the mistake by defeating fragmented forces in detail—the mistake could be fatal. Was it recognition that the enemy in Vietnam was unlikely to be able to exploit the fragmented forces that persuaded senior U.S. commanders to fragment their armored units? Or was it truly a serious mistake, reflecting our collective inability to learn our lessons well? Armored soldiers would argue the latter case—that it was a mistake, a typical and frequently repeated mistake in any war which is generally viewed by senior commanders as an "infantry war." *It was true in Korea; it was true in Vietnam. We cannot afford to let it be true again.*

It was also reported in early chapters that there was a considerable body of experienced advice available from U.S. officers who served as advisors to Army of the Republic of Vietnam (ARVN) armored units in the early days. For a number of reasons, this advice was either not available to the right audience or not heeded by persons senior enough to cause the U.S. Army, especially its armor community, to react to Vietnam in a more positive way concerning armored employment. *This was an unfortunate display of our inability to learn from both ourselves and others. It too must not be allowed to happen again.*

The second lesson of Vietnam has to do with finding the enemy. Possibly the most innovative and exciting development of the Vietnam era was the fielding of air cavalry. In Vietnam, the critical problem was to find the enemy before he could close up and organize to do his mischief. This is a problem in any war. It will be an especially critical problem on a modern battlefield that is saturated with a wide variety of quality weapon systems, and on which early knowledge of where the enemy has massed those systems will be critical to battle success. The unique mobility of air cavalry provides a badly needed addition to our reconnaissance and surveillance capability.

Later in the war, when air cavalry was confronted with sophisticated enemy air defenses, it also became apparent that the reconnaissance mission could still be performed if the commander was willing to pay the price to suppress the enemy air defenses. If information of the enemy is as critical a commodity as we have suggested, then the price must be paid. We should not dismiss air cavalry as some do, claiming that it can only survive against an enemy with little or no air defense. The scouting mission—reconnaissance—is still critical. Air cavalry adds a new dimension to reconnaissance — a dimension complementary to reconnaissance by ground scouts in armored cavalry units. The fact that the air cavalry element of armored cavalry units were widely used as combat maneuver forces in Vietnam, in contrast to their traditional role of reconnaissance forces, tends to obscure the fact that they are still a part of the central core of the reconnaissance team. The air cavalry-ground cavalry combination should be viewed as a system whose presence on the battlefield can give a much needed advantage to the force commander who uses it wisely.

In Vietnam, there was considerable use of air cavalry troops and squadrons as divisional, corps, or field force troops, in some cases fragmenting air cavalry to use gunships for armed escort and scout helicopters for staff visits. These practices, while a boon to the needs of senior headquarters, did all too little for tactical commanders at brigade level and below. Only in the 11th Armored Cavalry Regiment (ACR) were air and ground cavalry integrated into a single operational scheme under a brigade level commander. Major General (then Colonel) George Patton once commented to the effect that the operation of his whole regiment really depended on the eyes of those nine warrant officers riding as scouts in his regimental air cavalry troop. The concept of integrated employment of air and ground cavalry must be fully developed and expanded if we are to realize the full potential of the new reconnaissance team.

Third among our suggested lessons of Vietnam is what might be learned about area and route security, especially in areas traditionally considered the "rear." In Vietnam of course there was no "rear area," the enemy was all around, a condition which we could probably expect to encounter in a fast moving mobile war featuring large quantities of mobile and lethal systems. Traditionally, the U.S. Army has used armored cavalry and other armored units for "rear area security."

In II Corps Tactical Zone (CTZ) for most of the war, the 1-69th Armor and 1-10th Cavalry were route security and reaction forces. At one point in 1970, the 11th Cavalry Regiment was daily clearing mines from and providing security

Reflections

by Lieutenant General Donn A. Starry

for almost 100 miles of logistical resupply routes and farm-to-market roads. While for many reasons armored units are good at this sort of thing, this practice can be, and indeed was in Vietnam, a considerable drain on combat forces capable of accomplishing much more for their commander than simply clearing roads and protecting logistical units.

With but limited combat forces at our disposal, it would seem far better to equip and train logistical units to protect themselves to an acceptable degree, and to provide area security with Military Police or other units mounted in armored cars, firing weapons designed for the type enemy they can expect to encounter. In Vietnam, some Military Police units were equipped with armored cars for this express purpose, but the concept was never widely developed. In addition, Vietnamese province chiefs, later in the war, had their own provincial reconnaissance units mounted in armored cars—these essentially performed rear area and route security operations. From a standpoint of manpower and equipment invested, it was a far more cost effective operation than to assign a tank, mechanized infantry, or armored cavalry unit to the same task. The concept of protection for rear areas and resupply routes, furnished in part by the units stationed in the area, and by Military Police-type units equipped for this purpose, needs full exploration and development.

Fourth among Vietnam lessons with which we must cope on future battlefields deals with what we should learn from and do about our land mine warfare experience in Vietnam. The enemy introduced a new dimension into this facet of land combat—random mining. Historically antiarmor land mines have been a persistent and vexing problem for which no really satisfactory solution has ever been found. Our failure to solve the land mine problem when dealing with pattern minefields is aggravated by random mining tactics.

In earlier chapters, we recounted that neither equipment nor tactics were adequate to the task. The total antiarmor mine experience of the U.S. Army in Vietnam comes down to three cardinal points. First, we should capitalize on what our enemy taught us about the tactics and techniques of random mining. Second, we must develop antiarmor mines and systems for random delivery of those mines as a first order of business. Finally, realizing that random mining could be used against us again, we should proceed with all possible speed to develop equipment for high-speed search and elimination of land mines which have been randomly sown. Since World War II essentially nothing has been done about this problem. The mine rollers used in Vietnam were not as effective as some 1940 vintage equipment.

The final lesson that suggests itself is the body of experience dealing with logistical support for armored units.

Maintenance units tended to want to operate well to the rear. Considerable pressure was required in many cases to persuade them that they could and should operate contact teams as far forward as squadron and battalion, making on-site repairs at company, troop, and battery level. The alternative to this is a long, long haul of damaged equipment back to a maintenance safehaven, and a long, long haul of repaired equipment back to the unit. This procedure is terribly expensive. At one point, the 11th ACR was hauling its battle damaged *Sheridans* nearly 150 kilometers round trip. As suggested earlier, some way must be found to provide better security for these traditional "rear area" units, and for the routes which connect them with their customers. Otherwise the customer pays an inordinate price to secure the "rear" and routes leading thereto. In addition, the situation described here calls for some reexamination of traditional direct and general support relationships. Perhaps we have too many intermediate levels of maintenance to operate effectively any longer. Whether or not this is true, we need to commence finding out.

Current U.S. Army logistical policies call for area support by maintenance and supply units. In short, this means support units provide maintenance and supply support so long as the customer unit is in the geographic area the supporting unit has been charged to support. When the customer unit moves elsewhere, its support must then come from another unit charged with support in the new area. The problem is that the parts supply system functions on equipment densities and spare parts usage rates. There is not now, and never has been, any satisfactory way to transfer with the customer unit its experience factors and supply stocks, built up in the supporting unit on the basis of the customer usage factors. The end result—in the eyes of the customer—is that support breaks down completely when the customer moves to a new area. At best, the spare parts supply system was usually capable of supporting no more than 50 to 60 percent of unit demands, the remaining 40 to 50 percent being made up by cannibalization of combat losses and bypassing of the normal supply system—in other words *scrounging*. On a mobile battlefield, even this system breaks down.

Armored units must have dedicated support—maintenance and supply—through the direct support level, and possibly even to the general support level. In any event it is a situation badly in need of close scrutiny and resolution.

The supply vehicle fleet provided to U.S. armored units was generally unsuited to its tasks. In a country with poor or nonexistent secondary roads, it was necessary to replace wheeled cargo carriers with full-tracked cargo vehicles—the *M-548*. These vehicles were essential to armored unit operations in wide areas along the borders; the Cambodian incursion could not have been undertaken without them. They were, however, not present in sufficient numbers and experienced less than acceptable availability rates.

Armored units have always been plagued with the problem of whether their supply fleet should be capable of operating on roads or cross-country, or both. In an attempt to design vehicles that will do both, neither capability has been provided satisfactorily. In forward areas, especially in countries with limited road nets, tracked resupply vehicles at unit level are essential. On the other hand, somewhere there must be a vehicle fleet which can move large volumes of supplies quickly over roads—even if those roads are secondary by some standards. This is primarily an organizational and equipment problem. However, the *M-548* was the last of its kind, therefore the U.S. Army needs to look seriously at the tracked cross-country resupply capability in forward areas, as well as the long-haul fleet that backs it up.

Battlefield recovery of damaged or inoperative vehicles is always a difficult problem for armored units, and so it was in Vietnam. Both in numbers and reliability, the recovery fleet needed considerable improvement. The *M-578,* in cavalry units, experienced only moderate availability rates, and was generally not well designed for its job. The *M-88,* the bull of the recovery fleet, was not provided in sufficent numbers. The 11th ACR attacked into Cambodia with its organic recovery capability bolstered by almost a dozen additional *M-88's* borrowed for the occasion out of depot stock. For almost two weeks, regimental maintenance operations lived on the guts and staying power of these vehicles and their crews. This is both an organizational and a doctrinal problem. Normally, unit recovery equipment evacuates to a vehicle collecting point, where the equipment is picked up by support units as they move along behind the forward elements. With support units immobilized far to the rear, the burden of battlefield recovery falls to the fighting units—a situation quite likely to recur on a battlefield dense with large numbers of quality systems. There is, therefore, a need for better recovery equipment, more of it at unit level, and a close look at how the Army intends to recover and evacuate battle losses in future wars.

Many other lessons might be drawn from the Vietnam war. Some are so obvious that to write them would be trite—the essentiality of the combined-arms team, the requirement to fight mounted, the importance of the U.S. advisors to ARVN and the general inadequacy of their preparation for the tasks that confronted them on arrival. All these and many more must be the outcome of some larger analysis.

As we look to the future, it is essential not only that we know the lessons of Vietnam, but that we understand them as well. Understanding them, in their correct context, and relating that to the future will take more time and space than have been available in this monograph. But it must be done. We can no more turn our backs on our experiences in Vietnam than we can take those experiences, relate them directly to our next battlefield, and so in the end get ready to fight better the war we have just left behind. The wisdom to learn from experience, without just getting better prepared to relive that experience, is not easily won. *But win it we must. We owe it to ourselves and our country. More however, we owe it to the brave men who went, helped us learn the lessons, and paid the price of learning. They left us a large legacy—larger perhaps than we deserve.*

Soviet Armor Doctrine

by Major Jeffrey Greenhut

In October 1917, Lenin and the Bolsheviks seized control of the Russian Revolution. Like most revolutions, it was faced with the necessity of defending itself from the military forces of the counter-revolution. Twenty years later, the state which the Revolution had established found itself once again under attack, this time by a great military power determined to crush the regime. Thus it is not surprising that the Red Army, called upon to fight first a civil war and later a war against Nazism, should have spent much time considering questions of military theory.

The military theory and doctrine of the Red Army did not rise full blown from the head of Lenin. Every army is a prisoner of its historical antecedents and the Red Army was no different. Russia, Imperial or Soviet, had a long and glorious military tradition. Peter the Great (1682-1725) introduced the first Russian army composed of all classes in which all individuals, officers and enlisted, had an equal duty to the state. In the late eighteenth century, the great Suvorov left a legacy of meticulous training of the individual soldier combined with the use of speed and shock.[1]

The nineteenth century witnessed a decline in Russian military art. Russian generals, selected from birth or for ability at court politics, forgot the strategic lessons of Suvorov and remembered only his discipline. Dependent solely on the valor of the Russian soldier, Russian military doctrine degenerated into the advocacy of frontal assault regardless of cost. The subsequent defeats of the Imperial

[1]Serge Andolenko, "The Imperial Heritage," in B. H. Liddell Hart, ed., *The Red Army,* (Gloucester, Mass: Peter Smith, 1968), pp. 13-17.

armies in the Russo-Japanese War and in World War I were in large part responsible for the revolution which eventually brought Lenin to power.

With the success of the Bolshevik Revolution, Russian, now Soviet, doctrine entered a new phase. The Soviet Union was the first Marxist state. Thus a new stimulus was added to the old Russian tradition—the thoughts of Karl Marx and his successors.

Unlike most of his nineteenth century contemporaries who saw war as a specific external political act by a particular government, Marx saw war as a natural outgrowth of a given socio-economic order. To understand war meant to understand that order. Marx was also among the first to comprehend that military activity accelerated the process of social change.[2] Concerned above all with the revolutionary war which he thought would break out at any moment, Marx left to his followers (Lenin, Trotsky, Frunze, and Tukhachevsky) the expansion of the Marxist vision of war to include a systematic analysis of all war and to define the Marxist attitude toward it.

Lenin made the first serious synthesis of Marxism and military theory. Lenin combined Marx with the Russian revolutionary tradition and integrated the combination with Clausewitz and Machiavelli.[3] All his life Lenin quoted the famous doctrine of Clausewitz that "war is the continuation of politics by other means."[4]

Lenin's theorizing about war took an immediate practical turn with the success of the Bolshevik coup which placed a small band of radical intellectuals at the head of the vast Russian state. Immediately beset by counter-revolutionary forces determined to overthrow the Red government by force, they were pushed into the study of war and military doctrine.

Since the Red Army was the creation of the Communist Party, composed of Marxist intellectuals and revolutionaries, it was almost inevitable that the Bolsheviks, in their first attempt to formulate military theory, tried to apply Marxism. This doctrinal dispute was not just an intellectual exercise, for it was intimately linked to party politics and personal struggles. The Party eventually split into two camps, one led by Leon Trotsky (1880-1940), Commissar of War, supporting the conservative position, and the other led by Mikhail Frunze (1885-1925), the Red Army's best tactician of the Civil War, who advocated a specifically Marxist theory of war. While not participating actively in the debate, Mikhail N. Tukhachevsky (1893-1937), another great field commander, was even more radical than Frunze but supported the Frunze position.

Trotsky had masterminded the coup by which the Bolsheviks seized power in St. Petersburg. As Commissar of War, his role as architect of victory for the Bolsheviks in the Civil War cannot be overemphasized.[5] He was exiled in 1929 and murdered in 1940 for his opposition to Stalin.

His antagonist was Mikhail Frunze, a Communist Party revolutionary turned soldier. Frunze shared with Trotsky a career of prison and revolutionary activity, and was the outstanding military commander of the Civil War. In 1925 he replaced Trotsky as Commissar of Military and Naval Affairs.[6]

The third participant in the drama was Tukhachevsky, son of an impoverished but aristocratic family. Captured by the Germans in 1915, he escaped in 1917 and joined the Bolsheviks. Of all the Red Army commanders in the Civil War, Tukhachevsky was the only one to show great strategic ability. An ardent admirer of Napoleon, he commanded the Soviet offensive against Poland in 1920 and rose to Marshal of the Soviet Union. Like Trotsky, he was later executed by Stalin.[7]

The debate over whether or not there was such a thing as a Marxist military doctrine began during the Civil War. As far back as 1917, those who favored a Marxist approach to the subject had advocated an "absolute maneuverist principle" in response to what they considered to be the "imperialist" principle of positional warfare.[8] Trotsky, responsible for the administration of the Civil War, had little patience with such theoretical speculation. He rejected "revolutionary" war and transformed the Red Army into a substantial military force.

As a result, the Party was subject to a deep rift. The Left Communists proposed that the Party adopt "revolutionary" war and once and for all scrap the regular military model which could represent only bourgeois regimes.[9] The events of 1919 lent support to their argument. The positional warfare of the Western Front of World War I proved unsuitable for the great Russian plain. The Red commanders had produced workable schemes which restored maneuver to the battlefield.[10]

By 1921, Frunze, who led the Left Communists in the debate, and Trotsky both published articles on what came to be known as the Unified Military Doctrine Debate. Frunze's basic ideas were grounded on sound military principles but to these he attempted to apply Marxist class analysis. He argued that the armed forces of the proletariat were best able to maneuver and take the offensive.[11]

Trotsky felt that this was foolishness. Maneuver and offensive were not unique to the proletariat. The conditions of the Civil War were a result not of the Red Army's inner qualities, its class nature, revolutionary mission, or zeal, but of the objective conditions of the vast spaces and few troops.[12] After all, the White armies were using the same tactics. Trotsky dismissed all theories of war as metaphysics.

In the end, external factors decided the issues. For political reasons, the Bolshevik generals, including Tukhachevsky and Frunze, rallied around Stalin in opposition to Trotsky. If Trotsky could be removed from power, along with his supporters, the high leadership positions of the army would be delivered into their hands.[13] Trotsky, for all his oratorical

---

[2]Karl Marx to the Committee of the Social Democratic Party of Germany, Brunswick; London, September 1, 1870 in *Selected Correspondance* (Moscow: Foreign Languages Publishing House, 1953), p.300.

[3]Stefan T. Possony, Lenin: *The Compulsive Revolutionary* (Chicago: Henry Regnery Company, 1964), p.vii.

[4]Stefan T. Possony, *Lenin Reader* (Chicago: Henry Regnery Company, 1966), p.488.

[5]Isaac Deutscher, *The Age of Permanent Revolution: A Trotsky Anthology* (New York: Dell Publishing Company, 1964), pp. 9-12.

[6]Walter Darnell Jacobs, *Frunze: The Soviet Clausewitz 1885-1925* (The Hague: Martinus Nijhoff, 1969), p.23.

[7]John Erickson, *The Soviet High Command, A Military-Political History, 1918-1941* (London: Macmillan & Co., Ltd., 1962), p.58.

[8]Leon Trotsky, *Military Writings* (New York: Merit Publishers, 1969), p.35.

[9]Erickson, pp.27-30.

[10]*Ibid.*, p.50.

[11]Jacobs, pp.42-7.

[12]Trotsky, p.54.

[13]J. M. Mackintosh, "The Red Army 1920-1936," in B. H. Liddell Hart, ed., *The Red Army* (Gloucester, Mass: Peter Smith, 1968), p.54.

and administrative capability, was cleanly and finally outmaneuvered in the Party infighting. Carried away by the brilliance of his own undisputedly magnificent mind and tongue, he did not appreciate either the emnity or the competence of his opposition.

With the defeat of Trotsky, the Soviet High Command was committed to molding the army around offensive doctrine. Still, the question remained as to how offensive principle was to be translated into specific military doctrine. Here, due to the early death of Frunze in 1925, Tukhachevsky took the lead.

As a result of his operations during the Civil War, and in the Russo-Polish war in 1920, Tukhachevsky had come to the conclusion that it was impossible, except in rare cases, to break the enemy forces in a single assault. It was essential that operations follow one upon another, attack follow attack, in order to inflict continual losses. The question confronting him and the rest of the Red Army was how this was to be accomplished considering the vast distances and huge forces likely to be employed in the next major war.

The attention of Soviet theorists was drawn quickly towards new technology. Lenin had always placed great emphasis on the machines of war, and Marxism as an explicitly materialist doctrine naturally pushed Soviet theorists toward close examination of new war machines, particularly armored vehicles.

The ultimate direction of the Soviet military system, however, was established as a result of the close contact between the Soviet regime and the army of Weimar Germany. Soviet visitors to Germany in the 1920s were impressed by German theories regarding the incorporation of the tank and the airplane into military operations, and they returned home to advocate their introduction into the Red Army. Tukhachevsky, as Deputy War Commissar, was their patron. He admired German military efficiency and had sent observers to the German army maneuvers of the late 1920s. Particularly interested in the military theories of General von Seeckt, Tukhachevsky wanted the Red Army to follow the German initiative in mechanizing the cavalry divisions of the Russian army. His plan called for each division to have a regiment of high-speed tanks.[14]

The first serious Soviet work on tanks and their use in war was written in late 1928. The Soviets had many technical difficulties with their early tanks, but this did not inhibit their interest. K. B. Kalinovskii carried out some of the first studies on the role of the tank including considerations of tanks as infantry support, in defense, high-speed tanks in the meeting engagement, and the problems of antitank defense. Concentration in this area coincided with the intensification of work in the joint Soviet-German training centers.[15]

The Soviets were also aware of the arguments of General J.F.C. Fuller and Captain B.H. Liddell Hart in Great Britain regarding this new armor doctrine, but felt that continuous maneuver would be impossible to maintain with the small armies advocated by the Fullerites. They believed that only mass armies could make use of transportation and motorization.[16]

The maneuvers of 1931 through 1933 were crucial to the development of Soviet armored doctrine. In these, the Soviets rejected total dependence on the tank and concentrated on combined arms. In practice they set up two armies, a shock army comprised of mechanized units with artillery and tactical air support to carry out the decisive breakthrough, and an infantry army of the older style to consolidate gains. The heart of offensive operations was to be the mobile armored corps, with parachute troops used to disrupt the enemy reserves and harry his rear. High-speed tank units were to make deep independent penetrations. All of these ideas owed much to Tukhachevsky's non-stop offensive.[17]

In spite of the new theory of the army and the increasing acceptance of the decisiveness of combined arms which included the tank, behind Soviet doctrine was the traditional Russian steamroller. It was to be given a more powerful engine and a greater capacity to defeat the enemy, but it was nonetheless a steamroller.[18]

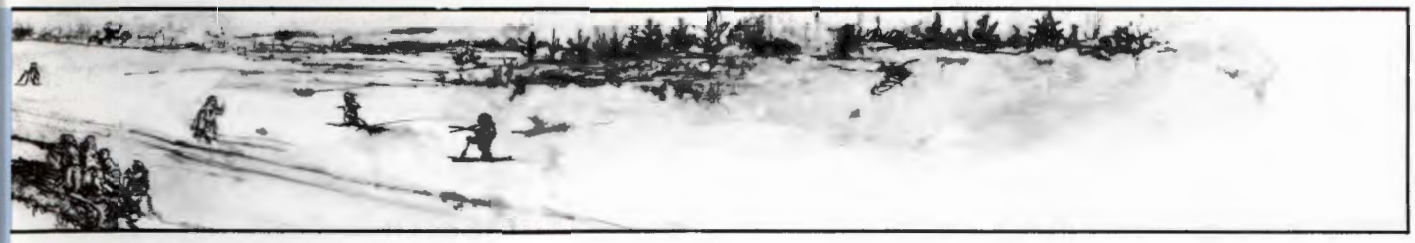
By the summer of 1935, the Soviets were well on their way to motorizing their armies. One third of corps artillery, one half of antiaircraft artillery, the heavy artillery of the main reserve, three rifle divisions, and seven frontier defense divisions had been motorized. Reconnaissance and engineer units had been partly motorized, and the signal troops were in the process.[19]

On 30 December 1936, new Provisional Field Service Regulations were issued. The general principle was that offensive action was the only way that destruction of the enemy could be accomplished. The method was to use combined arms acting along the axis of the main attack in complete depth, supported by tanks providing mobility and the artillery providing firepower. In the offensive, the tanks would open the path for the infantry.

Although the infantry was specifically designated the arm of decision, the key to the doctrine was the effectiveness of deep penetrating tank columns. The distinctive Soviet

[14]Otto Preston Chaney, *Zhukov* (Norman, Oklahoma: University of Oklahoma Press, 1971), pp.14-19.

[15]Erickson, p.270.
[16]*Ibid.*,p.318.
[17]*Ibid.*, pp.350-1.
[18]*Ibid.*, p.406.
[19]*Ibid.*, p.390.



features of the Field Service Regulations of 1936 were the flank attack and disruption of the enemy rear, offensive and initiative by lower level commanders, depth of both offensive and defensive operations, relative subordination of infantry tactics, and wave after wave of assaults rather than the single assault of the blitzkrieg.[20]

In the late thirties when the Spanish Civil War began, the Soviets sent both troops and leaders to aid the Spanish Republican forces. General Demitri Pavlov, the reigning Russian tank expert, went to Spain during the fall of 1936 and stayed until the summer of 1937. Based on his Spanish experience, he incorrectly decided that tanks could not play an independent operational role on the modern battlefield. He was able to persuade both Stalin and Voroshilov that his view was correct and, as a result, the Red Army's large tank units and motor mechanized corps each containing about 500 vehicles were disbanded. Another blow to Soviet doctrine was Stalin's execution of Marshal Tukhachevsky in 1937. He had been the primary advocate of the offensive in the Soviet High Command, and his execution and the discrediting of his views on political grounds may have led Pavlov to take the position he did.[21]

Fortunately for the Soviets, a new star was rising, Georgii Zhukov, who advocated the use of independent tank force on the modern battlefield. A protege of Stalin; he believed that the tank forces should not be spread out among slower infantry units which would dissipate their strength.[22] The battles of Lake Khasan (1938) and Khalkhin-Gol (1939) against Japan in Manchuria further reinforced his views when his tanks made comparatively deep penetrations of Japanese positions. But when he returned to Moscow, Zhukov found that the seven mechanized corps were in the process of being disbanded and their tanks distributed to rifle divisions as support weapons.[23] Yet with all his emphasis on the tank, Zhukov's Far Eastern experience had convinced him that combined-arms action was the principle condition of success in combat. The Field Army Regulations prepared toward the end of 1939 reflected Zhukov's ideas. However, the regulations of 1939 were never published because the German successes in the early part of World War II made new studies necessary. New field service regulations were in process when the German Army struck in June of 1941.

A careful study of Russian army campaigns during World War II shows that by and large they adhered to the tactical doctrine they worked out in the twenties and thirties. Yet if their tactical doctrine was not faulty, the question must be asked as to why the Germans were so successful in the early stages of the war. The answer to this question is twofold. First, Stalin had discounted the idea of strategic surprise, and the Red Army had not deployed to meet the German attack. Second, although Soviet military doctrine in theory was more than adequate, the tactical skill, nerve, and initiative needed at low levels had in large part been inhibited by the purges of 1937 and the execution of the best of the High Command. The army was a dogmatic bureaucratized body while the doctrine of the army demanded flexibility and initiative. The Red Army had developed excellent doctrine, later successful in defeating the Germans, but had not developed an instrument capable of effecting it. Rather than new doctrine based on the German model, their wartime doctrine was based largely on reconsiderations of prewar theory. It brought back assault shock troops, massed artillery and tanks, and Tukhachevsky's basic theme of the indispensability of combined arms.[24]

The debate which had begun with Trotsky and Frunze in the early twenties had followed in the course of nearly 20 years a Marxist dialectic. Between the extreme theoretical positions of Tukhachevsky and Frunze at one end and the *ad hoc* theories of Trotsky as the other, a synthesis had resulted. Gone was Frunze's and Tukhachevsky's emphasis on proletarian war and revolution. Gone also was Trotsky's radical rejection of military theory. In their place was a doctrine which synthesized concepts of offense and maneuver with the practical application of warfare, a doctrine proved sound in World War II.

Today, the Soviet High Command, following Tukhachevsky's example, has abandoned romantic theories of proletarian war. The generals of the Red Army, like their Western counterparts, are pragmatic men interested in winning battles, not in ideological debate. Present Soviet doctrine, as in World War II, is sound and imaginative, based on the real strengths and weaknesses of Soviet society and its potential adversaries. Thus, in any conflict with the U.S.S.R., the West can expect to be opposed by not only a large, well equipped military force, but also one led by men unafraid to develop and apply innovative military doctrine.

[20] *Ibid.*, pp.437-45.
[21] Chaney, pp.25-7.
[22] *Ibid.*
[23] *Ibid.*, p.59.
[24] Erickson, p.659.

MAJ JEFFREY GREENHUT, a former intelligence officer in Vietnam, is a reservist working toward his PhD in European military history at Kansas State University. A graduate of Arizona State University, Cornell University, the University of California at Berkeley, and the Command and General Staff College (C&GSC), Major Greenhut is currently serving with the 5047th U.S.A.R. School.

Tankers have always assumed that hatches are closed during combat only as a last resort—like when under heavy indirect fire, fighting in cities, or under close infantry attack. If you button up to minimize risk to exposed crewmembers, do tanks become less effective? If so, by how much?

To answer these questions, HQ, TRADOC directed the TRADOC Combined Arms Test Activity (TCATA), formerly Modern Army Selected Systems Test Evaluation and Review Activity (MASSTER), at Fort Hood to conduct a "Degradation of Tank Effectiveness Test" in September and October 1975. The purpose of the test was to assess the degree of degradation in the operational effectiveness of tank crews when operating with the hatch closed rather than open. Four platoons, equipped with *M-60A1* tanks, from the 2d Battalion, 5th Cavalry, 1st Cavalry Division were used as test units. These 20 tank crews performed various tactical activities both as crews and as platoons. In all cases, the baseline data was the crew or platoon's open-hatch performance. Thus all test activities described below were accomplished with hatches both open and closed. Additionally, night and day trials were conducted but not directly compared.

Individual crew tactical activities were target acquisition, battlefield movement and navigation, and live fire. Daytime target acquisition testing was conducted on a marked route along which the crews moved after being directed to simulate engagement of all enemy vehicles and equipment they could find. The target array presented to all tank crews consisted of tanks, APC's, and personnel; and were both active and passive. At night, an ambush scenario was used with stationary friendly tanks searching a sector for the same types of targets with the aid of a companion tank's searchlight. Measures of effectiveness were targets detected and times required to do so.

The battlefield movement and navigation activity consisted of several separate activities. The first of these was a cross-country speed run of about 3 to 5 kilometers. The crews had several requirements to navigate from known points on the ground to distant reference points. They also had to cross streams and climb hills. With the exception of shortened distances, the night course was similar. Measures of effectiveness were success versus failure and times required to complete these activities.

The individual crew live-fire course was an amended tank Table VIIA and B fired at Fort Hood's Crittenberger Range. Equivalent targets were engaged with hatches open and closed. Measures of effectiveness were percent of hits and times required to fire.

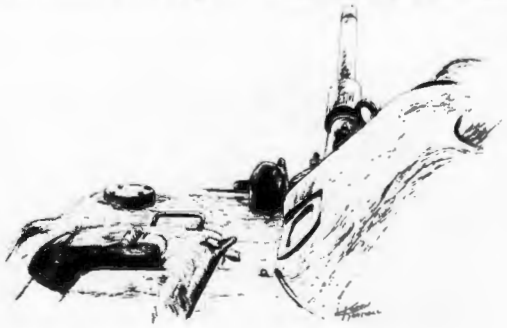
Platoon tactical activities consisted of movement to contact and delay exercises, without live firing, and a live-fire exercise with a defensive scenario. The FTX activities were two-sided with attrition resulting from the tactical and numerical kill system (TANKS). This method uses alpha-numeric designators posted on the combat vehicles as identifiers, coupled with a predetermined kill probability based on range and correct target detection. Measures of effectiveness were targets detected, times required to move, number of elements attrited or lost through navigation errors, and communications volme. Because of the lower sample size (4 platoons versus 20 tank crews) and the general nature of the measures of effectiveness, additional data gathered from participants and observers through questionnaires and interviews were relied upon heavily to evaluate this area.

Platoon live fire was conducted on a specially constructed range to contribute platoon fire distribution data. The platoon leaders and tank commanders were permitted to conduct a reconnaissance of a defensive position, which they would subsequently occupy to block an enemy penetration. Following the reconnaissance, 30 *T-62* frontal silhouettes were placed in front of the blocking position. The platoons, with six main-gun rounds per tank, were ordered to occupy the blocking position and engage the targets. The fewer the engagements of any enemy tank by multiple friendly tanks, the better the platoon's fire distribution.

In addition to all of the above, data as to the unit's closed-hatch training program were collected periodically throughout the test, and during a pretest training period. This was done to determine the changes in closed-hatch proficiency as each platoon's experience in closed-hatch operations increased. A proposed closed-hatch program of instruction, standard operating procedures (SOP), and training circular were developed as a result of the test.

The results of the individual crew testing concluded that target acquisition ability is degraded to a statistically significant extent in the daytime and slightly more at night. The ability of crews to navigate and negotiate obstacles is degraded even more when hatches are closed. The tanks also move quite a bit more slowly; this obviously exposes the tanks to the enemy for a longer period of time, increasing individual and unit vulnerability. There was no degradation in hit performance or times required to fire, however.

Of greater significance were the platoon-level test results. As was feared, the small sample size and imperfect measures of effectiveness precluded conclusive results from the objective data collected during FTX activities. However, the opinions of the participants and observers yielded a number of important conclusions about platoon-level closed-hatch operations. Because of the reduced and restricted visibility of vision blocks in the closed-hatch mode, detections of the enemy were achieved at the expense of both time and good use of terrain. Responses in acquiring targets from handoffs were much slower. Crews with closed hatches found it more difficult to select good overwatch positions to minimize detections from the enemy. At night, in many cases, crews thought they were in good positions



Closed Hatch Operations

by Major Robert C. Barron

when in fact they were quite vulnerable to enemy fire. Tank commanders and evaluators felt that little degradation in target acquisition existed while tanks were stationary. However, target acquisition was more difficult when platoons were moving, concurrent with attemping to find the enemy. Overall, navigation problems detracted from target acquisition. Two obvious areas of closed-hatch target acquisition degradation are the diminished ability to hear the enemy during closed-hatch operations, and the inability to employ dismounted listening posts.

In navigation, degradation could be summarized as follows:

Aggressive movement was generally impaired. Reduced visibility impacted greatly on performance, both at crew and platoon level. Because of the reduced field-of-view during closed-hatch operations, movement rates were slower, more cautious, and frequently interrupted because of temporary crew misorientations. This reduced visibility generally affected the crew's ability to maintain orientation and to see in the immediate vicinity of their vehicle. This hindrance was greater in heavy woods when distant terrain features were not visible for orientation purposes. However, light to moderate woods caused little impairment, and frequently, speed was increased since the tank commander was not vulnerable to low-hanging tree limbs. It should be pointed out here that the tank platoons on this test did not operate with attached infantry.

Generally the use of overwatch techniques, and selection of movement routes and firing positions were degraded due to the limited field-of-view of the crews and the platoon chain of command. Bounding overwatch was frequently discarded in favor of traveling or traveling overwatch during periods of imminent contact because of the simplicity of command and control inherent in the two latter techniques. However, the consensus among leaders was that the attacking elements would always lose when operating in the closed-hatch mode!

Position selection was particularly difficult to accomplish at night, and as stated previously, crews frequently tended to believe they were well concealed during darkness, when in fact, they were quite susceptible to enemy detection.

More frequent maintenance problems, primarily thrown tracks, resulted from closed-hatch operations. Inability to adequately determine the trafficability of terrain to be crossed or select usable alternate routes, coupled with the desire to find the best possible cover and concealment, tended to place additional strain and wear on engines and suspension systems.

In the area of command and control, several factors contributed to closed-hatch degradation.

First, the closed-hatch mode tended to emphasize the skill differences among the various crews. This degraded the fighting effectiveness of the entire platoon. Frequently, during the test, it was common for a weak tank crew to be placed under extremely close control of one of the two leaders. This often resulted in the weaker crew following immediately behind into contact, creating a situation in which two friendly tanks were simultaneously acquired and engaged by a single aggressor element. In these instances, compensation was made at the expense of platoon and crew survivability. Second, operational performance was degraded because of the added stress felt by both platoon leaders and platoon sergeants when operating in the closed-hatch mode. All leaders agreed that command and control functions were more important and greatly increased in difficulty because of the loss of visibility and necessarily increased reliance upon FM communications. Third, the loss of guidance capabilities (inability to use arm and hand signals and flag sets) is an unquantifiable factor adversely impacting on command and control functions. And last, the additional importance and difficulties associated with command and control adversely affected each leader's performance in completing normal tank commander functions in a combat role. All these factors contributed to a consensus of leaders and evaluators that significant degradation exists in closed-hatch operations.

Additionally, it was found that there was no significant degradation in the platoon leader's ability to distribute fires during closed-hatch operations. There was significantly greater importance and reliance upon FM communication during closed-hatch operations even though the volume of traffic does not necessarily increase. In summary, there is significant degradation in closed-hatch platoon operations. Judgmentally this degradation will range from 20 to 30 percent. In any given tactical scenario, degradation of a tank section or platoon could be lower than this range, as in the case of stationary overwatching fire, or higher, as in the case of crossing an obstacle or navigation. We also know that conducting tactical training with closed hatches has the bonus effect of raising open-hatch proficiency—something like putting weights on a bat while in the on-deck circle to make the real bat seem lighter. Improved vision blocks and the addition of an installed navigation device were also recommended as a result of the test.

To answer the questions posed at the beginning, tanks in the future may have to close their hatches and continue to operate or take unacceptable casualties. And it may not be possible to just close hatches and "sit out" the enemy artillery fire. If hatches must be closed, we now know the extent of the loss in crew and unit efficiency which has to be traded off for this added crew protection.

MAJ ROBERT C. BARRON was commissioned in Armor upon graduation from the University of Notre Dame in 1961. A former platoon leader and staff officer in both CONUS and Korea, he has also served as a staff officer with the CDC Armor Agency. Major Barron is currently serving as the Chief of Industrial Operations for the Hanau Military Community, USAREUR.

PROFESSIONAL THOUGHTS

PILOT STRESS

"Red Ripper 36, this is Red Ripper 10, ATTACK —moving tank—from firing position one—direction 350—range 2,000 meters—stationary hover—NOE—break right—follow me to position 3—attack on my command—over."

You are part of an attack element, 30 kilometers forward of the FEBA, at night, participating in a modern, mid-intensity battle in an aircraft which is low on fuel. You have maintenance, navigation, and survivability problems. During the engagement you can't help but wonder when you will be released to return to our side of the FEBA and get some much needed rest. Just before taking off on this mission, operations said something about having to reposition the forward area rearm, resupply point (FARRP) again. The problem of finding a new FARRP location in the middle of the night, flying nap-of-the-earth (NOE), while attempting to avoid the multitude of threat antiaircraft systems has been bothering you since the start of the mission. The loss of four of your crewmen a few hours ago is still on your mind.

"Ripper 36, this is Red Ripper 10, ATTACK—out." "Ripper 36—DANGER—HIND—3 o'clock—1000 ME..."

A new challenge is confronting Army aviation and we must meet that challenge successfully. In the past, Army leaders have used night attack helicopter operation's sparingly; however, the October War confirmed that night helicopter operations, if executed correctly, can inflict great material and morale damage to the enemy, produce a shock effect, and give the advantage of creating fear and confusion in the enemy's ranks. We must be able to place effective fire on the enemy when and where he least expects it and survive as an effective combat force to attack other hostile targets on the battlefield. In order to win the first battle of the next war, we must master and utilize the broad range of new techniques of flight, target engagement, Threat antiaircraft weapon destruction and/or avoidance. Can we be expected to properly employ all of these techniques, successfully engage the enemy, and survive—or will we be the victims of overstress or overload situations and fail to accomplish the mission?

In the next war, night combat operations will be as common as those during daylight. We will be expected to function around the clock, in good weather as well as bad. Darkness, while it restricts the Threat's ability to visually locate us, does not reduce the capability of radar-equipped antiaircraft weapon systems. Therefore, terrain flying is as fundamental to night operations as it is to operations conducted in daylight. The myriad hazards associated with terrain flight will tend to quickly produce fatigue. Physical hazards such as wires, trees, and birds coupled with weather hazards such as reduced visibility, winds, and high-density altitudes demand maximum crew performance at all times. Terrain flight hinders and often restricts communications. It will often be essential to voluntarily restrict communication in a high-threat environment because of the enemy's ability to electronically track radio transmissions. This communication problem will place an added burden on helicopter crews to make sound tactical judgements whenever necessary.

Night flying places an additional workload on the aviator. As darkness increases, judgement in depth perception decreases, visual cues decrease, making it more difficult to navigate and acquire targets, and the aviator becomes more susceptible to visual illusions and spatial disorientation, along with becoming mentally and physically fatigued sooner than during day flights.

The high-threat battlefield on and over which we will operate will be dominated by Threat antiaircraft weapons. Threat forces have a complete air-defense system that integrates the complimentary capabilities of individual infantry weapons, vehicle-mounted machineguns, antiaircraft guns, and antiaircraft missiles to form a protective screen around and above the ground forces. Threat forces currently field attack helicopters as well as utility helicopters armed and equipped with machineguns, cannons, antitank guided missiles and rockets. These rotary-wing aircraft should be treated as one of our potentially greatest enemies. Threat high-performance aircraft will, at times, dominate the air above the battlefield.

Friendly forces will employ a similar antiaircraft system making positive target identification a critical factor in the survivability of our own aviation forces.

The fact that aviators will have to effectively operate and survive in such a high threat environment, utilizing the most difficult modes of flight, will place a great deal of stress on the pilot. The stress producing factors mentioned so far, however, are all external factors. Add to those factors the following self-imposed and internal stress factors and you get a more complete picture of what aviators are up against.

Consider the known effects of smoking, alcohol, and nutrition on night vision. Add the effects of fatigue, the emotional stresses associated with any combat situation, the external stress factors mentioned above and, for those flight crews just arriving overseas, the jet lag's complete disruption of their circadian rhythms for the first few, critical days of battle, the potential for an overload on the crew's role in the man/machine system can be seen. With all the potential external and internal stress that aviators will have to endure to accomplish their mission in the mid-intensity battlefield environment, it is imperative that we be ready to meet the challenge successfully.

Our success on the modern battlefield will depend on our ability to place effective fire on the enemy during the most adverse conditions and surviving to fight on. To insure success in combat, aerial gunnery training must reflect the environment that we can expect to encounter on the modern battlefield. Under the best of conditions, total confusion will

reign over the air crews new to combat. Commanders must do everything they can *now,* to acquaint the individual aviators, the attack helicopter crews, and team/sections with expected conditions on and over tomorrow's battlefield. We must insure that we are psychologically ready to win the first battle of the next war. As Lieutenant General Donn A. Starry, former Armor School Commandant, said, "The clear lesson of war is that in the end, the outcome of battle depends on the excellence of training, the quality of leadership, and the courage of soldiers. It is also quite clear that the side that thinks it will win, usually does." To achieve this necessary positive mental state, our training *must* instill confidence in our ability to conduct night flight, fly NOE, effectively engage targets, use new gunnery techniques, and successfully accomplish our mission.

Confidence in our training, equipment, and tactics coupled with confidence in our abilities will permit us to overcome the multitude of stresses we are sure to encounter in the next war and provide the edge that will allow us to win while outnumbered.

DONALD B. SKIPPER
Captain, Infantry
Ft. Knox, KY

TO CHANGE IS TO MATURE— TO MATURE IS TO LEARN

Anyone who has dealt with officer students for any length of time, soon becomes aware that those students' quest for meaning, significance and commitment grows stronger as they progress through the educational cycle. They view the chaos, confusion, and disorder in the world around them with skepticism. We must recognize that officer students vary to a remarkable degree. They have different abilities, different interests, different personalities, and seek for different objectives. It therefore becomes absurd to demand one standardized educational mold to shape them into a coherent mass where the individual is no longer distinguishable.

The Advance Officer Course should be more satisfying to the intellect and more enriching to the human personality than the constant repetition of subject matter with which the vast majority of the students are already familiar, and the presentation of which becomes intellectually frustrating. If you carefully review the POI of any of our schools you will find that the entire structure is much the same today as it was 10 or even 20 years ago. The only major change has been the reduction of certain repetitive hours which provided time for the introduction of the Elective System into the curriculum. Courses in many schools should be longer (up to 36 weeks) since the station change has already been made; therefore, no further costs would be involved. This additional time would provide, in many schools, for an enrichment of the program.

The educational program in our service schools has been "hardware" oriented, and in the term, "hardware," I include the subject of tactics and its related areas. The entire Army has had its attention focused on "hardware" and "management." The Army consists of people! Our courses of instruction should be restructured to give more attention to people and their related problems.

The officers and enlisted men of today's Army are a product of our own social structure and environment, and look to the service for guidance and counselling of a different quality than that of the accepted standard in the Army of the past several decades.

Our course requirements frequently seem to be make work and POI's appear to have little connection with career goals, personal concerns, or intellectual curiosity. Many of our courses of instruction are so highly specialized that they replace broad general culture with narrow technical competence. Greater emphasis on social studies for the officer time frame is urgently required. We must add to the curriculum of our advance classes positive units of instruction in the communication arts, *psychology, sociology,* and the *art of counseling,* all of which will become increasingly essential in meeting the challenge of the Army of the future, which will be from a far less affluent society, thus giving added emphasis to the problem of a social nature.

I am also firmly of the opinion that all officers should have a course in the history of the Soviet Union and China, inasmuch as these will be the two powers that will critically affect the future of the United States. To cope with the conflict between the West and the East, between democracy and totalitarianism, the West needs a better understanding of the character, origins, and historical background of the Soviet system than it now possesses. It is far more than a spectrum of liberal ideas.

In our schools, much can be learned from fellow students, but under the lecture method, which is distressingly prevalent, this opportunity does not exist. By breaking classes down to small teaching units under faculty control, or if lacking in faculty, under the guidance of specially selected students, the officer benefits from the thinking of the students as well as the instructors. Even more important, you invite active individual participation, on a major scale, which does not exist in large classes. This condition is due to the hesitancy of students, when in large groups, to express themselves. Groups should be planned to encompass all experience factors available among the students, and should include outstanding officers, the so-called "mid range" and the least experienced. If the class contains officers from other arms or services, they should be equally distributed among the groups.

One of the major problems in any educational system is that of motivating the student. Here the lecture type of presentation as referred to above is not a contributing factor in motivation—since it fails to challenge the student or permit any real student participation. Small groups provide a technique which develops intellectual skills, where students actually do the thinking and have the opportunity to test their thinking against others. To develop motivation, we must pose problems that are outside the immediate range of

the student's ability. Unless the excessive number of hours programmed as lectures can be revised to become more meaningful, why not give the student a copy of the lecture and let him read it with care in the quiet confines of the school library?

As I examine the curriculum in our service schools, I am disturbed by a trend toward uniformity—a growing rigidity of structure that reflects less and less the interests of the individual officer. We must enlarge our concepts of what a service school can be—we need alternate paths to an education that produces a professional soldier in its most broad concepts. The first step in achieving our goal of creating a more challenging school system is to realize that the school is but a part of our learning achievement. To the modern sophisticated officer of today, school should be an enabling process rather than an instructional one.

We must realize that to exist is to change—to change is to mature—and to mature is to learn. A fundamental of all arts is the art of learning. In analyzing our schools, we are so immersed in the problems which beset us day after day, that it is hard to find a hilltop where we can obtain an objective viewpoint.

In the present environment, we must study our schools and strive to shift the focus of the program from teaching to learning. This means teaching the instructor to present material so that the student, however diverse his rank or background, can master it. Any subject can be a difficult one, if poorly taught. The lecture method of teaching is the quickest way of getting information from the notebook of the instructor to the notebook of the student—without going through the minds of either.

The officer of today's Army and the Army of the foreseeable future will be faced with many problems—war, crime, drugs, city squalor, riots, dissident groups, pollution—these problems cannot be solved by being an expert in motor maintenance, communication, or the functions of the brigade S-3. By being trained in the humanities, he can overcome the emotional apathy which characterizes a large part of our reaction to the pressures of these critical problem areas. Professionalism is not just hardware and tactics—it is the development of the full man!

HENRY C. NEWTON
Brigadier General, USAR (Retired)

FOR WANT OF A HORSE

The Commander of an Armored Cavalry Squadron (TOE 17-105H) is the only commander in the Army who has an organic air cavalry troop but does not have helicopters allocated to his own headquarters. Because of this, I believe that the armored and mechanized divisional cavalry squadron commanders are not adequately equipped to command and control their air cavalry troop. The current equipment authorization of an armored cavalry squadron dictates that either the commander uses some of the air cavalry troop's aerial vehicles or he accepts a less than desirable capability to control air cavalry operations. Neither course of action should be acceptable.

The air cavalry troop exists today with almost the same organization and equipment that was envisioned by the Howze Board and tested by the 11th Air Assault Division. Through 7 years of combat, this aerial combat unit with 27 helicopters repeatedly proved itself to be a viable and effective organization. From one air cavalry squadron of the 1st Cavalry Division with its air cavalry troops, the air cavalry concept has permeated the Army. During the height of the Vietnam War, there were separate air cavalry squadrons as well as those organic to divisions. Today you can find an air cavalry troop organic to all divisional cavalry squadrons and armored cavalry regiments. Considering the 13-year existence of the air cavalry troop and its expanded utilization, it should be apparent that the air cavalry troop effectively employs all of its aerial vehicles (helicopters). If the armored cavalry squadron commander utilizes aerial vehicles from his air cavalry troop for command and control, he reduces the operational ability of the troop.

By looking at figure 1, it is readily apparent that the divisional armored cavalry squadron has been slighted in the area of headquarters aerial vehicles. An air cavalry squadron has four aerial vehicles, an armored cavalry regiment has 10, and the regimental cavalry squadron does not have an air cavalry troop but does have four helicopters authorized for its headquarters. Hence there appears to be a basic disparity in the organization of these cavalry units.

There are no basic differences between the missions of the three types of cavalry squadrons or the cavalry regiment. The conduct of offensive, defensive, and retrograde operations while performing missions of reconnaissance, security, and economy of force is common to all cavalry organizations. Having the same missions, it would seem that all cavalry headquarters having organic air cavalry should have the same requirements for aerial command and control vehicles.

What capabilities do the cavalry headquarters helicopters provide? The stated missions of the aviation platoon/section organic to cavalry headquarters follow:

- *Aviation Platoon—Air Cavalry Squadron.* Organized and equipped to furnish command and control helicopters for the squadron commander and staff and

UNIT	HQ HELICOPTERS	NUMBER AIR CAV TRP
AIR CAV SQDN	4	3
ARMORED CAV REGT	10	1
DIVISIONAL ARMORED CAV SQDN	0	1
ACR ARMORED CAV SQDN	4	0

Figure 1

to establish air traffic control (FM 17-37).

- *Aviation Section—Regimental Armored Cavalry Squadron.* Provides command and control, emergency supply and evacuation, and liaison (FM 17-95).
- *Aviation Platoon—HQ, Armored Cavalry Regiment.* Provides command and control, limited troop transport, emergency resupply, evacuation, and liaison.

If the foregoing helicopter support of cavalry headquarters is justified, then the divisional armored cavalry squadron should have the same requirements.

Even without considering the air cavalry command and control problem, the divisional cavalry squadron commander requires constant helicopter support for performing his operational missions.

The normal spatial diversity of cavalry squadron ground operations prohibits the commander's firsthand knowledge of the situation unless he has helicopter support. A squadron helicopter section would provide additional operational assets for ground cavalry operations. The ability to rapidly resupply critical parts and ammunition and to position observation posts by air would substantially enhance divisional cavalry effectiveness. All divisional brigade commanders have the aerial capability provided by four helicopters organic to each brigade headquarters. The divisional cavalry squadron's area of operation is normally greater than that of a brigade and therefore would derive greater operational enhancement from the employment of organic helicopters.

It is not probable that the helicopter support required by the divisional cavalry squadron would or could be provided by the armored/mechanized division aviation company. This company has only 10 helicopters and its mission is to provide aircraft for command and control or liaison as required by the division commander and staff.

It appears that the helicopter support requirements of the divisional armored cavalry squadron can only adequately be satisfied by changing TOE 17-106H "Headquarters & Headquarters Troop, Armored Cavalry Squadron," to include an aerial support platoon (figure 2). The organization should have a cross section of the number and type of helicopter organic to an armored cavalry regiment and those of an air cavalry squadron. The divisional squadron has fewer ground cavalry units than the regiment but more than the air cavalry squadron.

The command and control section with two light observation helicopters (LOH) and one utility helicopter (UH-1) would provide initial and responsive aerial vehicles which would enhance the squadron commander's ability to control both armored and air cavalry troop operations. This section

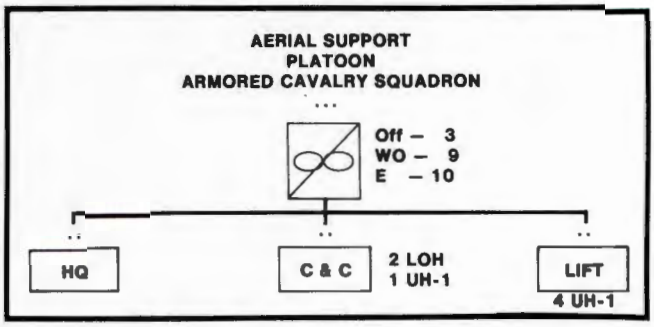


Figure 2

would also provide for squadron liaison and could be used to support armored cavalry troop commanders in special situations.

The transportation section would indeed be a versatile element of the cavalry squadron. This section equipped with four utility helicopters would be both a combat and a combat support aerial force. By reenforcing the air cavalry troop's lift section, a two-platoon infantry air mobile assault could be conducted, thus doubling the squadrons air assault shock effect. The squadron lift sections would more normally be employed in support of one or more of the armored cavalry troops. Scouts could be air lifted over obstacles or to inaccessable observation points and a composite infantry platoon could be lifted providing a significant increase in air mobility for the armored cavalry troop.

In the combat support role, the squadron lift section would be invaluable. There is almost no end to the list of supplies; ammunition; and petroleum, oil, and lubricants (POL)—a shortage of which would be critical for an armored cavalry troop. The rapid aerial delivery of missiles or conventional ammunition would promote extended cavalry operations and, therefore, improve the security which the squadron provides for its parent division.

The Armored Cavalry Squadron of the Armored and Mechanized Division requires an organic aviation section to provide adequate command and control of the air cavalry troop and to enhance the overall mobility of the squadron in the performance of its assigned reconnaissance and security missions. This addition of helicopters would ensure that air cavalry troop aerial vehicles are not diverted from their primary mission and place the organization of the divisional armored cavalry squadron in line with the other major cavalry units in the Army.

WILLIAM P. GILLETTE
Lieutenant Colonel, Armor
Ft. Carson, CO

CAN IT SURVIVE?

In December 1970, the Department of the Army made the decision to discontinue the Command Maintenance Management Inspection (CMMI) Program. The termination of this program, which had been in existence for years, astonished many supply and maintenance personnel.

Based on past history, we know that the U.S. Army does not discard a program without replacing it with another, especially one as important as the CMMI.

Commanders and maintenance personnel were critical of the CMMI concept because it did not provide the commander with the true picture of a unit's readiness posture. It was felt that the CMMI grading system was a determination of who had the best paper managers and not the best maintained equipment. The CMMI also contributed to the requisitioning of unneeded repair parts, created excesses, and wasted funds.

Commanders in Vietnam were placed in a 'do or die' situation that required them to maintain their equipment in the best possible condition and created the desire to know even more about maintaining it. The varying weather conditions in Vietnam contributed to many maintenance problems otherwise not usually encountered.

Fortunately, the U.S. Army recognized the problem and staffed the support commands with Assistance and Instruction (A&I) teams for each area of support. The assistance and instruction team concept, a forerunner of the Maintenance Assistance and Instruction Team (MAIT) Program, was effective and became very popular with the commanders in a short time.

In February 1971, the Department of the Army required all major commands to form a MAIT. CMMI personnel spaces were transferred to MAIT and became the nucleus of the MAIT Programs. Unfortunately, many commands transferred CMMI *personnel* to fill positions with MAIT. This was not a realistic approach to the new MAIT concept because unit commanders tended to envision the program as one of inspections, not instruction. The transition from inspector to instructor was difficult for many former CMMI members to overcome and their personalities did not project the new MAIT image. As a result, commanders and supply and maintenance personnel were very suspicious of the MAIT Program from the very beginning. Many felt that the CMMI had merely changed its name, and MAIT encountered difficulty in obtaining the confidence of the commander.

Soon after implementation of the MAIT Program, the Logistics Evaluation Agency (LEA) at New Cumberland, Pennsylvania, conducted one of four evaluations of the MAIT Program at several installations to determine the effectiveness and acceptance of MAIT. Unlike the three previous evaluations, the 1975 evaluation was conducted on a worldwide basis. Each of the evaluation findings determined that there was a need for the MAIT Program on the unit level and that it was a viable program to the U.S. Army. Each year it had gained in popularity.

As the initial LEA evaluations were being conducted, major commanders had already begun to misuse and abuse the MAIT Program and its concept. Personnel spaces for MAIT were diverted, only partially filled, or taken to form inspection teams. These inspection teams were formed throughout the U.S. Army without a formal DA requirement; however, a DA circular gave major commanders the authority to form inspection teams. In the event of the inspection team formations, commanders were to use in-house assets. The team names and functions varied, but the most predominate was the Maintenance Evaluation Team (MET). The most available assets were the MAITs, already formed and beginning to function after an unstable start. When the MAITs lost personnel and spaces to the METs, combined with the low priority to fill when a member of the team had a permanent change of station (PCS), the MAITs were rendered incapable of providing effective and professional instruction in commodity areas to the units visited. As a result of these actions, commanders were reluctant to call on the area MAIT for assistance.

However, there are commands that do not have METs and the units only have to contend with the Annual General Inspection (AGI) Team. In my professional opinion, the AGI lacks the capability to conduct an in-depth readiness inspection, especially in the unit motor pool. A commander that receives a satisfactory rating from the AGI in the motor pool area harbors a false sense of security if he thinks it was a thorough inspection. As a result, one of the inducements to call on the MAITs for assistance is defeated. It is strictly the unit commander's choice to expose any problem areas he may have.

AR 750-51 (Maintenance Regulation) requires units to receive MAIT visits at least once annually. This requirement causes commanders to treat MAIT as an inspection team at the beginning of the visit and they will not share or expose the real problem areas, consequently rendering little assistance to the unit. Unit commanders fail to realize until the MAIT visit is almost over that the MAIT is, in fact, there to help the units and not to inspect. Not only can a MAIT provide expert assistance on maintaining organic equipment, but it can also clarify any procedural questions of the command's policy letters, standard operating procedures (SOPs), and regulations.

Commanders must have the ability to assist and determine their command's readiness posture. They are charged with the responsibility to keep their commands combat ready. But do they have the ability without a MET to insure it? With this question in mind, one begins to understand why major commanders use MAIT personnel on MET and AGI teams, because these activities are necessary for measuring the unit's command readiness posture; but, by doing so, he has reduced the MAIT capability.

In Europe, the Deputy Chief of Staff for Logistics has staff supervision for USAREUR's MAIT Program. This surveillance provides sufficient monitoring of the program to ensure MAIT personnel are not misused and their credibility damaged and/or destroyed. Major commands should not become reluctant to enforce major subordinate commanders to stay within the parameters of the regulation.

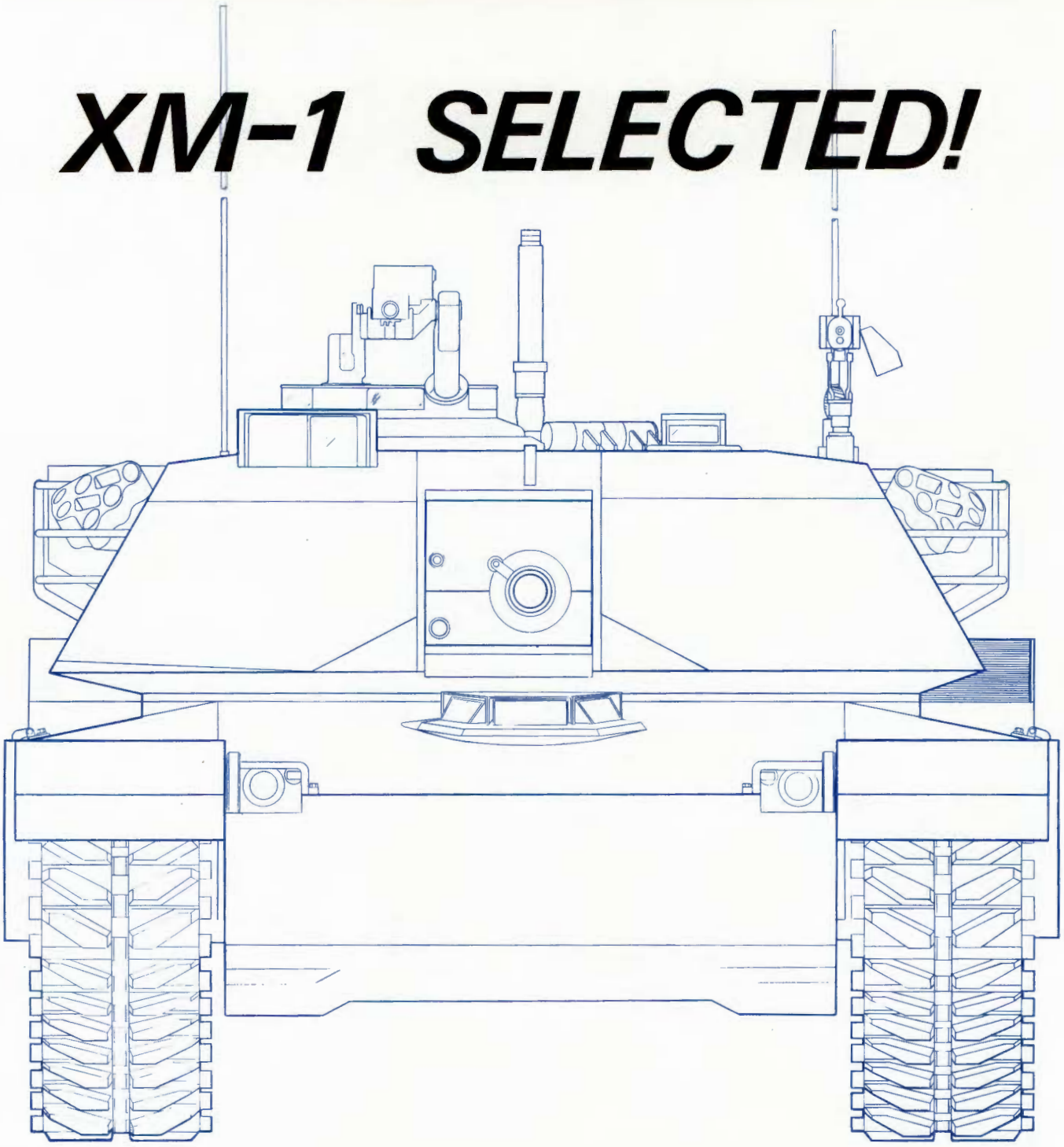
It is recognized that inspections are not only required, but are needed. However, inspections alone are not sufficient. The MAIT Program is one of a kind and provides a balance in the U.S. Army's maintenance program. Commanders would be wise to use it and encourage its use. MAIT members are the U.S. Army's 'unsung heroes' in the effort to properly and effectively maintain equipment.

Can MAIT survive? Yes, with command support! Can it survive without the threat of an inspection to induce the commander to use MAIT? Yes, but only if commanders realize that preventive maintenance programs will save time, money, and material. Must we have MAIT and MET in order for both to survive? MAIT and MET should work together in order to provide the best maintenance management program possible.

Commanders have always had and will continue to have the responsibility for their commands in all aspects. MAIT can assist him in performing his obligation for equipment readiness.

RONNIE L. ADAMS
Chief Warrant Officer 3
Student Warrant Officer Career College

XM-1 SELECTED!



On 12 November 1976, the U.S. Army's drive to obtain a new main battle tank moved one step closer to achieving its objective. On that date the Secretary of the Army, R. Hoffmann, announced that the Chrysler Corporation *XM-1* prototype vehicle concept had been selected over the General Motors Corporation contender as the winner of the competitive validation phase of the *XM-1* Program. Chrysler now becomes the sole U.S. contractor to enter full-scale engineering development. This decision, which was originally scheduled for July 1976, was postponed in order that the potential benefits of standardization between the U.S. *XM-1* and the German *Leopard 2* tanks could be studied. A July 1976 addendum to a December 1974 Memorandum of Understanding between the U.S. and the Federal Republic of Germany (F.G.R.), established the objective of achieving maximum commonality of major components between the two tanks. The specific components mentioned were the turbine powerpack, track and associated suspension system, fuel, thermal imaging modules, metric fasteners at crew serviced interfaces, and gunner's auxiliary telescope. In addition, the U.S. agreed to develop an *XM-1* turret capable of accepting a 105-mm or 120-mm gun.

When introduced on the battlefield, this vehicle will be the most effective and deadliest land combat vehicle in the world. Designed and developed by Chrysler to the requirements and performance bands provided by the Army, the *XM-1* represents a quantum advance in combat vehicle design. The vehicle encompasses improved ballistic protection, a reduced silhouette, dramatically increased mobility, revolutionary suspension, and a precision fire control system.

Powering the 58-ton vehicle is the 1,500 horsepower

AGT-1500-C regenerative AVCO-Lycoming turbine engine. This engine comprises 62 percent fewer critical parts, has half as many accessories, insignificant vibration, and no visible smoke in comparison to a diesel engine. It is estimated that it will be capable of operating more than 12,000 miles without overhaul and will never need an oil change. Able to use a wide range of fuels, including gasoline, diesel, and jet fuel, this turbine has the capability for power growth to 2,000 horsepower. The turbine is of modular design and 65 percent of normal maintenance can be performed without removing the powerpack. If removal is required, four men can completely remove and reinstall the powerpack in just 60 minutes using a standard 5-ton wrecker.

Coupled to the turbine engine is an Allison X-1100-3 automatic transmission with four forward and two reverse ranges. The transmission also incorporates hydraulic variable steering, integral brakes, and neutral steering. With this power package, the *XM-1* easily attains a top speed of 45 m.p.h., accelerates from 0 to 20 m.p.h. in 6.2 seconds and climbs 60-percent slopes. The prototype can also climb a 42-inch vertical obstacle and cross 9-foot ditches.

The unique advanced torsion bar suspension system enables the *XM-1* to traverse cross-country terrain at speeds in excess of 30 m.p.h., providing the crew with relative comfort and the weapons system with the steady platform so necessary for accurate firing on the move. This suspension system consists of 7 roadwheel stations with high-hardness steel torsion bars at all stations and modular, rotary shock absorbers at stations 1, 2 and 7. Aluminum idler and 25-inch diameter roadwheels, capable of 15-inch travel, operate on an improved steel track with integral rubber pads similar to the *T-97* track used on the *M-60A1* tank.

The superb ballistic protection afforded the traditional 4-man crew is the result of advanced armor and the compartmentalization of on-board fuel and ammunition outside of the crew fighting compartment. These features assure not only a high probability of no penetration given a hit by enemy gunners, but also enhance crew survivability through the reduction of explosions should penetration occur.

The primary armament of the initial *XM-1* production vehicle will be the rifled 105-mm *M-68* gun capable of firing all types of ammunition currently in the U.S. inventory. In addition, the gun will also accept the newly approved *M-735* APFSDS round and the experimental *XM-774* APFSDS round with either a tungsten or an improved depleted uranium penetrator. This combination of gun and ammunition types is capable of defeating all known and anticipated, Threat vehicles through the late 1980's and 1990's. However, should the Threat dictate, the *XM-1* turret has been designed to mount either a smoothbore or rifled 120-mm gun with minimal modifications, thus assuring the maximum effectiveness of the *XM-1* tank well into the next century. Complementing the main armament will be a 7.62-mm machinegun as the coaxial weapon, a 40-mm high velocity grenade launcher or a .50 caliber machinegun at the commander's station, and a 7.62-mm machinegun for the loader. The tank will also possess two distinct smoke systems: a grenade-launched system similar to that mounted on the *Sheridan* vehicle and an integral smoke generator.

The main gun, either 105-mm or 120-mm, is slaved to a stabilized sight fire control system incorporating both day and passive thermal night sight optics, an integrated neodynium laser range finder and a digitial self-checking computer. With this system, there is a high probability of putting steel on the target during any moving or stationary engagement, regardless of the range.

Scale Model

Scale Model

From the beginning, Chrysler has stressed the importance, not only of integrating functional and human-factors characteristics into the system, but of subjecting the evolving design to continual user-oriented evaluation. To capitalize on the superior *XM-1* performance, primary emphasis has been placed on the crew's ability to "fight the tank" in a harsh mobile environment for extended periods of combat. Crew-oriented features include preset-and-forget platform and seating at the commander's station with protected open-hatch capability, optimized sight/unity vision arrangements, and ease of movement to permit instant changes in the commander's position for maximum visibility with minimum vulnerability. The gunner's station includes a wraparound brow pad and a swing out chestrest for safe, effective mobile gunning over severe terrain. The loader's station combines a seated loading function with swing-out guards, a seat belt and a unique spent case ejection guard to ensure that loading is unhindered by severe tank motion. The driver's station is compact, combining a comfortable tipped-back seated position with close-proximity, hatch-mounted periscopes for the driver to obtain full performance when driving closed-hatch.

Designed with reliability, availability, maintainability and durability (RAM-D) characteristics far beyond those of current tanks, the *XM-1* is able to exploit its greater performance capability with matching combat availability. Designed-in maintainability characteristics include the grouping of mechanical, electrical, and hydraulic disconnect points to facilitate powerpack removal; built-in-test equipment (BITE) capability of the ballistic computer which permits rapid fault diagnosis; isolation and checkout of replaced components within the fire control system; ease of suspension system maintenance afforded by removal of torsion bars from either side of the tank and vertically hinged side skirts; replacement of all gun mount hardware, including springs, wipers, and seals without removing the mount from the turret; replacement of the starter, hydraulic pump and alternator without removal of the powerpack; centralized location of electrical boxes with easily accessible test connectors to aid in fault isolation which can be conducted without disconnecting the connectors from associated electrical components; modularized fire control components with respect to laser and thermal night sight components which may be replaced without removal of the gunner's sight and without the need for time consuming realignment; a transmission brake which requires no adjustment; and a 59-percent reduction in the number of special tools at the organizational and direct support level of maintenance as compared to the existing U.S. main battle tank, the *M-60A1*.

Having selected the Chrysler prototype concept, the Army now begins the 36-month full-scale engineering development phase. During this phase, 11 vehicles will be manufactured in order to confirm and further demonstrate the awesome performance aspects of the vehicle as well as to finalize design for low-rate initial production.

At the conclusion of this phase, in early 1980, the production phase will ensue with an anticipated run of at least 3,312 vehicles. Including government furnished equipment, program acquisition cost will be in the neighborhood of 4.9 billion escalated dollars. Initial low-rate production will begin at the Lima Army Modification Center in Lima, Ohio with 10 vehicles produced each month. After intensive evaluations and successful quality assurance checks, the rate of production will be increased to a full production run of 30 tanks per month in early 1981. In the future, complementary production is planned at the Detroit Tank Arsenal upon the phaseout of *M-60*-series production.

Pages from the Past

A PASSING FAD

There is no antagonism between horses and bicycles so long as they do not actually interfere with one another on the road, but the increasing number of bicyclists is apt to make them pugnacious and their demands for right of way excessive, and this horsemen will resent, for roads are kept up at public expense, primarily for public convenience as to transportation. However, horsemen may content themselves in peace, for if history does not belie its teachings the fashion will go out, and there will be thousands of second-hand bicycles offered for sale within a few years.

The Cavalry Journal
September 1895

THE CHAIN OF COMMAND

Probably the most remarkable fact about exercising command is that while most officers know it in theory, a good many fail to put the theory into practice properly. One reason for this is that peace-time organizations are so small that field officers have not much opportunity to actually command units suitable to their rank. Having spent many years of their service as troop commanders, they now use their spare time to interfere with the prerogatives of their own troop commanders. The latter, having small organizations, take over the duties of their lieutenants, sergeants and corporals. The young lieutenant, noting the manner in which his captain exercises command, continues the system when he is promoted, and so the vicious circle goes on.

The Cavalry Journal
January 1928

KEEPING THE BUSHEL OVER THE LIGHT

Our army of the future is the great body of citizenry—organized reserves as far as they will go, and then plain Mr. Jones and Mr. Johnson—millions of him. Plain Mr. Citizen (to say nothing of the Reserve Officer and the National Guardsman) is the man we need to keep interested and informed about our military activities.

The War Department makes fine speeches that have for their purpose to educate the people of the country to our need for national defense and to appreciate the significance and general scope of our National plans and our Army of the United States. Probably most of them appeal to the average Mr. Citizen as so much governmental propaganda, to be let out of the other ear as fast as possible.

The Cavalry Journal
January 1924

PAO

Is it out of place to suggest that every organization should follow the example of the 6th Cavalry (whose action in this respect has come particularly to our attention) and designate a live, earnest, enthusiastic "publicity agent?" And that this officer be impressed with the need to find out what the newspapers will print and want to print, and then furnish them with good, live, cavalry stuff? The newspaper man's complaint, everywhere, is: We do not "tip him off." We don't send him the story. This should be easy to remedy. Organize your publicity, O you little troops, and you squadrons and regiments; and oh, you Division, tell your story and chant your numbers!

The Cavalry Journal
January 1924

Test Activities

The U.S. Army Armor and Engineer Board (USAARENBD) is currently conducting a series of Operational Tests (OT's) and Force Development Tests and Experimentations (FDTE) on a variety of materiel and equipment: the command and control training vehicle *(CCTV)*, and the tank-mounted motorcycle, to name two.

Command and Control Training Vehicle

The *CCTV* project is a comparative evaluation of three candidate command and control training vehicles to determine which, if any, meet the U.S. Army Training Device Requirements for a simulated tracked combat vehicle to be used for leader training where maneuver damage, space limitations, and fuel conservation preclude training with actual combat vehicles. Two commercial models, the Hustler vehicle and Recreative Industries vehicle, and one military model, a modified *M-151A* 1/4-ton truck, are being used for comparison with standard tracked vehicles. Each vehicle is to accumulate 2,000 miles to develop data for a reliability and maintainability (RAM), safety, and human factors engineering evaluation. To date, B Company, 4th Battalion, 37th Armor has utilized the vehicles in a 30 day exercise to obtain training and maintainability data.

Hustler

Modified M-151A

Recreative Industries

Tank-mounted Motorcycle

The tank-mounted motorcycle test will explore uses for motorcycles by tank platoon leaders. Currently, the concept is for a bustle rack-mounted bike of undetermined size to be used in a series of field exercises by leaders of tactical units. The selected platoon leaders have been trained in motorcycle operation and are currently participating in a field evaluation of the potential uses of the motorcycle as auxiliary transportation and its impact on training, tactics, and maintenance in tank elements so equipped.

Multibarrel Smoke Discharger and the Special Study of the Vehicle Commander's Weapon Station

Recent tests of interest were the *Mark 9* monobloc multibarrel smoke discharger and the special study of the vehicle commander's weapon station for 40-mm high velocity grenade launcher (40-mm HVGL). The *Mark 9* monobloc multibarrel smoke discharger, the current in-service launcher for armored vehicles in the United Kingdom, is used as a defense against antitank weapons and guided missiles. Smoke has emerged as a viable way to provide armored vehicles with rapid self-screening capability. Currently, the *M-60A1* has no screening capability and the system tested meets many of the desired requirements.

The special study of the vehicle commander's weapon station for 40-mm high velocity grenade launcher was made to evaluate the effectiveness of the launcher in terms of time to adjust fire onto a target and accuracy when used in the role of the TC's weapon. The 40-mm HVGL was being considered for use at the commander's station for the *XM-1* tanks and the armored cavalry scout vehicle.

Cable Reinforcement for the Medium Girder Bridge

The Cable Reinforcement Set (CRS) for the Medium Girder Bridge (*MGB*) was developed by the Mobility Equipment Research and Development Command (MERADCOM) to give the *MGB* a class 60 rating for up to 160 feet in length. Without the CRS, the *MGB* has a class 60 rating for only 100 feet. The CRS consists primarily of reinforcing cables, cable connection beams, vertical post assemblies and installation hardware. Hydraulic rams are used to apply tension to the cables. The test will be conducted at Fort Bragg, NC, during the period 1 February 1977 to 29 April 1977. The test unit will be the 264th Engineer Company (Panel Bridge), 20th Engineer Brigade. The primary purpose of the test is to determine if the CRS can be installed on the bridge without adding more than 3 hours to the normal construction time. The *MGB* with the CRS will be erected and recovered a total of 25 times in a simulated operational environment. While in place, a total of 792 class 60 and 2,376 other crossings will be conducted.

THE FAMILY OF SCATTERABLE MINES

The family of scatterable mines (FASCAM) consists of a group of surface emplaced antipersonnel (AP) and antitank/antivehicle (AT/AV) mines currently in various stages of development. These mines are designed to be rapidly delivered by artillery, aircraft, rockets, and ground vehicles. They are characterized by their compactness, light weight, antidisturbance mechanism, and self-destruct capabilities.

Mine Dispersing Subsystem, Aircraft, XM-56

The *M-56* helicopter delivered system is the first of the family to be fielded and is a pressure activated AT/AV mine. The minefield effectiveness portion of the development test (DT) II (Service Phase) of the Mine Dispersing Subsystem, Aircraft, *XM-56,* was conducted by USAARENBD during the period 1 February 1973-7 August 1973 at Fort Knox, KY.

The test objectives were to assess the *XM-56* system's effectiveness with respect to the relationship between probability of a tank encountering a mine, and the time of traversing the minefield for fields of varying densities; and the gain (or loss) in effectiveness of covering fire due to the use of the *XM-56* system emplaced minefield. These tests were conducted in two phases. During phase I, encounter rates and delay times were determined by requiring *M-60A1* tanks, *M-114A1* command and reconnaissance carriers, and an *M-25A2* 2 1/2-ton truck to cross minefields containing dummy mines at different densities and emplaced in various configurations. Simulated battlefield tests were conducted during phase II using *M-60A1* tanks fitted with *SIMFIRE,* a system which uses a laser beam to simulate the firing of the main gun.

Area Denial Artillery Munition

The area denial artillery munition (ADAM) is a trip wire activated AP mine. The USAARENBD participated in the development test/operational test II (DT/OT II) in November 1974 and is currently assisting the Field Artillery Board (USAFABD) in planning for the OT III to be conducted at Fort Sill, OK, in April 1977.

The DT II (Integrated Engineering and Service Phase) of the 155-mm, *M-692-E1,* and *M-731* HE projectiles and *M-72* and *M-67* mines was conducted at Yuma Proving Ground, Jefferson Proving Ground, Fort Knox, and the Panama Canal Zone. The USAARENBD conducted minefield effectiveness and vulnerability tests during the spring of 1974 at the above mentioned test sites.

The OT III will consist of an artillery battery firing groups of test items at various combinations of charge, range, and high and low angle trajectories selected to provide a representative cross section of firing conditions expected to be encountered in an operational environment.

Remote Antiarmor Munition

The remote antiarmor munition (RAAM) is a 155-mm artillery delivered *XM-70* antitank mine system that uses a magnetic impulse AT/AV mine. The USAARENBD is currently participating in a joint DT/OT II which will consist of two phases; an Engineer phase conducted by the USAARENBD, and an Artillery phase conducted by the USAFABD. The Artillery phase will consist of both observation and independent reporting of appropriate portions of the DT II and firing by the USAFABD, using average soldiers, from which both the OT and DT agencies will derive data. The Engineer Phase will consist of observation and independent reporting of applicable portions of the DT II, and observation of Field Experiment 77-GC-026, "Tactical Effectiveness of Minefields in the Antiarmor Weapons System (TEMAWS)," to be conducted by Combat Development Experimentation Command (CDEC). Other tests will be conducted by the USAARENBD to determine the ease with which *XM-70/73* mines can be visually detected, vulnerability to secondary tank armament, and to supplement vulnerability to mine plow, mine roller and magnetic countermeasure DT II testing.

Ground Emplaced Mine Scattering System

The ground emplaced mine scattering system (GEMSS) is a trailer mounted (modified *M-794* flatbed with modified suspension) device operable in tow behind a standard wheeled or tracked vehicle, over both roads and cross country terrain. AP and AT mines of the same dimension are carried in the magazine and can be dispensed concurrently or separately during a mission.

The purpose of the test is to determine the logistical support required to field the GEMSS, command and control associated with employment of the system, and reporting and recording the minefield locations. In addition, the organizational concepts, reliability, availability, maintainability, and validation of training requirements will be determined.

The OT III is scheduled to begin in February 1978 at Fort Knox, KY, using field troops from the 19th Engineer Battalion, 194th Armor Brigade.

Ground Emplaced Mine Scattering System

Tanks Against the Beachhead

by Brigadier General S.R. Hinds USA-Retired

Innovations in tactics spring from many sources. This article by Brigadier General S. R. Hinds, USA (Retired), describes the development of a doctrine for counterattacking a beachhead with tanks which was developed during maneuvers in Hawaii in the early thirties. — ED.

In 1930 all equipment in the hands of troops was still of World War I vintage. Six-ton *Renault* tanks and American-built six-ton, chain-driven, solid-tire *M-1916 Mack* trucks as carriers were the main items. Two 37-mm cannons and three air-cooled .30-caliber machineguns, both turret mounted, gave the 11th Tank Company three platoons of five tanks each a somewhat formidable battlefield appearance of fire-power by the standards of that day.

Mobility was another story. The old *Renaults* with a 42-horsepower engine could clank along across country just about as fast as a man could go over the same terrain. The engine compartment was so hot, in spite of a large Sirocco cooling fan, that the coating of the magneto armature winding would melt and, of course, short circuit, and go dead. The ingenious mechanics of the 11th Cavalry devised a simple system for a quick magneto change that was

adopted by Ordnance for Army-wide use, whereby a rebuilt magneto installed by the crew would restore mobility in less than 3 minutes. Two extra magnetos were among the standard spares to be carried in the tank. There were many other ingenious devices and methods employed, mostly "unauthorized," to make-do with the obsolescent, fast approaching antique equipment. The *Mack* carriers provided pretty reliable, if slow, road mobility.

The Schofield divisional company was up to strength in men, a far cry from the woefully under-manned outfits at Meade and other mainland stations. This enabled the company to do quite a lot of realistic training both within the unit and with the infantry in field problems.

With four infantry regiments, each with three battalions, the tank platoons did, and re-did, "The Battalion in Attack"—the same problem over the same ground, until the tank crews got to know every ditch, trench, slope, and fold in the ground on the Schofield range area. There was no other place on the island where live artillery ammunition, machineguns, and tank guns could be fired with safety to support the infantry attack.

A platoon of five tanks to an infantry battalion was "normal." I do not recall a single exercise in which the entire "mass" of the company's 15 tanks was used to exploit a successful breakthrough of the enemy trenches. There really wasn't any place to go farther so it was just as well, although the platoon leaders did get a little tired

of capturing the same objective and often wished that the problem could have extended on to the beach at Haleiwa and terminate there, to be followed by a swim in the Pacific.

Strangely enough, in spite of the vigorous infantry battalion attacks over the Schofield ranges supported by aggressive tank action of five tanks, the plans for the defense of the Island (Oahu) called for the tanks to be used in a passive defensive role. The infantry defenders of the beach would include a prepared enlarged foxhole into which the tank was to be emplaced to await the hostile landing—a sort of armored pill-box, each with one 37-mm cannon or a light machinegun. As I recall, the second platoon, commanded by Lieutenant Harry M. Gizzard, would support the Waianae leeward beaches; the third, commanded by Lieutenant Ralph W. Zwicker, the north shore; and the first, commanded by Lieutenant S.R. Hinds, the Honolulu Sector—a very formidable disposition!

Following the first such "Annual Maneuver" and soon after the company had recovered from the strenuous drive to the beaches in the *Mack* carriers, the 11th Tank Company officers rose up in arms at morning "coffee call" at this way of doing things. Captain Julian Dayton and Lieutenants Shattuck, Gizzard, Zwicker, and Hinds were the "dissidents" of the day. Holding the entire company in reserve and employing it in counterattack against the hostile infantry landing was the obvious "Better Idea." We were all in accord, but just how to do it was the problem.

Fortunately, Dayton was pretty much of a salesman and was able to get the ear of General Briant Wells, the newly arrived division commander, through his old friend and staff member, Major Charles Thomas. Thomas encouraged us to develop this "Better Idea" and come up with some reconnaissances and definite recommendations as to what, where, and how to do it.

When Dayton got this "green light," he, Shattuck, and Gizzard began reconnoiterring the main and secondary road net for routes, distances, assembly areas and the like, while Zwicker and I took every path, trail, and by-way to and from possible landing beaches.

Zwicker and I used a privately owned vehicle (POV) for our wheeled scouting—a WW I "surplus" Harley-Davidson motorcycle that I had bought for $5 while on detail in Holabird. It was a rugged and sturdy cycle and the price was right. Zwicker carried a pole as long as the width of a tank, plus a few inches for a margin of safety, to measure the trail while I guided the old Harley up and down and around the Waianae mountain paths. It would go almost any place a tank could make it, but at times I wasn't sure whether Zwicker was going to lose his measuring stick or the motorcycle was going to lose Zwicker.

After the reconnaissances were done and the tentative plans charted out on maps, the 11th Tank Company entered upon several months of the most delightful "training" any soldier could imagine.

Taking the *Macks* with only the tank crews, a problem was "walked through" with orders, messages, signals and all to "counterattack" every beach on the Island in its turn. Traffic safety through the congestion of Honolulu and the narrow and somewhat dangerous country roads indicated that the 7¼-ton tanks might well be "constructively" transported on the 6-ton *Macks,* whose brakes were hardly effective on level ground with the full load. Fortunately, there were no accidents, much to the relief of Captain Mike O'Daniel, the military police commander.

After a beachhead "counterattack," which usually succeeded about noon, a hot marmite-can lunch was taken care of and the next few hours were devoted to a detailed study of the sand, surf, and weather conditions of Hawaii before returning to Schofield.

In some instances, it was possible to actually use the tanks on the ground. Intensive cultivation of the last square foot of sugar land made the use of private property almost prohibitive. Even walking through the cane fields on the red dirt field roads had to be done with the very greatest of care and supervision to avoid the danger of fire by a careless cigarette.

Through the cooperation of the manager of the Waipahu Plantation, an important lesson was learned. The *Renaults* could successfully penetrate the thickest and highest canefields.

Just before the harvesting of one of the Waipahu fields, not far from Pearl Habor, the plantation allowed the tank company to experiment with a platoon problem through the cane. Visibility was zero, either ahead or to the right and left, so keeping on the proper direction was a problem to be solved. The issue compasses were worthless inside the tank due to the great amount of metal surrounding the magnetic needle.

The problem was solved by determining the azimuth from the map and having the third crewman, the *Mack* driver, walk several yards behind the tank with a compass and give hand signals for "Gee" or "Haw" to indicate to the tank commander in the turret to

kick the driver's right or left shoulder for steering in the proper direction. It was remarkably effective, at least all five tanks came out of the canefield at approximately the points at which they were expected.

There was no infantry following up in this trial canefield problem. However, it was judged that it would have been a comparatively easy matter for the foot soldiers to follow the tanks to round up the enemy survivors and bury their dead after the tanks had finished their devastation on the beaches.

There was another problem in which the tanks were actually used that might be of interest; at least it was interesting to the 11th Tank Company while contributing to the increase of graying hair to most of its members.

The problem called for the entire company to attack to envelop the enemy landing in force which had advanced a few miles inland from Haleiwa toward Schofield. The route was to be down and along the sides of Waikakaloa Gulch to Thompson's Corner. Zwicker and I had reconnoitered it by motorcycle and Zwick's stick; it was wide enough throughout the length of about 5 miles.

When the first tank got to the highest and narrowest point on the trail, about 100 feet above the bottom of the canyon, the earth and tremendous boulder started a fissure on the uphill side. I was in front of the tank, walking backwards to be sure the driver was going straight for he couldn't see well to the sides, probably fortunately. I thought, "Well, this is it! But may God have mercy on us!"

Popp, the driver, got out, as did Corporal Six, the tank commander. We waited with baited breath for the earth to give way and the tank to roll over on its sides a dozen times to the bottom of the gulch. But it didn't. After holding up for half an hour, we decided, with Captain Dayton's approval, to try inching Popp's tank forward past the fissure. It looked even more dangerous to try to back-up this tank and then back the entire company of 15 tanks all the way to Schofield. The first tank made it across the fissure safely as did the other 14 by the same inching forward procedure. A careful examination after each tank had crossed showed no further dislodgement of the boulder even after the last tank had cleared. Each driver got a commendation for his courage and skill, and the officers had a double ration of okolehao that night before dinner.

This incident reminded me of the old stage play, "Death Takes a Holiday," as did many other suspensions of catastrophy during World War II. Perhaps such harrowing experiences make up an intangible phase of the development of Armor.

The final and crowning exercise of this series of 11th Tank Company problems took place over the Kolekole Pass several months before the Joint Army and Navy Maneuvers of 1931, one of the early super-maneuvers. Kolekole was the gateway over the rugged Waianae mountain range about midway between the best landing beach on Oahu and Schofield Barracks.

The first part of this problem was the same as the others, counterattacking a beach landing at Waianae Bay, except this time only one platoon worked its way down the precipitous and narrow trail during darkness for a dawn attack against the hostile beachhead while the other two platoons went around the south end of the mountain by Barbers Point to envelop the right of the enemy position at Nanakuli. All went well, even considering that it was comparatively easy—due to private property restrictions and that only one platoon of tanks could actually be used in the attack through the one available pasture patch of Kiawe.

After a night's bivouac on the beach, including further study of the surf, sand, and gorgeous Hawaiian weather, the 11th Tank Company then became the enemy who had enlarged his beachhead and landed 15 tanks at Waianae. The problem was to assault Schofield Barracks via Kolekole Pass with (imaginary) supporting infantry and artillery.

By this time, the activities of the tank company had gotten considerable notoriety and an occasional stranger from the staff of a higher headquarters would appear in the vicinity looking on, often just about the time the problem was over and the surf and sand phase was to begin.

On this occasion, Dayton was quite nervous all evening and early morning as if it were a big deal. Finally, with the issuance of his orders to "go," he told the platoon leaders that General Wells himself might be at the top of Kolekole Pass to see the problem and he hoped to God that all the tanks made it up the mountain.

Stopping at a spring about halfway up and just below the steepest final slope and climb, a short halt was made to refill the boiling radiators and to replace a few of the hotter magnetos with cool ones. Precisely at 10:30, the scheduled and hoped for time of arrival, Zwicker's lead tank reached the top of Kolekole where the General and quite a few of the brass were awaiting the tank assault on Leilehua Plain and Schofield Barracks.

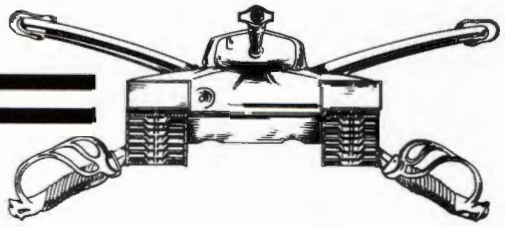
The 11th Tank Company got a nice letter of commendation from the Division commander, Dayton got his prayed-for orders for the Command and General Staff School at Leavenworth and the Tank Plan for the Defense of Oahu got changed.

This was the development of Armor in Hawaii in the early '30's.

The 2½ mile-an-hour, OD-shirt days in the Army were gone forever.

BG (Retired) S.R. HINDS graduated from the United States Military Academy in 1920. A graduate of the Infantry and Tank Schools, and the Command and General Staff College, he served with the 53d, 3d, 19th, 35th, 7th and 11th Infantry Regiments, as well as the 13th Cav and 1st Tank Regiment. At the time this article was written, General Hinds was serving with the 11th Tank Company, Hawn Division. He also served with the 2d Armored Division, 41st Infantry Regiment and Combat Command B (CCB). During General Hinds' loyal service, he was the Triple Distinguished Marksman and Gold Medalist in the 1924 VIII Olympics in Paris. General Hinds retired from active service with a physical disability in 1947. He then served at the United Nations (Washington, New York and Geneva, Switzerland), the Inspector General Office and the Defense Supply Agency until a second retirement in 1966. General Hinds, a faithful subscriber to ARMOR since 1921, resides in Falls Church, Virginia.

OPMD - EPMD ARMOR



NEW FACES IN ARMOR OFFICER ASSIGNMENTS

The rotational cycle has once again created various changes in the personnel at MILPERCEN who make the assignments for Armor officers. To keep you better informed the following directory is submitted:

Colonels Division	LTC John E. Toye	221-7873
Lieutenant Colonels Division	LTC Patrick J. Quinlan	221-9549
Majors Division	MAJ(P) Timothy J. Grogan	221-0686
ARMOR-COMPANY GRADE		
Branch Chief	LTC Warren J. Walton	221-9696
Captains	MAJ Thomas M. Montgomery	221-9658
Lieutenants	CPT Peter J. Schoomaker	221-9696
Aviators	MAJ Gordon W. Tingle	221-9444

PROFESSIONAL DEVELOPMENT

Professional Development is an expression being used more frequently as the Enlisted Personnel Management System (EPMS) continues to be implemented. Its ultimate aim is to help every service member reach his highest level of potential through training, formal schooling, promotion, and varied and progressively more challenging assignments. Commanders and selection boards at various levels make decisions that affect soldiers in these four areas. Nevertheless, all soldiers have the opportunity to influence their own career by a continuing program of self-development.

The duties, knowledge required, position titles and grade levels in MOS 11D and 11E were revised prior to conversion of Career Management Field (CMF) 11 under EPMS. This revised information is contained in pages 3-11-11 through 3-11-15 of AR 611-201, and every enlisted soldier in an Armor MOS should look into these changes. They outline what you should know in the future to be eligible for promotion. Under EPMS, an individual will be required to achieve a higher passing score on the skill qualification test (SQT) before being eligible for promotion. In other words, you will have to be qualified for the next higher grade before promotion. This means you won't be promoted based upon your past service and then be placed in a new job to learn it.

This is where individual self-development begins. Read the recommended pages in AR 611-201 to find out what you are required to know at this stage in your career. Then set your own goals and determine how high you want to go. The Army does not have the capability to send everyone to formal classroom training. However, everyone has the opportunity to develop through self-study. Correspondence courses from the U.S. Army Armor School are listed in DA Pamphlet 351-20. These courses provide excellent opportunities to gain the knowledge you need, and correspondence course completion is equivalent to formal training. This is your opportunity to become actively involved in your own professional development.

OVERSEAS VS CONUS ASSIGNMENTS

Recent inquiries to the Armor Branch at MILPERCEN have shown that there is a misconception by service members in the field on the subject of overseas assignments versus CONUS assignments.

Time in Conus

The time each service member in the armor career management field (MOS 11D & 11E) spends at a CONUS assignment differs with each grade and MOS. The main factors that govern turn-around time between oversea assignments are the stabilization of certain assignments and the overall strength of each grade in each MOS. This chart shows the *average* turn-around time for each grade.

E5	11D & 11E	18 to 24 months
E6	11D & 11E	12 to 18 months
E7	11D & 11E	32 to 37 months
E8	11E	24 months

Remember these are only *average* turn-around times with no guarantee that each Armor soldier will spend that exact amount of time in a CONUS assignment before returning to an oversea assignment. As previously stated, each grade structure differs in strength based on promotions, reductions and separations.

Stabilization is the other factor governing time spent in a CONUS assignment. *For example:* If the Army-wide strength at grade E6 is at 70 percent and 35 percent of all E6's are on a CONUS stabilized assignment, then the remaining 35 percent *not* stabilized will return to an oversea assignment much sooner than if the grade E6 had originally been at 100 percent strength. In this case, their turn-around time would be less than the average for their grade. Most stabilized assignments are for 24 months, but in some cases can be extended based upon the Army's needs and priorities. The following chart indicates the different stabilized assignments, tour length, and authorized pay grades:

ASSIGNMENTS	LENGTH OF STABILIZATION	PAY GRADE
Drill Sergeant	24 months w/option for 1 yr voluntary extension	E5 - 7
Training Center Cadre (50% of assigned)	24 months	E5 - 8
Master Gunners (ASI C5, C6, C7)	24 months	E6 - 8
1st Sergeant	24 months	E8
ROTC	24 months	E6 - 8
Readiness Region (Civilian Component)	24 months	E7 - 8
MILPERCEN	36 months	E7 - 8

NOTES

MODIFIED COBRAS DELIVERED TO ARMY

New modified AH-1S 'snake' helicopters, which pack the *TOW* missile system, and a heftier engine, transmission and tail motor are now being delivered to the Army. Conversion is to be completed by mid-1977.

Since June 1975, 92 *Cobras* have been modified to a *TOW* configuration—*AH-1Qs*—under an Improved *Cobra* Armament Program (ICAP) contract with Bell Helicopters. The most recent modification plans call for about 200 additional G-model *Cobras* to be converted to S-models, and another 305 newly built S-models, which will give the Army an attack helicopter fleet of 795 *TOW*-equipped *Cobras*. Only a handful of the Vietnam-proven *AH-1Gs* will be left for possible escort missions and training.

DA aviation officials label the *Cobra TOW*-equipped fleet an "interim measure" until the advanced attack helicopter (AAH), now under development, begins to enter Army inventories sometime in the early 1980s.

A large number of the *TOW*-equipped *Cobras* will be sent to Europe; the first arrived there last November for use in crew training.

According to current DA plans, by the end of the decade, there will be 16 attack helicopter companies or troops in Europe, each with 21 *TOW*-equipped *Cobras*. Each of the four divisions are to get two companies and the two armored cavalry regiments each will receive a troop. The two Corps will receive an attack helicopter battalion made up of three attack helicopter companies.

With the increase of *TOW Cobras* in Europe, the number of scout helicopters—*OH-58s*—is also increasing. Each of the attack companies will have 12 *Kiowas*.

The requirement for aviators—commissioned and warrant—is also increasing with this increase of aviation assets in Europe. There is an immediate need for about 300-400 aviators and about twice this number are needed before the end of the decade. Enlisted aviation personnel requirements could increase by more than 1,600.

The *TOW Cobra* fleet, with its 90 percent accuracy hit rate, will help offset numerical tank superiority that Warsaw Pact forces have over NATO forces in Western Europe.

OBSERVERS ADDED TO SCOUT CHOPPERS

The first aerial observer course in the Army was recently designed and taught by the 4th Squadron, 9th Cav (the Real Cav) of Fort Hood, Texas.

Although there were brigade TOE positions for aerial observers, for sometime there was no school in existence where troopers could be taught the skill of aerial observation.

Up until this time, crewchiefs were doing the job of aerial observer, picking up the training from scout pilots. Now, the newly trained aerial observers will take their place next to the pilot in the aircraft, thus terminating the flight status of the crewchief.

The instructors of the new course are scout pilots from several scout platoons of the 6th Cavalry Brigade. The students consist mainly of ground scouts (11Ds), E-2 thru E-5, assigned to the Reconnaissance platoon and the Aeroscout platoon. At the completion of the course, having learned the additional skill of aerial observer, the graduates will be classified as 11D2F, wear crewmember wings, and will be on flight status.

The responsibility of the aerial observer is to assist the pilot in navigation and in detecting the enemy. The overall objective is to have highly skilled reconnaissance personnel in the aircraft so the squadron can better perform its mission as the ears and eyes of the brigade.

Students are trained in air navigation, map reading, visual search techniques, identification of enemy tanks and vehicles, aerial radiological services, fire support assets and requests, and reconnaissance and security. Two hours of night flight time are also included. Although the aerial observers are not allowed to operate the aircraft, they are familiarized with the controls of the aircraft, should the pilot ever become incapacitated.

IMPROVED CAMOUFLAGE FOR THE M-60A1

Improved camouflage for the *M-60A1* tank is being developed and tested to compensate for the increased capabilities of detection equipment and the improved accuracy of weapons.

To prevent heat seeking missiles from 'locking on' to the hot exhaust fume from the tank's engine, an air foil was developed. The foil forces the exhaust up and out, thus causing the heat to dissipate over a wider area, lowering the temperature and effectiveness of the heat seeking missiles .

A special camouflaged net is hung on a permanently mounted 6-foot fiberglass rod which folds out above the tracks in a matter of seconds. A camouflaged disruptor is used to disguise the gun barrel. This disruptor, previously developed by MERADCOM, is a portion of a net mounted on a collapsible aluminum frame. Twenty foliage brackets have been added to secure and supplement other techniques.

Prototype smoke launchers located on the turret are being evaluated at Edgewood Arsenal, Maryland.

A special vision port filter, developed by the Tank Automotive Command (TACOM), will allow the crew to look out and use lights inside the tank without being spotted by the enemy during night operations.

T-72

The photographs of the Soviet T-72 tank appearing on this page were provided to *ARMOR* by Headquarters FORSCOM.

Military History:

THE ARMY'S PIVOTAL STUDY

There should be little real doubt of the efficacy of military history as a tool of today's rising Army officer. Historians strive to find parallels, rhythm and importance in the annals of the past. So as to better comprehend the present and future, the devotees of Clio search for continuities, coherence and similarities, for habits, patterns, and traditional experiences that might foreshadow developments now facing mankind and the nation's Armed Forces. But the military or general historian must be on his guard to note also accidents that interrupt established order. If this procedure is performed with extreme caution, the process can liberate the present generation from place and time in which we now operate, always being aware of changes in conditions.

An important and proficient role is being played today by military historians in the Army's Reserve Officers' Training Corps (ROTC) units, in the advanced courses of the branch schools, at West Point, at the U.S. Army Command and General Staff College, and at the U.S. Army War College, not to mention corresponding institutions of sister and allied services.

In the teaching of military history in the United States, including that done in the Army's schools and colleges, more attention should be paid to the "other side"—what the enemy is like, what he did or can do and his leadership capabilities. For example, while many students and faculty in U.S. military history courses remember with awe and admiration the famous charge of the young Virginia Military Institute cadets in the Battle of New Market in our Civil War, remembrance and study could also be made regarding the similarly imperishable charge made by the equally young cadets of the Mexican Military Academy at the Battle of Chapultepec in 1847. There is nothing new in the so-called "psychohistory" analysis of historical figures, including military men. Many of our classical historians—George Bancroft, James Ford Rhodes, Theodore Roosevelt, Francis Parkman, Henry Adams and Roy F. Nicholas, to mention a few—engaged in this useful technique years and decades ago.

Then, too, some teaching and study of military history in the Army as well as in civilian institutions today lack realism and hard-nosed practicality. It is sometimes overglamorized and becomes polemical or propagandistic. On occasion, too-neat packages are conjured up for the sake of order and easy explanation. Stephen Vincent Benet caught this danger in his *John Brown's Body* when he wrote:

If you take a flat map and move wooden blocks upon it strategically,
The thing looks well, the blocks behave as they should.
The science of war is moving live men like blocks
And getting the blocks into place at a fixed moment.
But it takes time to mold your men into blocks
And flat maps turn into country where creeks and gullies
Hamper your wooden squares. They stick in the brush,
They are tired and rest, they straggle after ripe blackberries,
And you cannot lift them up in your hand and move them.
—A string of blocks curling smoothly around the left of another string of blocks and crunching it up—
It is all so clear in the maps, so clear in the mind,
But the orders are slow, the men in the blocks are slow
To move, when they start they take too long on the way—
The General loses his stars and the block-men die
In unstrategic defiance of martial law
Because still used to just being men, not block-parts.

But we often tend to see what we want to see. Martin Blumenson writes:

To understand the clash of arms, we need to understand the larger context within which it takes place.

The point is, war, the threat of war and the preparation for war...have become an inescapable strand in the fabric of our time, as it was earlier. As Karl von Clausewitz so clearly saw, even though he was generally misinterpreted for a century, politics and the use of force are inextricably intermingled; military force and political action are indistinguishable.

Professional military officers working at the higher levels who fail to comprehend the meaning of this will certainly be less capable of carrying out the duties and functions that have overwhelming significance for our national existence. And this is now implicit in the study of military history, which has come to mean, once again, simply history.

The continuing study of military history is of incalculable value to the officer of today. To heighten morale and establish a strong esprit de corps in a unit, the history of that military organization should be given to its members by the commander. This sense of pride

in its past record and in its tradition often impel the troops to excel in an endeavor to equal or better that achievement. Looking backward will not necessarily limit flexibility in dealing with current problems of tactics, logistics, and strategy. Such study of military history indeed makes the soldier often aware of the need for changes in modes of transportation, weapons systems, and doctrine. History provides that officer with the data and information required for judging procedures and ideas. How else can the probable usefulness of a new concept be assessed, or indeed if the concept is new at all?

Through scholarship and self-study, the officer can prepare himself to deal with the generally well educated political and bureaucratic leaders with whom he will inevitably be associated, to give the lie to the frequent charge that soldiers are inflexible, militaristic, and narrow. It is through history that we can learn the capabilities and limitations of ourselves and other men, and we may get some insight about how to govern ourselves and lead other man. To have some understanding of history is to better comprehend the human condition, and life itself.

"Those who ignore history," declares George Santayana, "are doomed to repeat it." Or, as Stanley Sandler put it:

(Vital) is the understanding of the unchanging nature of human character...

The concept may seem rather nebulous to the man of arms, and may well lead him to discard the study of history as fit for only the dilettante. It can be demonstrated that history, while not a practical or, by any means, predictable science, can yield lasting and even tangible benefit. For history bears the same relationship to a man's development as does music or literature. It is a liberating subject, broadening and depending, and giving satisfaction in and of itself.

Specifically, history can give one perspective, enabling those who truly understand it to avoid the tyranny of the present, to realize that similar problems have been wrestled with since the beginning of recorded time, that the joys and sorrows of past mankind are very like his own, and that man has survived. This understanding is a superb antidote to despair and a most useful answer to the eternal heresy that insists that our times are unique.

While this solace will not provide practical means of contemporary problem solving, it will surely improve the atmosphere in which these problems are solved or at least serviced...

...as the study of man, valuable in and of itself, history remains one of our most liberating forces.

Abraham Lincoln glimpsed this truth 112 years ago when he courageously affirmed to the political, civilian and military leadership of the Federal side of our American Civil War, that:

We cannot escape history. We...will be remembered in spite of ourselves. No personal significance, or insignificance, can spare one or another of us. The...trials through which we (now) pass, will light us down, in honor or dishonor, to the latest generation... We...hold the power, and bear the responsibilities. We shall nobly save, or meanly lose, the last, best hope of earth.

Extracted from an article by Dr. Warren W. Hassler which appeared in the October 1976 issue of Military Review.

UNCONVENTIONAL WARFARE

Although the world today may not be shrouded in a dark cloud of global conflict, there are numerous dark areas of revolution, subversion and other forms of conflict which are obscure in meaning but cast dullness and creeping gloom over the aspirations of many people. If not maintained under constant observation and measured correctly, these small areas of suspended haze form a billowing mass and once again cloak the earth in the darkness of global war.

Critical shortages in natural resources, economic instability, internal sociopolitical and other structural weaknesses among nations are several of the numerous and complex causes of these various forms of conflict and rebellion. These factors have, without question, accelerated the pace of change in many nations and precipitated a marked increase in the interaction of political events in various parts of the world.

To add to the turmoil, small conflicts or rebellions involving military and paramilitary forces in one area have caused dissident movements in others. Therefore, the political, military, economic and social atmosphere of the world, compounded by the current energy crisis, continues to appear to be dominated by uncertainty.

Descriptive terms such as "worldwide revolution," subversion, sabotage, guerrilla warfare, terrorism and "liberation movements" have been used to describe this disorder. These terms are valid watchwords and not mere stereotypes constructed by the mass media. More than half of the hundred-odd member states of the United Nations exist as the result of some form of revolution or have attained sovereignty because the nations' rulers yielded to the demands inspired by successful revolutions elsewhere.

While some forms of low-level conflict from their outset will demand immediate attention, others will gain importance as foreign powers seek to subvert them to their own ends. Thus, the use of force in some areas of the world may become detrimental to U.S. national interests and have multinational ramifications.

A term, which may be used to encompass most forms of low-level conflicts, is unconventional warfare (UW). This is a strategy of conflict which has confronted the Free World since the end of World War II. It may be

assumed that UW will continue to be one of the principal modes of conflict for the present and the future. It is an economy-of-force measure. Small nations simply do not possess the population nor the economic and industrial base to wage large-scale conventional war. Leaders are inclined to use guerrilla warfare and other unorthodox forms of conflict for political gains. Through the use of small numbers of personnel and minimum logistical support, UW appears to be an economical and politically prudent way to wage conflict without fear of massive retaliation.

An example of misunderstanding over UW is our experience in Vietnam. For even the most diligent pollsters, it would be a formidable task to locate many individuals within the hierarchy of government to acknowledge that the United States was confronted with a UW situation in Vietnam, yet the fact remains that this conflict was not predominately conventional in the eyes of the North Vietnamese. Their strategy in Vietnam embodied guerrilla warfare, political warfare, subversion, sabotage, terrorism, *ad infinitum.* It was essentially a war involving paramilitary forces. Although the U.S. counterstrategy was conventional in nature, the opposition chose to use unconventional tactics and techniques.

Only when the enemy massed into division-size elements did the U.S. conventional posture and superior firepower turn possible victory into defeat. Once defeated by massive firepower, the enemy military and paramilitary forces returned to the strategy of guerrilla warfare and subversion.

Unconventional warfare has not been solely limited to Southeast Asia. Numerous newspaper and magazine articles have been published on UW activities in Northern Ireland, the Philippines, Thailand, Indonesia, Ethiopia, Somalia, Mexico, the Middle East and various countries in Central and South America in the recent past.

For several decades, the Soviet Union and the People's Republic of China have used this strategy of war in varying degrees, most notably in the conflicts between North and South Korea, Vietnam, Cuba, the Indian/Pakistani War and the Arab-Israeli conflict.

Today, there is evidence of extensive Soviet involvement throughout the continent of Africa, and the use of UW tactics and techniques is also evident.

The United States also possesses a capability for the conduct of unconventional warfare. If considered to be a viable option, forces are available for immediate deployment. This capability lies with the Army Special Forces, Navy SEALs (Sea-Air-Land Teams) and special units of the Air Force.

From the outset, it must be emphasized that, in time of war, UW is not to be considered as a separate unique operation but as military operations conducted specifically in support of the overall military effort. Operating in either a direct action or force-multiplier role, UW forces support the conventional effort.

Operations normally are conducted as a joint endeavor. It is almost an absolute requirement to use the essential skills and capabilities of two or more services for any UW mission. Additionally, the nature of UW stresses close cooperation and coordination between military and civilian agencies.

Options are the key to any offensive or defensive response to a confrontation. Leaders must possess the ability to react to any provocation with a measured response for either a contingency, limited war or major conflict. UW strategy provides another option for consideration.

The use of deception also should be addressed when considering the options available. An outward aspect is present today in the interaction of world events as it has been in the past. Machiavelli stated many years ago that:

"Though fraud in other activities be detestable, in the management of war it is laudable and glorious. He who overcomes an enemy by fraud is as much to be praised as he who does so by force."

One common thread which appears to be interwoven among the many widely scattered conflicts today is the difficulty in determining the cause of these conflicts. Is the cause internal or international?

As nations attempt to live within a world that is cloudy at best, it is imperative that serious study be given to UW strategy and its impact on world order. When directed against a nation-state, UW strategy attacks the basic elements of national power. It saps the economic strength; and undermines the political structure, precipitating a loss of confidence in national leadership; and the military power of a nation is drained in combating an elusive guerrilla. An exorbitant expenditure of national resources becomes necessary to replace combat losses and repair damages to the economic base of the nation. Finally, national will is gradually diminished due to the protracted nature of the conflict.

The strategy of UW has been used in the past, it is present with us today and will continue to have an impact on the future. It is a strategy of war which cannot be overlooked. Who uses it is only a matter of choice.

Condensed from an article by Colonel George E. Palmer in the Military Review, August 1976.

A TANK MYTH OR A MISSLE MIRAGE?

At present, there seem to be difficulties for operating a missile from a moving platform such as a tank, so, for sometime, there seems no likelihood of the tankgun being displaced by a missile. The antitank missile has proved to be a sound "defensive weapon," shown to be at its best in static defense. But its capabilities may

improve, unless blocked by conservative and traditional protagonists of the tank.

The war was also a keen disappointment for those who feel the tank has had its day and should disappear from the battlefield. While the Egyptians insist that a high proportion of Israeli tanks, and their own, were knocked out by missiles, both sides speak up solidly for the tank. Each thought its own were the best. The Egyptians claim that the low silhouette of the Soviet tanks and their greater battle range made up for cramped conditions for the crews and lack of ammunition storage space, while the Israelis claim that their American *Pattons* and British *Centurions* were better because they had more ammunition storage space, sophisticated aids to gunnery and were less tiring for crews to operate for lengthy periods. The late Egyptian Field Marshal, Ahmed Ismail neatly summed it up when he told me that, "The tank and the aircraft have lost their dominance of the battlefield, but not their usefulness." The Commander of the Armored Corps insisted that, "The dynamic of the campaign will continue to depend upon the tank." On the other side, the Israelis firmly stick to their pre-October 1973 opinion of the importance of the tank, without any thought of discarding it or even of lessening its role. It is now simply emphasized that it has been badly handled initially by them and that it should be part of an all-arms combat team and never used alone and unsupported.

Therefore, while a new weapon, the antitank missile, has made its appearance and proved its worth in battle, the old one, the tank, remains albeit with its former prestige dimmed somewhat.

Extracted from an article by Charles Wakebridge in the August 1976 issue of Military Review.

WHAT'S A VART?

What's a VART? There are some classic comebacks to this one! But for the sincere reader, VART stands for Visual Aircraft Recognition Training, and the Department of the Army has recently published a Army Subject Schedule (44-2) on VART.

Unfortunately, publications such as this one are distributed without fanfare or special emphasis, and tend to gather dust on training room shelves. This is too bad, for I really believe you should look at this subject schedule—it is interesting, and it is also most important to Infantrymen.

For example, not too long ago in Korea, a G-3 phone in a certain TOC started ringing. Admittedly, answering the phone in a G-3 shop is sort of like getting a bad tooth pulled—it can be painful, but it's always necessary. In this case, the rather nervous and somewhat concerned voice of the S-2 of a Nike Hercules air-defense battalion was on the other end.

"We have an unidentified aircraft making passes over our installation!"

"O.K., what kind is it?"

"Well...we don't know."

"What color is it?"

"We...uh...we don't know."

"Go look!"

A few minutes passed during which a faint scurrying of feet could be heard.

"We just looked...(heavy breathing)...and we can't tell exactly what color it is.

"Well...are the wings swept back or perpendicular to the fuselage?"

"We just can't tell!"

"Look again and call back."

A return call was never made, and because no reports pertaining to the aircraft ever crossed the G-3's desk, it was assumed the aircraft was either a U.S. or a stray Republic of Korea Air Force aircraft.

The point of the story is obvious: an intelligence officer of an air-defense unit could not classify an unidentified aircraft over his installation, even into the rather broad categories of "good guy" or "bad guy."

Innumerable discussions, publications, training revisions, and bull sessions lead even the most casual observer to believe that, somewhere in the hierarchy of the U.S. armed forces, consideration is being given, and contingencies are being planned, for our participation in a so-called mid-intensity conflict. One could also deduce that in the event such a conflict does take place, U.S. air superiority would not be assured.

If this is logical, then it seems apparent our soldiers will face a significant threat from the air. Thus, we need some defense against that threat. We certainly cannot afford a system by which "the ones who shoot at you are bad guys, those who don't aren't." That may be a terrific method of aircraft recognition, but a soldier could be dead before he has much chance to practice it.

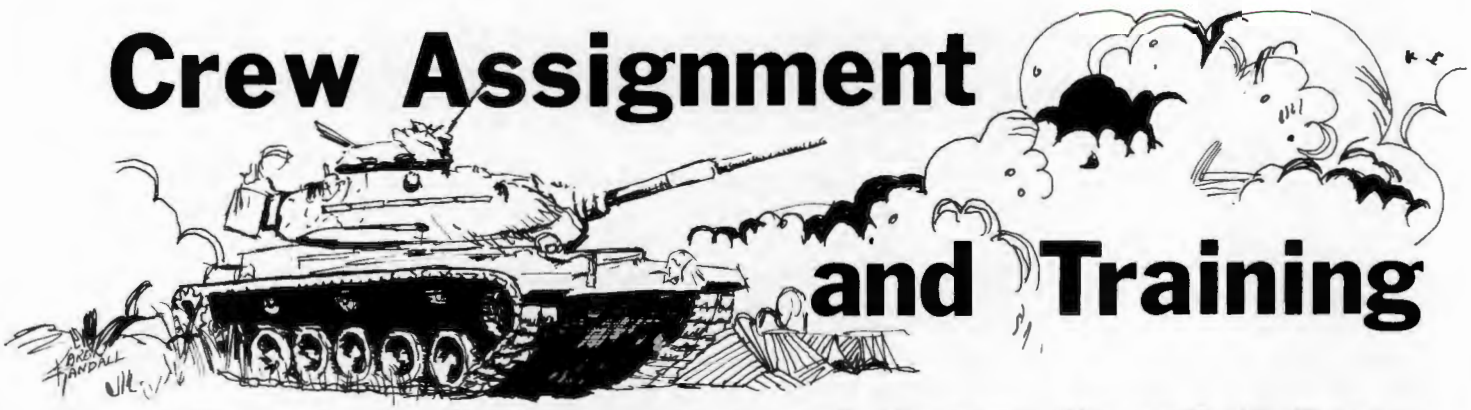
Aside from the obvious tactical advantages of accurate visual aircraft recognition (VAR), such as self-defense and active engagement with an opponent's aircraft, certain fringe benefits could be reaped. If the frontline soldier is indeed an invaluable source of intelligence as our community of military intelligence personnel would have us believe, wouldn't he be even more valuable if he had the ability to identify an aircraft and its probable mission?"

The Army subject schedule does outline a well-rounded and convenient VART program. Basically, the program calls for familiarization training for all personnel, with more extensive training being given to soldiers whose jobs call for a higher level of proficiency.

There is a great deal of flexibility in the program and, conscientiously applied, it is complete and comprehensive. All we need now is a little command emphasis to get it on its way.

From an article by Captain John C. Shannon in the March-April 1976 issue of Infantry. ▲

Crew Assignment and Training



by Captain V. Paul Baerman and Doctor Newell K. Eaton

The force ratios we may face on the modern battlefield demand tank crews who can shoot quickly and accurately. Recently *ARMOR* magazine has featured articles on tank gunnery, new equipment, and tactics which may help in achieving this goal. This emphasis has promoted an exchange of ideas that can only enhance the preparation of armor units for future battles.

Despite this stimulating exchange, however, answers are still sought by armor commanders for the traditional questions: what do I look for to get the best people in my tank crews, whom do I assign and where, and how do I best train and motivate them?

In November 1975 officers of the 1st Battalion, 70th Armor reviewed a video-taped speech by General DePuy of TRADOC, given at the second October FORSCOM-TRADOC conference at Ft. Hood. In the speech, Generaly DePuy stressed the necessity,, given the Threat and restraints to training, of maximizing our tank weapons system effectiveness. We must, he suggested, assign only the most capable personnel to crew our tanks, and then train them effectively. Without highly qualified, highly trained crewmen in our tanks we face a "performance gap" like that diagramed in figure 1. Actual hit performance of a tank crew can be reduced to a fraction of the theoretical performance of the system if men with the correct aptitudes aren't assigned to the right job, and then given effective training in the performance of that job.

Based on the battalion's less than optimal showing on the 1975 Tank Crew Qualification Course, "The Tankers" of the 70th Armor resolved that they would emphasize careful assignment and effective training in their 1976 gunnery season. The gunnery program would be based on certain proven and other relatively radical training methods. A unique opportunity arose when the 1st Battalion, 70th Armor, while searching for a method to implement General DePuy's guidance, contacted the U.S. Army Research Institute (ARI) at Ft. Knox to see if it could offer any suggestions.

The interest of the 1-70th in assignment methods proved to be quite fortunate for ARI-Ft. Knox. At the time the 1-70th contacted ARI, the Ft. Knox unit was in the first stages of a research program designed to provide the type of answers that the 1-70th was seeking. The research had been initiated in response to requests made by the U.S. Army Armor School through TRADOC. While ARI had relatively little to offer the 1-70th in terms of concrete crew assignment suggestions, it did have the results of several pilot studies, and a desire to research the problems further in an Armor battalion during their annual tank gunnery season. The 1-70th agreed to cooperate with ARI in the conduct of an intensive research project, which we hoped would allow both organizations to accomplish their missions in the best way possible. The 1-70th would incorporate time into its training program for extensive paper and pencil aptitude testing, hands-on skills tests, and accurate recording of all training and testing performances. Thus, ARI would have the quantitative data required for their research. ARI would provide the 1-70th, in turn, with information on previous tank gunnery research and recently-developed training methods.

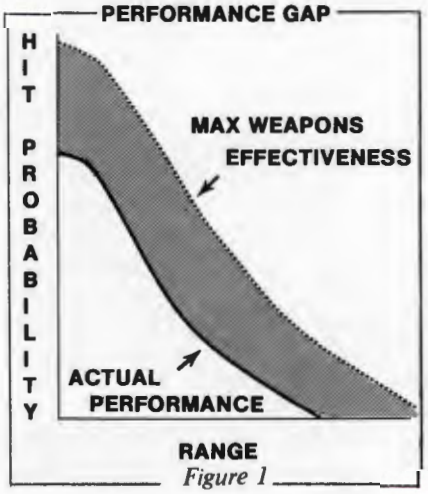


Figure 1

The collected data would enable ARI to answer the first question asked of them, "Does it appear possible to devise an assignment test battery which can predict potential gunnery performance?" Such information could give commanders at company, battalion, and brigade levels information upon which to make more optimal crew assignments *prior* to the crew training which precedes Table VIII qualification. Thus fewer men would be reassigned due to poor performance during the pre-qualification tank tables and a more stable training environment would be obtained. Expected results would include better trained crews, more main-gun target hits, and resulting higher qualification scores with more distinguished crews and fewer "no-goes."

The data would also enable ARI to determine the degree to which individual motivation assessments made at the beginning of gunnery training were related to actual qualification performance. An experimental motivation assessment test was being developed around a motivation model based on specific sources of motivation in these areas: *recognition, tangible reward, personnel development,* and *individual values*. Successful application

of the experimental motivation tests could assist in a determination of which specific sources of motivation were indeed related to gunnery performance, and to what extent. Successful research in this area could provide the commander not only with information on the importance of performance motivation for successful training and qualification—something he probably already believes—but also specific, proven, management tools which can be applied in his units.

On the very first phase of the training programs the *Tank Crew Gunnery Skills Test* (TCGST) (TC 17-12-5) was administered to the battalion to determine what areas needed the most emphasis. Based on test results, training was organized to stress the weak areas uncovered. At the same time several officer, NCO, and enlisted classes were held to promote understanding of the scope and importance of this year's tank gunnery and to built enthusiasm and motivation. The battalion S-2 began a promotional campaign within the unit; stressing pride, professionalism, and final results on tank gunnery. Questionnaires based on ARI preliminary motivational research were distributed to all crewmen asking them to rate promoted tank gunnery prizes in order of appeal. The rules of competition for high tank and high company were also outlined early in the program. Prizes were on display throughout most of the gunnery program.

Screening

The second phase of the program began with the screening of all 11E's in the unit. Armed with some preliminary ARI findings, the Battalion used a battery of performance and physical tests to screen and select tank crewmen. The battery had five tested areas: visual acuity, color perception, hand-eye coordination on the Willey Burst-on-Target (BOT) Device, a records check, and ranging proficiency. After eliminating from the key positions of TC and gunner those people with obvious difficulties, company lists of tested crewmen were distributed. Company commanders then applied their knowledge of the personnel to the results to organize the tank crews. Although every effort was made to keep the same TC and gunner together throughout the next 4 months of gunnery training, the units were only about 60 percent successful.

The admittedly crude screening and selection process allowed the 1-70th Armor to specialize in the classroom portion of its training program. Rather than give all gunnery classes to everyone, crews were broken down immediately into groups by crew position. Where possible, most gunners and loaders were cross-trained in one another's position. This specialized instruction allowed maximum concentration on particular skills being developed in a select group of individuals. To further promote professionalism and increase the interest in classes, all presentations were formally rehearsed, including all practical exercises, before the Battalion S-3 or his representative. Some classes were rehearsed seven or eight times until the S-3 was satisfied the class was well presented, technically correct, and covered the assigned topic.

More Tests

In the third phase of the program, ARI actively began its part by administering an experimental assignment test battery to every armor crewman in the battalion, including all officers and NCOs holding crew positions. Most testing took place in February and March 1976, 2 months prior to qualification, and a month before the beginning of the main-gun tables. All tests had some potential for success as performance predictors based on past research, and were scored and analyzed by ARI personnel. In addition, numerous skills tests were incorporated into the training schedule, as both training and evaluation exercises. These included gunner's BOT exercises on the Willey trainer plus firing and accurate scoring of six mini-tank range tables, and tank commander's ranging and gun-laying exercises incorporated into a second TCGST administered in the fourth phase. ARI was on hand for most of the skills tests to assist in scoring and in the use of the training devices. In several cases, ARI-Ft. Knox personnel had extensive experience with new armor training devices and techniques. Following a persistant effort by both the 1-70th and ARI, over 200 of the 216 crewmen in the battalion were tested—almost everyone who was physically present for duty.

In keeping with the new emphasis on sub-caliber firing, the 1-70th Armor spent many days on the mini-tank range (.22 sub-cal). Day and night sub-caliber tables were fired per TC 17-12-6 except that one stationary target table and the inoperative fire control table (V and VIII) were eliminated, and a second moving target table was added. Each identified gunner and several alternates fired nearly 300 rounds at both stationary and moving targets. The range was considered by both instructors and gunners to be excellent training and very enjoyable. Though the unit would have liked to fire the standard tank Tables I, II, and III, machinegun convergence problems arose. In any event previous ARI research had indicated that the mini-tank range should provide at least the same if not better training. At this point ARI personnel returned to Ft. Knox and the 1-70th continued its training program. Coordination and information exchange continued regularly by AUTOVON and mail.

Practical Exercises

In the fourth phase of training, still prior to main-gun firing, extensive practical exercise periods were scheduled by the Battalion. Long day and night hours were spent on nearby "dry-run" TCQC's. Platoons were rotated through several sessions using the Willey BOT simulator. Ranging, gun-laying, and tracking practice were stressed. Gradually, the program started to build real momentum. While the unit realized classes were important to ensure technical understanding and to stress the importance of following proper procedures, we emphasized the old lessons that *there is no replacement for repetitive practice in tank gunnery.* The culmination of practical exercises was the "Tanker Stakes," a modified and tougher version of the TCGST in TC 17-12-5. Throughout the training, attention was given to careful evaluation of performance and immediate feedback to the crewmen. Following the "Tanker Stakes," for example, prizes and recognition were given to the top three crews at a battalion for-

mation. Again, stressing evaluation and training to overcome deficiencies, commanders received all "stakes" results and were able to conduct additional training in areas of weakness.

A major feature of phase five of the unit's tank gunnery program (main gun firing) was the modification of the traditional tank tables. As indicated, Tables I-III were eliminated in favor of the mini-tank range. The day phase of Table IV was reduced to a zeroing exercise for primary and secondary sights while the night phase provided only a limited amount of IR firing. Table V was cut exactly in half, and Table VI eliminated entirely. This provided a supply of ammunition which was used in a modified Table VII designed to provide both stationary and moving-target practice in a more realistic setting. The modified Table VII was set up by combining parts of neighboring ranges on Ft. Carson normally used to fire Tables IV and V. The battalion stressed moving crews onto a modified Table VII as rapidly as possible because we were confident the classes, practical exercises, and sub-caliber firing had provided sufficient momentum and training. As the program progressed the battalion moved to Ft. Carson's regular Table VII. Before any crew reached Table VIII, it had fired at least four day and four night runs on the two Table VII's.

The battalion officers and NCO's reported many beneficial effects of the changes in main gun Tables. The early movement to modified Table VII gave crews extra practice and appeared to make them more confident. It also enabled the unit commanders to identify and solve training and maintenance problems well in advance of qualification firing.

Just before the first company moved to Table VIII, ARI again arrived on the scene, and remained throughout the qualification firing. Coordination with the Tank Gunnery Assistance Team, 4th Infantry Division (Mechanized), who ran the qualification table, was completed, permitting ARI access to detailed hit/miss/time data for all Table VIII engagements. In addition, personal information, some final aptitude test scores, and platoon leaders' and platoon sergeant's evaluations of their crewmen were collected.

The 1-70th's performance proved the merit of its extensive training pro-

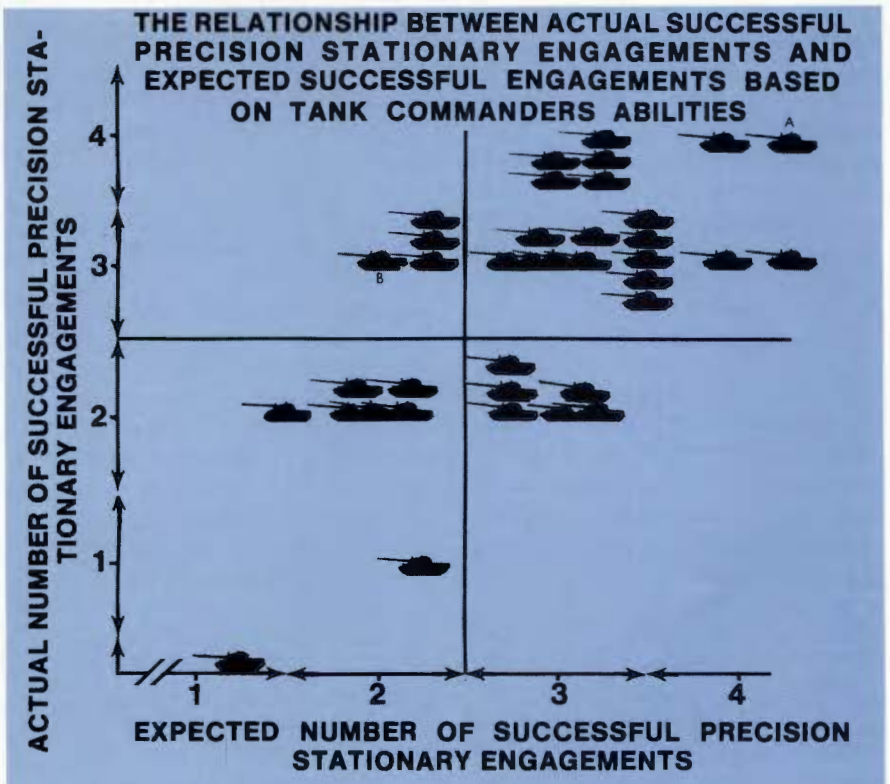


Figure 2

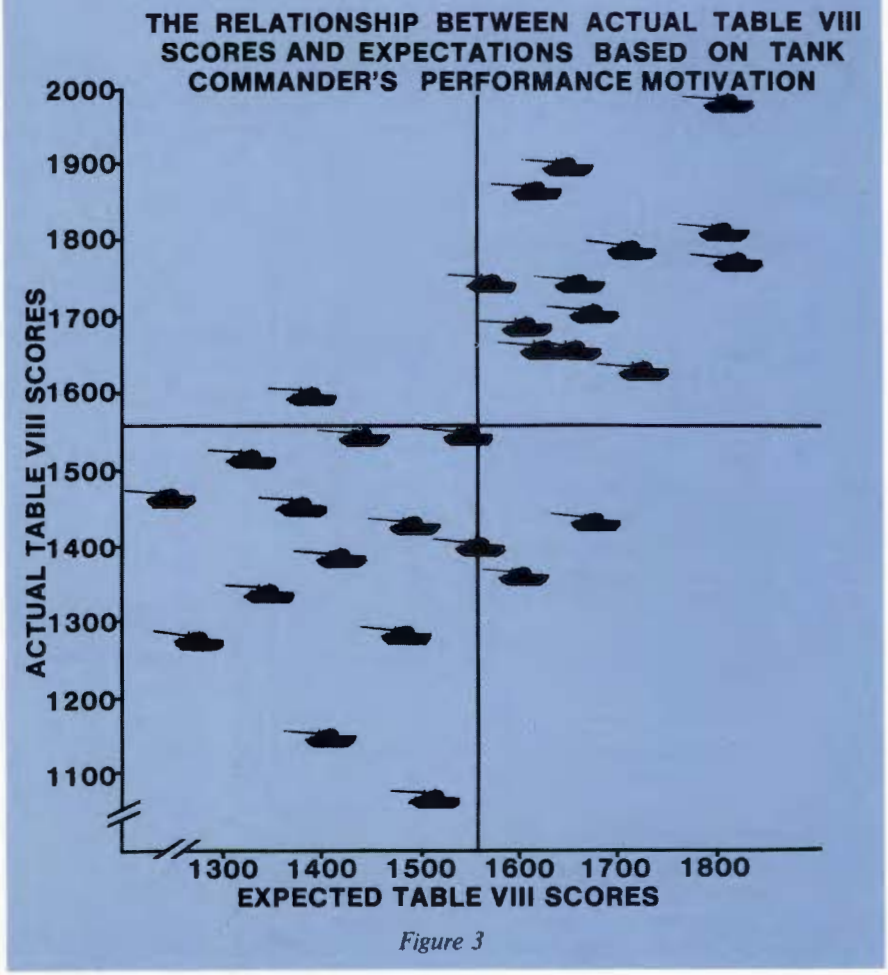


Figure 3

gram, and showed that harmonious relationship could be achieved between ARI's research mission and the TOE battalion's operational mission. After 5+ months of hard work, the 1-70th's crews could be proud of their accomplishments. The battalion was the highest of four tank battalions on post and had the division's high tank company and high crew. It also had the largest number of distinguished crews, qualifying nearly 40 percent more crews on the first run than the year before. This was all despite the fact there had been the normal turbulence and there had been no increase in tank-gunnery-experienced personnel. As a matter of fact, nearly a quarter of the tank crews in 1976 qualified with an E4 or an E3 as the tank commander.

When ARI analyzed the research data many encouraging relationships were found. TC's aptitude test scores proved to be significantly related to Table VIII scores, and both aptitude and skills test scores were significantly related to success on precision engagements. Gunner's aptitude scores were significantly related to Table V (moving target) hits, and both aptitude and skills test scores were significantly related to their opening times on Table VIII battlesight engagements. An example of one of these relationships is shown in figure 2. The vertical axis represents the actual number of successful precision-stationary engagements fired by a tank while the horizontal axis shows the expected number of successful engagements based on a statistical analysis of the tank commander's ability test scores. Tank *A*, for example, had an expected score of four successful engagement and actually had four, while the tank labeled *B* had an expected score of only two engagements, but actually was successful on three. In this instance 28 of the 38 tanks (74 percent) were correctly classified into high (three or more successful engagements) or low (two or fewer) categories. Because success on precision engagements is important in its own right, as well as being of paramount importance for good scores on Table VIII, such information could prove most useful to commanders in assigning tank commanders with good chance of successful gunnery performance.

The quantitative measures of performance motivation also were significantly related to gunnery performance. TC's motivation measures made in March, two months prior to qualification firing, proved to provide highly significant relationships with Table VIII scores. Further significant relationships were noted between gunner's motivation measures and gunnery performance, and between driver's motivation scores and driver ratings. An example of the relationship between the TC's motivation measures and Table VIII scores is shown in figure 3. The vertical axis represents actual Table VIII scores while the horizontal axis represents expected Table VIII scores based on a statistical analysis of motivation scores. Twenty-five of the 29 NCO-led crews (86 percent) were correctly classified into high (above average) or low (below average) categories.

In closing we wish to highlight the five major areas of emphasis in the gunnery program which we feel led to the 1-70th Armor's fine performance. First, the men were tested to identify areas where training was needed to eliminate areas where all were qualified. Second, the men were evaluated and assigned to specific tank crew positions before gunnery training began and, for the most part, stayed with their crew in the same position throughout the season. Third, the battalion stressed quality training by knowledgeable cadre and insisted that all presentations be well-rehearsed. Fourth, a motivation program was built into the training from the very beginning based on continued quantitative evaluation and recognition for outstanding performance throughout the program. Finally, the main-gun Tables and resources were used creatively to provide both a grounding in the basics and an early transition to the more realistic shoot-and-move setting of the modified Table VII and the standard Table VII.

★ ★ ★ ★ ★

CPT V. PAUL BAERMAN was commissioned in Armor upon graduation from the United States Military Academy in 1968. He has commanded armor and cavalry units in Vietnam and the United States and has been a battalion and brigade S-3. A graduate of the Armor Advanced Course, CPT Baerman is currently assigned to G-3, 4th Inf Div (Mech), Fort Carson, Colorado.

DR. NEWELL K. EATON, a research psychologist with the Army Research Institute at Ft. Knox, has been engaged in motivation and assignment research since completing a doctorate in psychology at the University of Oregon Health Sciences Center in 1975. He had previously spent three years in the Army, completing OCS in 1969, served as a Basic Training Officer at Ft. Lewis, in 1970, and as a platoon leader and guard post commander on the DMZ in Korea in 1971.

Recognition Quiz

This Armored Vehicle Recognition Quiz is designed to enable the reader to test his ability to identify the armored vehicles of armored 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 armored fighting vehicles. 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 appearing in the picture should also be provided. Suggestions for improving or expanding this feature are welcome. — ED.

(Answers on page 57)


1


2


3


4


5

BOOKS

A SHORT HISTORY OF GUERRILLA WARFARE by John Ellis. St. Martin's Press, New York. 1976. 220 pages. $8.95.

Since 1945, civilian and military theorists have devoted an increasing amount of study to the problem of guerrilla or irregular warfare. In particular, the "people's wars" of Asia and Latin America have given the guerilla a reputation as a new and invincible foe whose tactics render conventionally armed forces ineffective and perhaps obsolete.

The intent of John Ellis' recent book is to counteract this exaggerated reputation by placing the guerilla in a wider historical context. Beginning with the ancient Jewish wars of resistance, Ellis summarizes irregular conflicts from many eras and geographic locations. In each case, the focus is on the preconditions for insurgent to counterinsurgent victory, rather than on the tactics involved. For example, the successful rebel needs a secure base area both as a refuge and as a source of supplies for the struggle. The insurgent must obtain political control and popular support of the population without offending any productive class by premature social changes. Despite the value of guerrilla tactics, the insurgent needs either an allied army to distract the defending forces, or else his own regularized units to eventually defeat those defenders in open battle.

The author skillfully illustrates these prerequisites by use of historical examples, and then analyzes the Chinese Civil War to show how the same principles were applied over an entire generation to produce the Communist triumph. Ellis concludes, however, that the Chinese model has misled other insurgents into impatience and over-optimism. The Greek, Malayan, and Philippine revolutionary defeats stem from insurgent efforts to create regular forces before secure bases had been established.

Professional soldiers will find few, if any, new concepts in *A Short History of Guerrilla Warfare*. They will find, however, a concise and able survey which provides a wealth of information to illustrate the basic rules of both insurgent and counter-insurgent operations.

Historical breadth is both the strength and the weakness of this work. In his efforts to illustrate the ancestry of irregular war, Mr. Ellis has overstated his point by including many other forms of combat. He apparently defines guerrilla warfare as anything which does not follow the rules of 19th and 20th century conventional war.

Nevertheless, this book provides the same combination of respectable scholarship and interesting presentation found in the author's other works. As such, it merits reading as a textbook and as a convenient compilation of important historical precedents in irregular war.

Second Lieutenant Jonathan M. House
USATCA

ANATOMY OF A BATTLE by Kenneth Macksey. Stein and Day, Briarcliff Manor, New York. 1975. 204 Pages. $8.95.

Anatomy of a Battle is a three-sided view of combat as seen by the Germans, British, and Americans during a minor World War II battle in France. The battle includes infantry, armor, and artillery in a combined-arms effort to secure an objective which is a farm located among the hedgerows of Normandy. To the officers, the plans seem logical and achieveable before the battle; however, the enlisted men have different views with that of the regular being expressed quite differently from that of the draftee. Once the battle starts, with its confusion, lack of communication, poor fire coordination, and indecision, the operation becomes a nightmare.

Within the participants, the emotions of war run the full gamit including despondency, futility, contempt, humor, and disappointment. The strong and infallible in training proved disappointing on the battlefield. The distrust and lack of understanding between allies is evident on both sides before and during the battle. Success and the feeling of accomplishment on the allied side turned the distrust into friendship and admiration, while on the German side, the necessity to shoot a comrade running from the battle only adds to the loss of confidence in the German ability to win the war.

Anatomy of a Battle provides the lessons of war in an interesting story book form. Notwithstanding, the book offers little in professional development and should be read for entertainment only.

The Late Colonel Carl M. Putnam

ARROWS AGAINST STEEL: The History of the Bow by Vic Hurley. Mason/Charter, New York, 1975. 238 pages. $9.95.

Military historians have ignored or misrepresented the part the bow has played in warfare, and have relegated it to a minor role. The glory goes to the Legions of Caesar and to the phalanx of Alexander, but it was the bow that enabled the latter to win and that slaughtered the former.

Hurley traces the development and use of the bow from the ancient Near East and China to the unpleasantries between the U.S. Cavalry and the Indians. This book is not a simple statement of facts, but the development of a specific thesis—the full potential of the bow as a weapon was not realized until it was combined with the mobility of the horse. Heavy infantry was helpless if the enemy could move faster than a walking pace or fight beyond arms length, and while heavy cavalry had some of the necessary mobility, it, too, had to close in to point blank range to fight. The mounted bowman was the only soldier who could give battle entirely on his own terms. He could trap foot soldiers in a defensive position and slaughter them with arrow flights, and if he could not stop a charge by heavy cavalry, he could pretend to run and then draw them into an ambush.

There are fascinating chapters on the design and construction of bows and arrows and comparisons of different sorts. The Mongol bow, for example, would shoot farther than the English longbow, but was much more susceptible to damage and might take 2 years or more to make. Mongol rearguards were under the strictest orders not to lose one. Steel plate, it seems, was poor arrow protection because an arrow was much like a sabot round when it hit. Thick felt or cotton quilting worked much better, and the Mongols found that an arrow would not penetrate silk underwear, but would

instead suck it into the wound when it hit. Instead of having to cut the arrow out, the Mongols simply pulled gently on the silk. This not only avoided the shock of surgery, it also kept the wound relatively free from infection.

Although written primarily for the historian and addressing itself to questions that are mostly of historical and academic interest, *Arrows Against Steel* contains much that should provoke thought in the contemporary soldier. Currently we are toying with ways of organizing the cavalry platoon and with the feasibility of permanently combining tanks and infantry into battalion-sized units. We are testing new scout vehicles and are trying to produce a new main battle tank. Alexander the Great, and his father, Philip of Macedon, were the first to successfully combine infantry and cavalry on the battlefield. Are the lessons that they learned about shock, mobility, and fire power still worthy to study? Are the Mongols, whom Hurley considers to be the finest soldiers the world has ever produced, to be dismissed as historical curiosities, or will the army that can combine fire power, mobility, and good staff work sweep all before them today, even as Subotai and Genghis Khan did 750 years ago?

However, *Arrows Against Steel* is not without its faults. It suffers greviously from a lack of maps and diagrams. Sketches of the different sorts of bows, with identifying nomenclature would be a great help, as would maps illustrating the battles and campaigns discussed in the text. At times the author states his case so strongly that he harms it. I have a hard time believing that Custer's men fell to massed arrow flights as Mr. Hurley would have us believe. In the age of the repeating rifle, the bow was undoubtedly not as decisive as Mr. Hurley suggests.

Still, the point in *Arrows Against Steel* is well taken, and I highly recommend the book to both scholars, and to those whose interest is more pragmatic.

Second Lieutenant John M. Jordan
USATCA

CRAZY HORSE AND CUSTER: The Parallel Lives of Two American Warriors by Steven E. Ambrose. Doubleday & Company, Inc., New York. 1975. 486 pages. $12.50.

This is not another rehash of the most over-worked episode in U.S. military history, the Little Big Horn affair. Rather, it is a cursory, comparative biography of the lives of the two principal actors on that stage, lives that were strangely similar yet often disparate. Both leaders were incredibly brave and had established their reputations at early ages, yet they were driven by far different motives and each's personal goals bore little resemblance to the other's.

While libraries are replete with books on Custer, Ambrose treats him lightly, emphasizing those aspects which tended to shape his character and point him toward the collision course with Crazy Horse. The chapters on the Oglala Sioux are more illuminating and constitute the better part of the book, even though much of the text is necessarily conjectural.

Ambrose is a well established author and has experience in writing about military subjects. (He has published seven books on Army matters, including three on Eisenhower and one on West Point). Thus it's disappointing to discover that this book suffers from several damaging flaws. Ambrose has written an interesting, often exciting story that takes a somewhat novel view of a familiar historical subject. Unfortunately, there are numerous trivial factual errors, each in itself irritating but negligible; however, the overall effect of so many gives the impression of superficial research. He sometimes takes artistic license with historical realities, tends to exaggerate in his adjectives, stretches the reader's credulity, and clutters his text with personal speculations.

In summary, the reader might feel that this book was written hurriedly and was inadequately checked. This may be above average adventure but it's mediocre military history and questionably worth the price.

Colonel (Retired) John R. Byers

THE ISRAELI ARMY by Edward Luttwak and Dan Horowitz. Harper and Row Publishers, New York. 1975. 461 pages. $15.

"Every civilian is a soldier on 11 months annual leave."

The Israeli Army is an inspiring story of how a people known for self restraint became a nation of aggressive warriors with the third largest tank force and the sixth largest air force in the western world all in one generation. There was no colonial army to build upon; so, innovation, controversy, and self-evaluation became the foundation of this fine military machine. While the majority of the book is concerned with ground forces, it does cover the Air Force and Navy as well.

The basic goal of the Israeli Army is to be ready to fight against any combination of Arab states at any time. Force development and training of the Armed Forces is constrained by the very necessary daily combat operations. While poor in material resources, manpower has never been a limiting factor. A real asset seems to be their leadership. After reading how the Israeli leadership is developed, the conclusion is reached that it is excellent. Consider this quote of an order given in battle: "All privates will retreat, all commanders will cover their withdrawal." Having given the order, the company commander, three platoon leaders and all but one section leader died in the ensuing battle.

Of particular interest to combat-arms officers is the evolution of the combined-arms concept. Initially the Army gave first priority to infantry and held the tank to a support role. Ignoring directives in 1956, Armor exploited the battlefield. As a result, Armor became equal to the Infantry. After 1967, Infantry was subordinated to a follow up role for pure tank formations. After the 1973 war, the Israeli Army determined that the unsupported tank was not a viable weapon and needs supporting Infantry. So, after 25 years, the Israeli adopted the combined-arms concept.

This is an excellent book that should be requiring reading for combat-arms officers.

The Late Colonel Carl M. Putnam

THE BLACK INFANTRY IN THE WEST, 1869-1891 by Arlen L. Fowler. Greenwood Publishing Corporations, Conn. 1971. 148 pages.

After considerable research, the author has produced a useful history of the 24th and 25th Infantry Regiments, during the period of 1869-1891 which with the recent writings on the two Black cavalry regiments, comprise the best historical account of Black soldiering immediately following Reconstruction. Using mainly official resources and in keeping with the limits set by the title, he traces the two regiments' history from their beginning in Texas following Reconstruction in the 1870's through the 25th's move to the Dakotas and Montana and the 24th's move to the Southwest in the 1880's. In addition to his

portrayal of the history of the two Infantry Regiments, the author devotes the last two chapers to the attitude toward the Black infantrymen and hope for a better day.

What may be the book's most significant contribution, is that it will prove highly useful since very little, until recently (1967-on), has been written in this area. Mr. Fowler describes the effects of the Army legislation which established the two Black infantry regiments and the obstacles presented as they tried to adapt the regiment to the task of helping to protect the western front during the Indian Wars. Mr. Fowler records some of the trials and tribulations of the regiment's organization and its men caught in the turmoil of trying to prove their effectiveness, exemplary deeds, and worth during this period.

While Mr. Fowler's purpose was to describe the total history of the Black infantrymen, he did not provide complete objectivity so necessary when touching on this very complicated and sensitive matter of the racial situation. It lacks the scholarly and the moving qualities of many good books. Although it is heavily fortified with footnotes and a good bibliography, the author uses mainly Army official sources and in my opinion, fails to use invaluable resources available from Black educational institutions and current historical organizations. He does not provide a good description of the real atmosphere, public attitude, and views of the times to properly reflect the true situation that existed toward the Black soldier during these years. It is basically a regimental or at least a narrowly written institutional history.

Overall, *The Black Infantry in the West* is an interesting and educational book which will provide the reader with some insight and understanding of the Black infantryman's activities and contributions during the period following Reconstruction and merits reading.

Lieutenant Colonel James H. Sangster

SOVIET STRATEGY IN EUROPE by Richard Pipes. Crane, Russak and Company, Inc. 316 pages. 1976. $14.50 (paper $7.50).

In response to the complex situation of relaxed tension and crisis, Richard Pipes, professor of history at Harvard University and senior research consultant at the Strategic Studies Center of the Stanford Research Institute, has collected and edited eight papers which address the interrelation between the political, military, and economic situation in Europe in respect to a stated Soviet policy of detente.

Professor Pipes has assembled in one volume these papers by known experts who review their area of specialization to assess the role of detente in the evolving post-cold war relationships between East and West. In the political section, Michael Tatu provides new insight into the Soviet view of detente through an examination of decision making in the U.S.S.R. This paper coupled with a look at Moscow's view of detente, at the interrelationships of Soviet policy and Western Europe's domestic policies, and at Soviet-East European relations provide the capstone overview for the detailed military and economic examinations which follow.

In the military dimension, the military reader will probably be impressed with the analysis of Soviet capabilities based on the Egyptian attack across the Suez in 1973 and the movement into Czechoslovakia in 1968. This demonstrated potential added to the mass of modern equipment located in Eastern Europe makes sober reading for anyone concerned with a viable defense of Western Europe. The Threat, as seen from the West, continues to grow in spite of political discussions to the contrary. The economic dimension is learned and puts into perspective the role of Western Europe in both Eastern Europe's and the U.S.S.R.'s economic future.

In an election year when force structures and the cost of supporting Europe militarily are sure to be questioned, Professor Pipes has given us a timely and readable treatment of a vital subject. Unfortunately, the conclusion is that detente, as currently incurred in the United States, is not in itself a bridge that will span the chasm between the world view of East and West. It is in the hope that an exhaustive dialogue will be started between the two adversaries that this book has been written. Such a dialogue is necessary, but will probably never take place.

Colonel C. A. Mitchell
USAARMS

THE VOLUNTEER FORCE by Hugh Cummingham. Archon Books, Hamden, Conn. 1975. 168 pages.

During the period of the American Civil War and its volunteer regiments, the British nation saw the rise of a similar phenomenon in the volunteer force. This little known British force is the subject of this tersely written political social analysis by the author who is a history lecturer at the University of Kent.

The Volunteers existed for a period of 50 years until 1908 when it was reorganized into the Territorials. This aptly named force was primarily a local home defense force in which the men and officers bought their own uniforms and weapons and, in some cases, elected their officers. The commanders of the units were legally responsible for the debts of the units. Unlike the American Volunteer Regiments of the Civil War, the Plains Wars, and the American Civil War, the Volunteer Force, with only a minute role in the Boer Wars, was never blooded or tested except in sham battles with the local populace in attendance.

The book attempts to explore the true benefits and effects of the Force in Victorian England. Besides tracing the history of the Force, the author examines the idea that as the initial fervor for the home defense force died, the social enrollment of the Force dropped from the middle to the working classes and the Force in effect became a force for social control. This premise does not quite clarify itself during the course of the book. Another interesting premise was

RECOGNITION QUIZ ANSWERS:

1) France AMX-30 **2) FRG Leopard IA3**

3) Japan STB-1 **4) Sweden PBV-491**

5) Great Britian Centurion MK12

that this relatively local force was instrumental in an improvement of the English civilian's preception of their Regulars. Although the establishment of a force being constituted of this nature in this era is rather unlikely, this account of the development of the Force and its impact on the English Society is rather interesting.

The book, despite its interesting insight into a relatively unknown military force, would be of little interest to the general military reader. If one is interested in the military and its role in Victorian England, the book might be worth reading.

Captain Albert F. Leister, Jr.
University of Washington

MEN AGAINST TANKS: A History of Anti-Tank Warfare. by John Weeks. 192 pages. Mason Charter, New York. 1975. $10.00.

Men Against Tanks is the story of the Infantryman and his fight against the tank. The book only considers those antiarmor weapons that are carried, pulled, or pushed by men on their feet. Armored vehicles and self-propelled guns have been excluded. There is an excellent discussion of ammunition which uses diagrams extensively to reduce the technical aspects to a layman's level of understanding.

The narrative reviews the various weapons developed to kill tanks, starting with the rifle and ending with the missile. This includes rifles, molotov cocktails, grenades, rockets, guns, recoilless rifles, and missiles. The key is to develop a way to launch a heavy projectile at a great velocity but with minimum recoil. The Infantry always demanded a bigger and more effective gun (heavier shell and longer range), but that becomes unprofitable since the guns become too difficult to move.

The United States is given credit for making the greatest contribution to World War II antitank efforts by inventing and producing the bazooka, the first of a long line of individually-controlled rocket launchers that can be fired from the shoulder. German research outshadowed others during World War II, but production difficulties and proliferation of weapon systems hampered effective use.

The book contends that until recently, the efforts of brave and determined men have always been a step behind armor plates. However, today the Infantryman armed with the missile has become the nemesis of tanks—another tank is not the best weapon to fight tanks. In the future, tanks, except for an increase in the night fighting capability, will change very little. The book acknowledges the advantages of placing the most deadly antitank weapon, the missile, on the Army's most mobile platform, the helicopter. Notwithstanding, the gun will be around a long time.

The author is an Infantry colonel with an extensive weapons background in the British Army. The book is well organized and will be interesting to the professional soldier.

The Late Colonel Carl M. Putnam

EAGLE AND SWORD by Richard H. Kohn. The Free Press, New York. 1975. 443 pages. $13.95.

In these modern days, we in the military are concerned about personnel reductions and billion dollar budget cuts that we envision jeopardizing the security of the United States. It's interesting therefore, though not necessarily reassuring, to read about some of the similar miseries our Army went through during its birth and early years. To learn, for example, that on 2 June 1784, the Continental Congress discharged the last regiment of the Continental Army, leaving only *80 men* to guard supplies at Fort Pitt and West Point! To learn that, by 1789, Congress owed its soldiers $150,000 (when a private got only $7 a month), and at one time (1788), Congress simply suspended all regular distribution of funds to the Army!

Richard Kohn, an already distinguished historian, has written an intriguing and very readable story about the first 2 decades of the Army. Some of the events are familiar: Shay's Rebellion, The Whiskey Rebellion, the Indian Wars, and Wayne's victory at Fallen Timbers. Some other aspects are not as well known: the Newburgh Conspiracy, the short life of the Legion of the United States, Alexander Hamilton's consuming military ambition. Dr. Kohn has woven these and many other highlights around a single, profound but fundamental question that troubled our forebears: what role should military forces play in a republic, could that republic survive the threat inherent in any permanent military establishment? (That same problem is causing some concern even today with our All Volunteer Army.) The arguments, the debates and rhetoric, the machinations and political maneuverings, the harsh campaigns and great despair that shadowed the young Army, and the apparent readiness of powerful men to try to use the tiny fledgling Army to promote their own ends are all described here in a book that breathes life and action into dusty history.

Military buffs will enjoy this lively story of some very tough times, and scholars in particular will like the detailed source notes included in an appendix. Despite the somewhat steep price, this is a fine addition to any soldier's bookshelf, especially in this bicentennial period.

Colonel (Retired) John R. Byers ▲

It is time again to ask you to help us give you the best *ARMOR* Magazine we can put together. Numerous changes in format and features were instituted as a result of your answers to our 1975 survey.

Please complete the following questionnaire and return it to *ARMOR*.

YOUR ANSWERS AND COMMENTS ARE IMPORTANT. PLEASE TAKE THE FEW MINUTES NECESSARY TO HELP YOUR JOURNAL. THANKS—ED.

1. The editorial policy of *ARMOR* Magazine is to stimulate interest in, provoke thought on, and provide an open forum for decorous discussion of professional military matters especially as they relate to the study of mobile warfare.

Do you agree with this policy? Yes. No. (If your answer is no, please explain) _____

_____

_____

2. *ARMOR* is published six times each year. How many copies have you seen this past year? 0 1 2 3 4 5 6

3. Why do you personally (subscribe) (not subscribe) to *ARMOR*? _____

_____

_____

4. Do you maintain a personal professional reading library of magazines and books? Yes. No.

5. Do you feel *ARMOR* contains valuable information for:

NCOs	Yes	No
Lieutenants	Yes	No
Captains	Yes	No
Majors	Yes	No
Colonels	Yes	No
Generals	Yes	No
Industry	Yes	No
Other	Yes	No

COMMENTS

_____

_____

_____

_____

6. I have a high interest in (please circle) Tactics, Doctrine, Historical Analysis, Armor R&D, Training and Training Techniques, Professional Thoughts, Leadership and Professional Development, Communication, Maintenance, Logistics.

7. The most interesting article read in 1976 *ARMOR* was _____

_____

_____

8. How thoroughly do you read *ARMOR*? (circle) scan, partly, fairly thoroughly, every page cover-to-cover.

9. Within the constraints imposed by Army Regulations, which have been mentioned in editorials, what would you like to see in *ARMOR* that is not presently included?

_____

_____

10. What changes in format and illustrations do you suggest?

_____

_____

11. How do you rate *ARMOR* overall as a professional journal? Excellent Good Fair Poor

12. I personally find little value in articles on _____

_____

_____

13. Do you read:

"Letters to the Editor"?	Yes	No	Sometimes
"Commander's Hatch"?	Yes	No	Sometimes
"Forging the Thunderbolt"?	Yes	No	Sometimes
"OPMD-EPMD"?	Yes	No	Sometimes
"Briefs from other Journals"?	Yes	No	Sometimes
"Professional Thoughts"?	Yes	No	Sometimes
"Book Reviews"?	Yes	No	Sometimes

Comments about any of the features in 13 above ____

_____

_____

Other comments on next page.

* * *

NAME _____

ADDRESS _____

BRANCH OR JOB _____

RANK OR POSITION _____

DUTY STATUS:

_____ Active Duty
____ Active Reserve
____ National Guard
_____ Retired
_____ Veteran
_____ Civilian

Local reproduction of this form is authorized and encouraged, and the results may be mailed in official "fees paid" envelopes to DEPARTMENT OF THE ARMY, US Army Armor School, ATTN: ATSB-MAG, Fort Knox, Kentucky 40121.

"PROFESSIONALS DEDICATED TO THE STUDY OF MOBILE WARFARE"

CUT HERE

Comments:

FOLD

DEPARTMENT OF THE ARMY
US Army Armor School
ATTN: ATSB-MAG
Fort Knox, Kentucky 40121

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

POSTAGE AND FEES PAID
DEPARTMENT OF THE ARMY
DoD-314

U.S. MAIL

DEPARTMENT OF THE ARMY
US Army Armor School
ATTN: ATSB-MAG
Fort Knox, Kentucky 40121

FOLD

☆ U.S. GOVERNMENT PRINTING OFFICE: 1976—757-041/1

STAPLE

From The Editor

A Point to Ponder

A young Armor Officer who came to see me recently was concerned that Armor leaders are undecided in their philosophy. He had talked to people and what they said made him feel that, as a branch, Armor might someday lose its identity because of lack of unity in defining its role.

The reader may or may not agree with what I told him.

I stated that Armor today is the culmination of ideas and was born out of trial and error. I explained to him that mobile warfare in this century had progressed rapidly as a result of advances in technology. These advances effected change in organization, tactics, equipment, and doctrine. In the nineteenth century we exploited the horse as far as we could. We bred him stronger and stronger. We learned to keep mounts rested for battle by transporting them by river barges and railroads and, early in this century, by trucks. Still after thousands of years with the horse as the mainstay of mounted combat the wheels of progress turned and the military machine arrived on the scene in the form of rudimentary armored cars and tanks. They certainly were not affectionately blessed by everyone, but they served a vital function by protecting soldiers while gaining or defending ground.

These changes caused a great deal of controversy throughout the military societies of world. Change from the familiar and proven was not easy.

The tank and other armored vehicles in World War I were anything but mobile and reliable by today's standards and only a handful of advocates kept the tank concept alive after the war. During the 1920's and 1930's the "true cavalryman" wanted nothing to do with tanks. Mounted combat was a heated subject of discussion throughout the world's armies.

My father, a cavalryman on the Mexican border during World War I, was a student of military history and an ardent reader of periodicals from Europe. At a briefing for senior officers in 1932 he explained why the horse was "through" as an important element of mobile warfare. His philosophy was particularly sacrilegious coming from a cavalry officer who was fond of horse shows and had been an Army champion jumper in the 1932 Olympics. His discussions got him banished in 1934 to the 463d Armored Car Squadron at Fort McPherson, Georgia. One day when he came home in overalls, my mother told him he smelled like metal and gasoline rather than leather and horse sweat. His greasy smile told her that he knew the cavalry was on its way to changing its mount. For better or worse, cavalrymen had to start adjusting to becoming mounted on wheels and tracks.

If you read your *ARMOR* Magazine you can trace the evolution. There was much spirited dialogue, but perservance slowly developed the type of equipment and leadership needed for mobile warfare.

We talk much today about combined arms, often as if it is something new. It isn't. From 1937 to 1940, many studies were conducted in Europe and the U.S. on mechanizing cavalry which of course evolved into the armored forces of World War II. In the U.S. especially, the transition was difficult. The tendency to employ the *combat car* (remember the proponency for the *tank* belonged to infantry as a support weapon) in "horse" formation was ever present and few could agree on tactics. From one field problem to another an axion became evident—that armored vehicles in the attack or defense must be supported by infantry and artillery. It was also very evident that the combat car (tank) was an unprecented ground gainer when properly supported. The combat arms had to be integrated for modern mobile warfare.

Many cavalrymen felt armor was born out of wedlock but as it matured it gained more and more disciples. The great debate and name calling went on while experts tried to determine how much of what was needed and, especially, who was to develop and command the new tank formations.

As World War II loomed over the horizon, the dash and doctrine of horse cavalry gave way to the spirited development of armored forces which later dominated the battles of Africa and Europe. The point here is that many of the cavalrymen adjusted their thinking and went on to become great Armor leaders. General Patton himself was not fond of the tank concept in the early years.

Armor units and their commanders emerged from World War II with a well-earned reputation which changed the course of land warfare. Armor did not do badly in Korea, and I hate to think what would have happened if it had not been for contribution of U.S. Allied, and South Vietnamese Armor Units during the hellatious fighting of TET 1968.

Now, a new transition for Armor begins with the dimension that has been added to the battlefield by attack and scout helicopters. Unlike the situation when the armored vehicle replaced the horse, this transition should not be so painful because the helicopter complements the tank as a part of the combined-arms concept, and this should not be too hard to accept. The antitank guided missile and the helicopter do not change the role of Armor. We can honestly say the tank is not going to have to take a back seat after all. Thanks to some far-sighted people the *M-60* and *XM-1* are going to offer the trained crewmen and armor unit commanders unprecedented combat power.

The debate will continue until all new aspects are tested under fire; we will discuss and probably argue strength, organization, and trade-offs among ourselves, and from the outside of Armor's sphere we may look like we are not together. But, as you can see, we have always had spirited debate and that is what made Armor develop into the combat arm of decision on the battlefield. Armor branch as a combat arm is expensive and small in comparison to the rest of the Army, but it is the most powerful ground force the U.S. can put into the field. *I doubt very much if our philosophy of mobile warfare or our leadership will be absorbed by anybody.*

Coming in ARMOR

☆ ***"WHAT IS SQT?"***

Captain D.A. Connell describes the evolution of SQT and shows how it will affect operations and the soldier's individual development.

☆ ***"BATTLERUNS"***

In his thought-provoking discussion of battleruns, Major John B. Whitehead III defends the concept of battleruns and gives suggestions for construction and operation of battlerun ranges.

☆ ***"A SWARM OF LOCUSTS"***

Colonel John C. Bahnsen, Jr. and Lieutenant Colonel Peter F. Bahnsen suggest a method for obtaining swarms of potential military pilots capable of instant conversion to a tank-killing force.

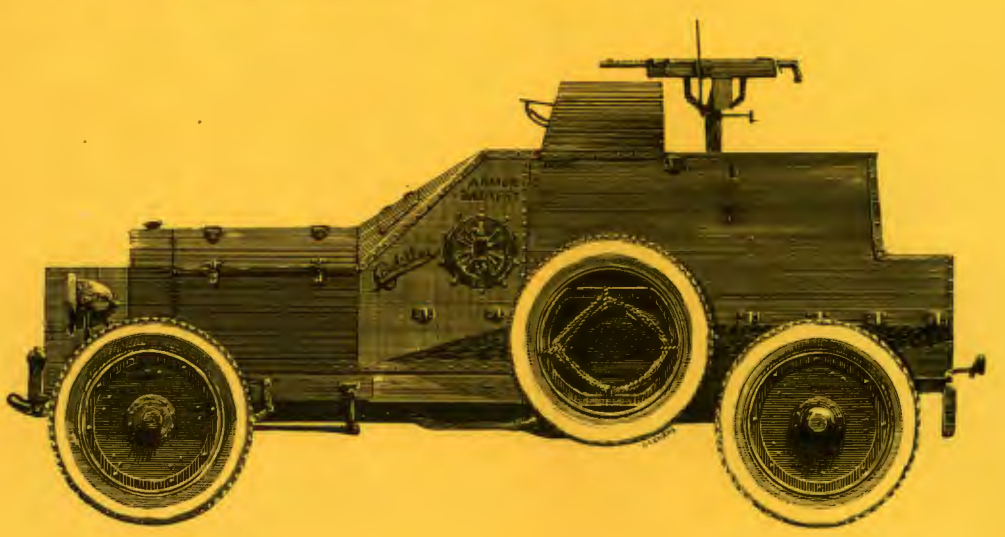
☆ ***"TANK EVOLUTION: IS IT PROGRESSIVE ENOUGH?"***

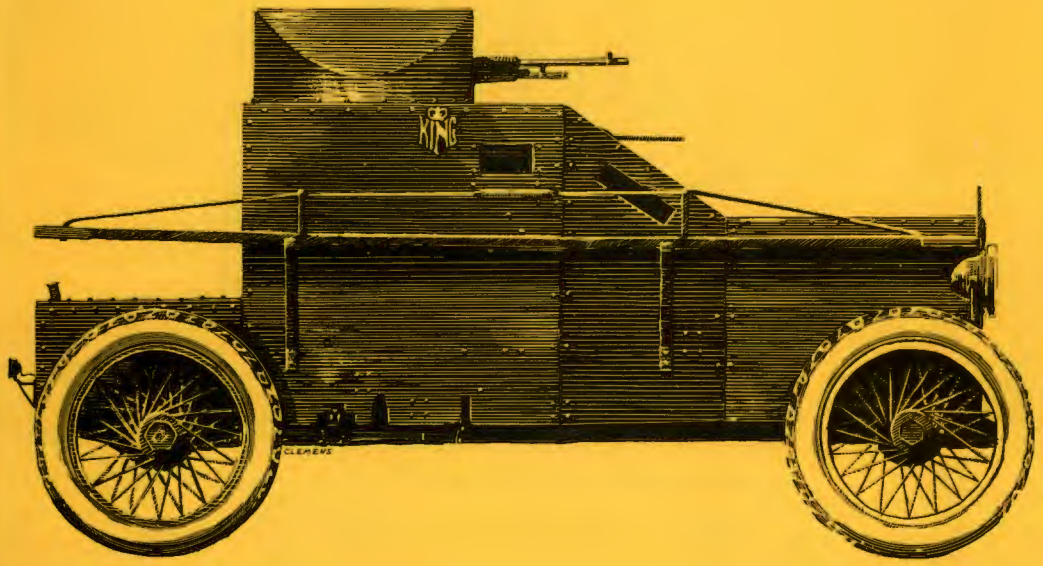
In his study of the overall development of the tank, Captain John Lee depicts the future trends in tank design and training and envisions a tank crew modeled on that of a flight crew.

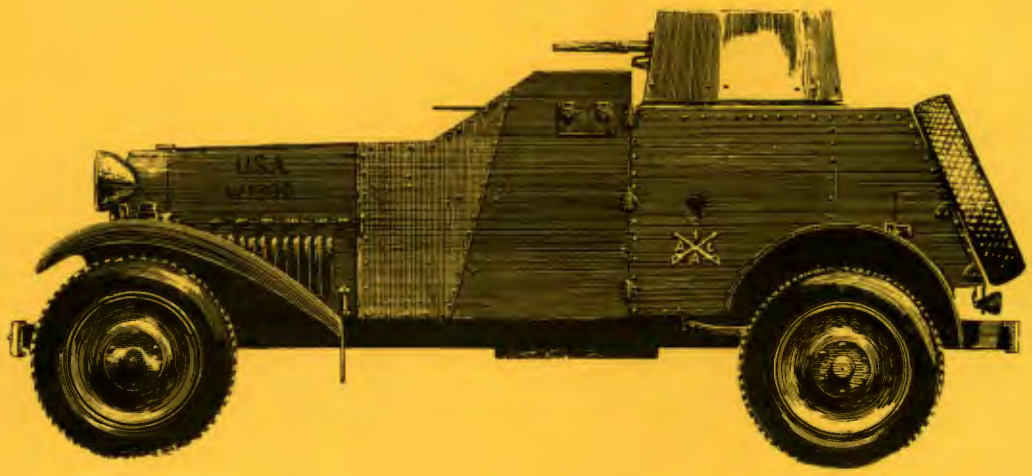
☆ ***"ARMORED CARS WITH CAVALRY"***

Writing in 1924, Major G.S. Patton, Jr. displayed an uncanny ability to foresee the development of tactics and equipment for modern warfare as we know it today.

ARMOR







march-april 1977

US Army Armor School

Commandant
MG JOHN W. McENERY

Assistant Commandant
BG DAVID K. DOYLE

Deputy Assistant Commandant
COL SIDNEY S. HASZARD

Educational Advisor
DR. CHARLES W. JACKSON

Secretary
MAJ WILLIAM A. SCHERR

Command Sergeant Major
CSM WILLIAM R. PRICE

INSTRUCTIONAL DEPARTMENTS

Automotive
COL JAMES L. MARINI

Command and Staff
COL CORWIN A. MITCHELL

Leadership
COL ADDISON D. DAVIS III

Weapons
COL JAMES W. BOOTH

DIRECTORATES

Combat Developments
COL JIMMY L. PIGG

Support
COL WALTER L. WATKINS

Training
COL DAVID R. HAMPTON

Training Developments
COL HERMAN J. VETORT

Evaluation
MAJ (P) PAUL E. FUNK

UNITS

The Lightning Brigade
COL HARRY E. B. SULLIVAN

"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."

Cover

The drawing of the armored cars on the cover of this issue were reproduced from the book, *American Armored Cars,* and are reprinted by permission of the author, Al J. Clemens. The cars are, from the top to bottom: Davidson's Cadillac (1915), King Armored Car (1916), LaSalle Armored Car (1928). A story about the role of armored cars with cavalry begins on page 30.

March-April 1977
Vol. LXXXVI No. 2

ARMOR

the Magazine of Mobile Warfare

ARMOR Magazine is published bimonthly by the US Army Armor School at 4401 Vine Grove Road, Fort Knox, Kentucky 40121, to stimulate interest in, provoke thought on, and provide an open forum for decorous discussion of professional matters. Unless otherwise stated, material does not represent official policy, thinking or endorsement by any agency of the US Army. Use of funds for the printing of this publication have been approved by the Department of the Army, 23 December 1975.

SUBSCRIPTION RATES: Individual subscriptions to ARMOR are available through the US Armor Association, Post Office Box O, Fort Knox, Kentucky 40121. **Domestic:** $8.00 one year, $17.00 two years, $20.00 three years. **Foreign:** $10.00 one year, $18.00 two years, $26.00 three years. Single copies: $1.50.

CORRESPONDENCE: Address all correspondence to U.S. Army Armor School, ATTN: ATSB-MAG, Fort Knox, Kentucky 40121. (Telephone: Autovon 464-2249 or Commercial (502) 624-2249).

POSTMASTER: Controlled circulation postage paid at Louisville, Kentucky, Department of the Army, DOD 314.

ARMOR may be forwarded to military personnel whose change of address is caused by official orders (except to APO addresses) without payment of additional postage. The subscriber must notify the postmaster.

LETTERS

More on the Armor Badge

Dear Sir:

In the May 10th issue of *ARMY TIMES* an article appeared which stated that the Vietnamese Armor Badge was no longer authorized for wear by U.S. personnel. The newspaper, in reporting the case of an armor NCO who had unsuccessfully challenged this ruling, cited a DA spokesman by saying that only the Vietnamese Airborne, Ranger, and EOD badges were still authorized for wear by former advisors. Why is the Armor Badge prohibited? No reason was given in the article for this flagrant example of prejudice.

I was very proud of the Vietnamese Armor Badge that I wore. I even bought several of these from *ARMOR*. Orders are orders, of course, so, after 6 years, I've quietly removed this item from my uniform and have tucked it away in a dark corner of the dresser drawer. Somehow, that just doesn't seem the proper place for the Badge. The award meant quite a bit to me when my counterpart pinned it on my uniform and it still does. What are the chances of getting some high-powered armor support in this matter? Who knows, if enough officers cared, may be we could have that DA directive changed and put our badges back on our chests where they belong!

JOHN W. MOUNTCASTLE
Major, Armor
Ft. Leavenworth, KS 66027

Dear Sir:

Captain W. A. Knowlton's letter in the September-October 1976 issue of *ARMOR* impressed me in a negative way: the tone of his letter suggests that he feels slighted for not receiving recognition for some period of combat service where he actually dismounted his tank or Armored Cavalry Assault Vehicle (ACAV) and walked upon the ground! Apparently Knowlton has missed the point of the Combat Infantryman's Badge, which is to add a little luster to the job of the infantry soldier, the man who sustains the majority of casualties in any conflict, the man who sits all night in the freezing rain in a foxhole (no heaters there, Knowlton), and the man who faces the enemy bullets with only his field jacket for protection. To add a Combat Armor Badge would be meaningless, as the unit patch on the right sleeve already indicates the wearer has seen combat. And as for the Republic of Vietnam (RVN) Armor Badge, I can only add that pretty badges do not stop *T-54* tanks...

CHARLES F. SANTOSE
Captain, Armor
Orrville, OH 44667

Comments on the "Commander's Hatch"

Dear Sir:

I read "The Commander's Hatch," September-October 1976, with great interest and general agreement, but concluded with numerous reservations. I have long believed that the combined arms of the Army should be structured and organized into the configurations in which we foresee them being committed in combat, i.e.; heavy/light tank and mechanized TOE battalions. Additionally, having been associated with the Army's recent Antiarmor Systems Program Review and now commanding a tank battalion, the subject of armored organizations strikes close to home.

With the ever increasing sophistication of weapon systems and their growing proliferation within the Army's maneuver units, the company-team commander in any future mid-intensity battle will be totally committed with precise and timely decision making, coordination, control, execution, and reporting. It is my belief that platoons consisting of only three tanks each will further complicate the company-team commander's task by holding him completely responsible for the EXECUTION of the very basis of armored combat—FIRE and MANEUVER. This may well hinder that unit's chance for success. It would be wrong to deny the tank platoon leader of this vital capability, especially under the conditions so vividly driving current tactical thinking for Europe, i.e.; wide frontages, independent and fluid actions, emphasized requirements for lateral movements, and initiatives at the lowest tactical levels. We must be watchful that tank organizations of other nations do not in themselves influence us so that we think we are wrong. Of the countries mentioned, only Israel has fought in significant armored combat since World War II, and we must remain aware that they are organized solely to defend their homeland, thereby not requiring flexible organization for worldwide deployments.

I am encouraged by the concept of a separate antitank company which will enhance employment of *TOW* assets and adds to the flexibility of the battalion. I do not agree with the benefits derived from the formation of a Combat Service Support (CSS) Company, as it splits the battalion staff, both in the field and in garrison, and thereby dilutes team effectiveness. Just the conation of CSS in a maneuver battalion, unless on an independent operation, has the commander looking in too many directions, and could well dull the unit's cutting edge. Granted, when project CABL—Consolidation of Administration at Battalion Level—is completed, the CSS organization may be required.

The Combat Support Company (CSC) should be left as currently organized. It does not have a competing command post in the forward area as currently employed. In the field, CSC assets are attached out or otherwise employed throughout the battalion's area of operation, and the commander becomes an advisor to myself and my staff on such matters as employment of scouts, *TOW*, air defense, ground surveillance radar (GSR), artillery and other appropriate matters.

Consolidation of *Redeye* and GSR above maneuver battalion level removes critical assets from my control, and decreases their responsiveness, thereby weakening the "combined arms" strength of the unit. Consolidation of this nature can later lead to a divisional *TOW* battalion, divisional AVLB's being assigned to the Engineers, etc.—each negating the original intent of organizing combined-arms TOE battalions, built upon a nucleus of armor and infantry.

It is encouraging to know that Armor and its leaders are actively leading the planning which I hope someday will result in common based heavy and light tank and mechanized TOE battalions. It is doubtful if future conflicts will give us the necessary time to become a creditable combined-arms force while enroute to battle.

WILLIAM D. CORLISS
Lieutenant Colonel, Armor
Fort Riley, KS 66442

Grain of Salt

Dear Sir:

It was with the greatest of relish that I read and reread John Cook's thoughts on "The Fallacy of Initiative," in the Novem-

ber-December issue. As a former Recon Company Commander during World War II under Ernie Harmon, John certainly knows whereof he speaks! So often in our field manuals, we diligently attempt to incorporate elan into our doctrine. Woe be unto he, however, who doth not incorporate the proverbial "Grain of Salt." Simply put, the initiative belongs to the guy who is beating holy hell out of his opponent. As I best remember it, that can be done in any number of situations other than the attack.

The article was good, and is sage advice to those of us going "come as you are," representing the "cutting edge" in the "first battle of the next war."—Well done, John!

WILLIAM A. PARIS
Captain, Armor

Boise, Idaho

An Author's Reply

Dear Sir:

I thank my good friend John Byers for his favorable comments on the article, "Writing a Readable OER." But his moralistic entreaty for fairness raises another issue to which I would like to respond.

A cliche says that "All's fair in love and war." Which is to say, there's hardly anything which is fair. Another often cited line is "Whoever said the world was fair, anyway?" Fairness is a value judgment; a perception held by the viewer that may differ from that of the viewee. So let me tell you how I see the situation. Bill Highlander and I made the points that OERs must contain a firm, memorable image of the rated officer and that the rater must strive to say what he means. We all know that amputation of an officer's career doesn't have to be done with a meat axe; a scalpel's edge will do nicely under the current system. So, perhaps, we do need to inflate the Armor officer's OER, just to get our fair share of selections.

John claims that the majority of officers are average and they should get an average report. I believe that Armor and Infantry have the toughest jobs in war and peace and the difficulty of the task should be credited. We're going to need a lot of these leaders in the next war. Selection boards do not promote by branch quotas (an example of fairness). Combat arms officers are compared with AG, QM, FI officers who, although important in the overall scheme, are not subject to the same job demands. If Armor OERs are less well done than those of other branches, our hard working tankers will get the short end. I sat on a promotion board which ended with a selection rate of 92 percent or better for tech services and support troops while Armor came out at about 82 percent. The disparity was due to the quality of OERs. In fact, ADA OERs on a whole were considerably better done than other branches and the selection rate proved the value of this.

The Army needs the best in each of its branches to move up the ladder—I don't question that. But the highest selection rate should go to the fighters. I've seen above-average Armor and Infantry officers miss promotion while some AG, FI, QM, etc., officers made it—even below the zone. *I don't think that's fair.* The fighters deserve a better break. We are [probably] the only Army in the world where the fighters compete for promotions with the service troops; and when the next war starts, we'll always have plenty of service troop leaders!

Lest someone accuse me of being parochial, I'll just admit it. I'm an Armor officer, damn proud of it, and especially proud of my fellow Armor officers. And I want to see them taken care of.

The OER is the most important document in an officer's file—the better it can reflect the Armor officer, the better our chances are for improving Armor's selection rates. Bill and I knew what we were saying; it's the kind of guidance that Branch should have provided years ago from reviewing OERs and their *relative* quality. If the advice is not heeded, Armor will continue to slip in the overall selection rates. Will that be fair? Already reprints of the article have been requested by other branches, most of them non-combat arms. Mull over that!

JOHN C. BAHNSEN, JR.
Colonel, Armor

Ft. Monroe, VA 23651

Comments on Command and Control

Dear Sir:

From the content of recent published material, there would appear to be a gap of understanding between the readers of two professional journals, and possibly the members of two branches.

I direct the attention of all personnel involved with Field Artillery forward observers at the Tank Company level, to two separate articles.

First, to an article of Captain Lyman L. Harrold, AR, in the March-April 1975 issue of *ARMOR* (page 31, "Command and Control-Demands of the Battlefield").

Captain Harrold (who has served as a company commander for an *M-60A2* company at Ft. Hood) utilizes an *M-113* from the company maintenance section as a mobile company CP. Fitted with an additional radio, plus the Forward Observer's PRC-77 radio, the track is occupied by the CO, a rattelo, the attached FO, and other key personnel (such as a battalion mortar platoon FO). This unit provides continuous radio contact with the platoons of the company, higher HQ, and fire support elements. There is no need for frequency changing, and calls for fire amount to pointing out the target on a map or the actual terrain to the FO's. The FO's then handle the actual supporting fires.

This organization for combat provides some armor protection for the command party. It also relieves the CO and FO of responsibility for command of an increasingly complex tank (with which the FO may not be sufficiently familiar). Further, it provides the CO with a light tank section which can be used either for HQ security, or the emergency reinforcement of a platoon in trouble. In an armor-intensive environment, these extra tanks may be crucial, especially if the enemy has numerical armor superiority.

The second article is a letter by Second Lieutenant Roger J. Buffington, FA, in the November-December 1976 issue of *Field Artillery Journal* (page 6, FO Vehicle).

In this article, Lieutenant Buffington points out the increased armor protection of the tank when used by the FO. Further, he states that the laser rangefinder of the *M-60A2* tank offers possible first round fires-for-effect.

Both of these articles make important points concerning the proper vehicle for use by the FO. As Captain Harrold points out, there probably is no one solution that will be correct for all situations and battlefield environments. Captain Harrold has tried his solution, and found it to be effective.

Since the combined-arms team is the essential element on the modern battlefield, it would seem to make sense to make maximum use of coordinating facilities (the mobile CP), while not reducing the effectiveness of any combat vehicle (the two tanks in the HQ assigned for CO and FO use).

No matter what method is employed by the company commander to insure the success of his mission, the commander has final responsibility for his unit's performance. While no one would suggest combat engagement without adequate fire support, it must still be the maneuver unit commander decides the priorities for the utilization of a assigned resources.

This topic invites further studies and experimentation, including the possible use of a more suitable CP vehicle, the incorporation of rangefinder capabilities into the CP, and improvements in command and control techniques involving fire support units.

BARRY D. NIGHTINGALE
Second Lieutenant, Armor

St. Helena, CA 94574

A New Mobile Land Target

Dear Sir:

On 6 October 1976 I observed a demon-

stration and test at Marine Corps Base, Twentynine Palms, CA, involving tanks of the 3d Tank Battalion and two mobile land targets (MLT's) which were designed and provided by the Naval Weapons Center, China Lake, CA. The demonstration and test was conducted upon the request of Naval Training Equipment Center, Orlando, FL.

I was extremely impressed by the possibilities an MLT presents to improve moving target ranges for our inventory of direct fire weapons or air-delivered munitions.

MLT is a remote controlled "dune buggy," utilizing a Volkswagen engine and running gear. It is capable of pulling a target sled or supporting a target panel. MLT operates very well over marginal terrain, and in cleared areas or on roads can achieve speeds in excess of 60 m.p.h. It offers a small silhouette of about 2¼ feet by 9 feet. It is relatively inexpensive to procure and is easily maintained. Most importantly, it can be maneuvered in nonpredictable patterns creating a highly challenging and realistic target for gunners to engage.

During the demonstration and test, two *M-48A3s* of Company A and an *M-60A1* from Company B initially fired at a towed target sled at a range of approximately 1,400 meters. They then engaged the MLT itself without the sled. The MLT was moving cross country at speeds of 10 to 20 miles per hour and at ranges from 1,400 to 1,600 meters. As a tanker, I am happy to announce that China Lake needs a new MLT.

The Army, as well as the Marine Corps, has an outstanding opportunity to influence the development and procurement of a very necessary training device. It is only with realistic training against such an unpredictable target that a high probability of first round hits can be achieved; and first round hits win battles. Semper Fidelis!

MICHAEL H. COLLIER
Major, U.S. Marine Corps
MCB 29 Palms, CA 92278

"Action at Facuti"

Dear Sir:

I was very pleased to read in your July-August issue "Action at Facuti," an engagement which I have participated as Staff Officer of Operations in the described "Combat Group W," a small brigade-size formation of combined armored forces.

You can be sure that I train my armor leaders with the thoughts in mind that those experiences have given to me.

I congratulate Major Hans W. Wagner for digging out this article, which first appeared in my book "Der Gegenschlag," Neckargemund, 1959, then in "Die 24. Panzer division, vormals 1. Kavalleriedivision 1939-1945," Neckargemund, 1962 and again in "Gefechtsbeispiels aus dem Zweiten Weltkrieg," Wien, 1971, for your readers in the U.S. armored forces.

DR. F. V. SENGER U. ETTERLIN
West Germany

FROM THE EDITOR

This LETTERS section belongs more to the reader than perhaps any other section of *ARMOR*. It is an open forum for discussion of informed viewpoints or opinions, but without the reader's continued support, this section will fail. LETTERS is the most accessible format in *ARMOR* for the reader to make his views known. If you find yourself strongly agreeing or disagreeing with *anything* you see in *ARMOR*, write us a letter. Without this feedback, we won't know if *ARMOR* is accomplishing its mission.

Boudinot

"The Senior Trooper"

Dear Sir:

Command Sergeant Major Krueger's article, "The Senior Trooper," in the November-December issue is one that could have only been written by a soldier who has been there and knows of what he speaks. Most of the responsibilities of the CSM mentioned are not covered in the job description offered in manuals and regulations, but are pertinent and cannot be avoided.

Two points made can never be overemphasized and must be understood by all:

- The CSM must have the total backing of the commander and the commander must have the fullest confidence in the CSM. In this respect, a CSM must remember that confidence and respect are not automatic, it does not come when the stripes are issued. Each time a CSM transfers or a new commander is appointed, the CSM must, by his own actions and performance, demonstrate that he is worthy of this backing and respect.
- The CSM must be where the action is. He must be there when the weather is bad and the hours long and arduous. He is not a fair weather soldier. The truth of the matter is that an NCO pays his dues as a platoon sergeant and is promoted to First Sergeant. Then he pays his dues as a First Sergeant and is promoted to SGM and CSM. He then pays his dues for the rest of his career for the privilege and honor of being a CSM.

The old pros know Command Sergeant Major Krueger has written the truth, and the young NCO's can learn from his article. Thank God there are many, many professionals like him in the Army. Soldiers such as he will insure that we have an Army today, tomorrow, and in the future.

DONALD E. HORN
Command Sergeant Major, Retired
Copperas Cove, TX 76522

A Commentary

Dear Sir:

With reference to Captain Bruce Bruder's letter to the editor on the subject of maintenance (*ARMOR*, November-December 1976). I suggest that he might be interested in the article I wrote on it in your November-Decmeber 1973 issue, "Are We Flogging a Dead Horse?" Perhaps you would be kind enough to bring it to his attention.

I continue to be impressed with the quality and variety of articles in *ARMOR*, and I believe that you and your associates are to be applauded for the efforts producing such results.

I was taken aback, however, at Lieutenant Colonel O'Meara's article, "Through the Eye of the Hurricane." I consider it an exercise in sophistry. There are several points that deserve comment, but I will restrict my attention to only one. This pertains to the type of economic system that exists in the U.S. Judging from Colonel O'Meara's comments, such as "Conditioned by his materialistic and commercial society to be on guard..." and later: "...life takes on a new perspective...and commercialism is forgotten."—it appears that he views our economy with distaste. Very strong distaste. I do not know Colonel O'Meara's qualifications in the field of economics, but he seems to be saying that "commercialism" (which he does not define) is a matter that occurs in the eye of the beholder; as opposed to its real characteristics. I do not know what sort of an economic system might please Colonel O'Meara. Personally, I prefer one in which the maximum degree of freedom and choice prevails—the only kind which can satisfy a wide range of tastes. How we might label or regard it are matters of individual values. Regardless of these aspects, prosperity is a function of production where incentives are sufficient to forgo some immediate consumption to invest in better and better tools. What distinguishes a prosperous country from an impoverished one is the use of tools so that the application of human energy is multiplied manyfold. We should never forget that in World War II it was the production "miracle" that provided the mili-

tary hardware in sufficient time and of the quality and quantity necessary for ultimate victory. This was due in large measure to large businesses who had the requisite resources and know-how.

Perhaps Lieutenant Colonel O'Meara might want to explain what he means. I would be interested to know.

GEORGE G. EDDY
Ph.D., Management Consultant
Austin, TX 76746

A Comment on Maintenance & Training

Dear Sir:

I was chagrined, but read and then reread with interest the letter Captain Bruce E. Bruder entitled "The Maintenance Factor" (*ARMOR*, November-December 1976). Certainly, it is most unfortunate that there may be Commanders (Read - Trainers) who may be afraid to use their equipment for fear of deadlining it.

I wholeheartedly agree with Captain Bruder's cry for mutually dependent training and maintenance scheduling. As an Armored Cavalry Troop Executive Officer and an Armored Cavalry Squadron Maintenance Officer, I have been fortunate enough to have assisted Armored Cavalry Troops and Artillery Batteries in maintaining their equipment during extensive field training missions both at Fort Bliss, Texas, and during Reforger designated exercises in Europe.

Hopefully, those Commanders and units with an inability to reconcile maintenance and training dependencies are few in number. It is a stated objective within my unit that we will (and do) train with maneuver and gunnery skills as primary objectives in order to detect and destroy the enemy with a first round hit. Fortunately, in the pursuit of these objectives, maximization of combat and combat support equipment availability rates *and* the extensive utilization of all organic vehicles in training is the *norm* rather than an exception.

JOSEPH P. PHILIPP
Captain, Armor
Fort Bliss, TX 79916

In Favor of Logistics

Dear Sir:

In the November-December 1976 issue, Captain William F. Greer has an excellent article, "Another Mission for the CSC Commander," regarding logistic operations at the battalion level. He states that a recent reader's survey revealed that 75 percent of your readers do not like to read articles on logistics and maintenance. Since I am in the minority in this case and since I think Captain Greer has an important message for your readers, I am compelled to comment on the article and recommend it to those readers who failed to read it. Perhaps after reading this, all maneuver battalion staffs could devote an hour at their next staff meeting to zoom in on trains operations. Captain Greer is recommending that the Combat Support Company commander get involved in logistics and I would like to support him and suggest that all commanders and staff officers of the battalion devote more attention to logistics. In an attempt to relieve the line company commander of administrative burdens, we have made logistics a neglected topic.

Captain Greer indicated he had much more to say about refueling and messing, but was constrained by space. I hope he will be given all the space necessary to discuss these vital topics.

The Quartermaster School has been engaged in studies of bulk fuel distribution and field food service operations in the division. We agree with Captain Greer that little is written on these topics and we are attempting to correct that deficiency through the new series of manuals now being published. The battalion staff should not wait for this guidance. They should focus their attention on all aspects of logistics operations and exercise the system during their next field training exercises. The many problems of cooking in the field must be overcome. Fuel and ammunition consumption factors and the concept of refuel and rearm several times a day need to be verified.

There seems to be an increasing number of combat arms officers involved in logistics over recent years. *ARMOR* is carrying more articles on logistics operations and I predict that the next reader's survey will show a change in the preference for articles on logistics.

JOHN R. SITTEN, JR.
Lieutenant Colonel, QMC
Fort Lee, VA 23801

LOGISTICS

In a war of materiel, such as modern practice has inflicted on the fighting man, a high standard of morale can only be the outcome of a well-integrated, smoothly working logistical organization. Whereafter, if we take the quartermaster as symbolizing all that we mean by logistics, there can be no gainsaying the profundity of Erwin Rommel's dictum that, "Before the fighting proper, the battle is fought and decided by the quartermasters."

Extracted from "The Military Review"

In Support of the Scout

Dear Sir:

This is late, but in this duty assignment, it is sometimes difficult to be eternally prompt. I especially wish to congratulate you on your selection of letters in the March-April 1976 issue. They were all fine, but I am compelled to draw particular attention to the letter by Sergeant First Class Easland on the scout; the 11D MOS.

I emphasize that in the half dozen maneuver battalion ARTEPs we have executed in the 2d Armored Division since the fall of 1975, well-trained scouts have frequently made the difference between level "1" and something lower. This is especially true in the Active Defense phase of the tactical portion of Armor and Mechanized Infantry Battalion ARTEPs. Their correct employment, their ability to assist units in lateral movement on the battlefield, their help on marches and their ability to provide correct information to the commander (on the battalion command push) have been absolutely vital to him when done correctly. When done incorrectly, the scouts can reinforce disaster.

I am compelled to comment on scouts fighting. This man normally fights only to accomplish his mission which is reconnaissance and security. I have long felt that sometimes we truly do not understand this role and thus tend to overarm him. For example, he now has some *TOWs*. When we do that, his normal reaction is to become a killer of sorts and the historically important reconnaissance and security role suffers accordingly. Here at Fort Hood, at least in this Division, we place much emphasis on this special skill and MOS. We have given him camouflage fatigues for field wear and at each Annual General Inspection, where scouts are organic to the inspected unit, I, as Commanding General, habitually inspect the scout platoon which (tragically) continues to ride in the ¼-ton truck and in some cases, the *M-113A1*. These are his assigned vehicles in this Division. Equally as tragic, he has no better vehicle forthcoming, either now or in the near term, by which to accomplish his vastly important mission in support of the battalions to which he is assigned.

Perhaps we will be able to do something about this particular skill in the near future. I don't know, but I will say that it is heartening to read a passage such as that written last spring by Sergeant First Class Easland. I hope someone sees fit to assign him to Hell on Wheels. His thoughts will fall on at least one set of receptive ears—mine.

GEORGE S. PATTON
Major General, USA
Fort Hood, TX 76546

THE COMMANDER'S HATCH

MG JOHN W. McENERY
Commandant
U.S. Army Armor School

WHO IS RESPONSIBLE FOR INDIVIDUAL TRAINING?

We're on the verge of a fundamental change in the way that we conduct training. Up to now, for a variety of reasons, the officers of our Army have borne the main responsibility of insuring that individuals and units were properly trained. NCO's, of course, have played a key role in this, but the responsibility has generally been that of the officers. This is not the mark of a truly professional army. Before World War II, our noncommissioned officers did virtually all of the individual training of soldiers; officers concerned themselves with collective training and those administrative tasks required of officers. The British army has traditionally done its individual training with a corps of expert noncommissioned officers, as have other highly professional armies. Sergeant Major of the Army Bainbridge stated it another way in a recent *ARMY* Magazine article: "The goal of the corps of noncommissioned officers, whose duty is the day to day business of running the Army so the officer corps has time to command it, is to continue to improve our Army at every turn."

Officers in the Army have to be oriented toward collective training and the unit's operational mission. They haven't the time to conduct individual training. That's the job of the noncommissioned officers. Some of us assume incorrectly that soldiers coming from the training base (Fort Knox included) are thoroughly trained. This is simply not true and cannot be. In the future we hope to do more than resources have allowed us to do in the past, but even in the best case, the new soldier can only became an apprentice in the time allowed.

Why then are we now speaking of a change in our training philosophy? The big difference is that now we are, for the first time, giving our noncommissioned officers the tools with which to conduct individual training. These basic tools are Soldiers' Manuals. By the time most of you read this article, you will have your Soldiers' Manuals for 11D and 11E, Skills Levels 1 through 4. These manuals lay out the tasks which each soldier must know, as well as the standards to which he must be trained. They do it for the soldier's current skill level, and for the higher-level skill levels to which he aspires.

The basic responsibility for training the individual soldier must rest solely on the shoulders of the first line supervisor, that is, the tank commander, squad or section leader. He is the only one that can possibly keep track of the status of learning of each soldier for each of the tasks that are listed in the Soldiers' Manual. It's a big job, but he's got to do it if we are going to train properly.

The first line supervisor can't do it by himself, he'll need

assistance. This assistance is in the form of time for training, training areas, equipment, field and technical manuals, TEC lessons, and ammunition. It's the job of the officer corps to provide these assets.

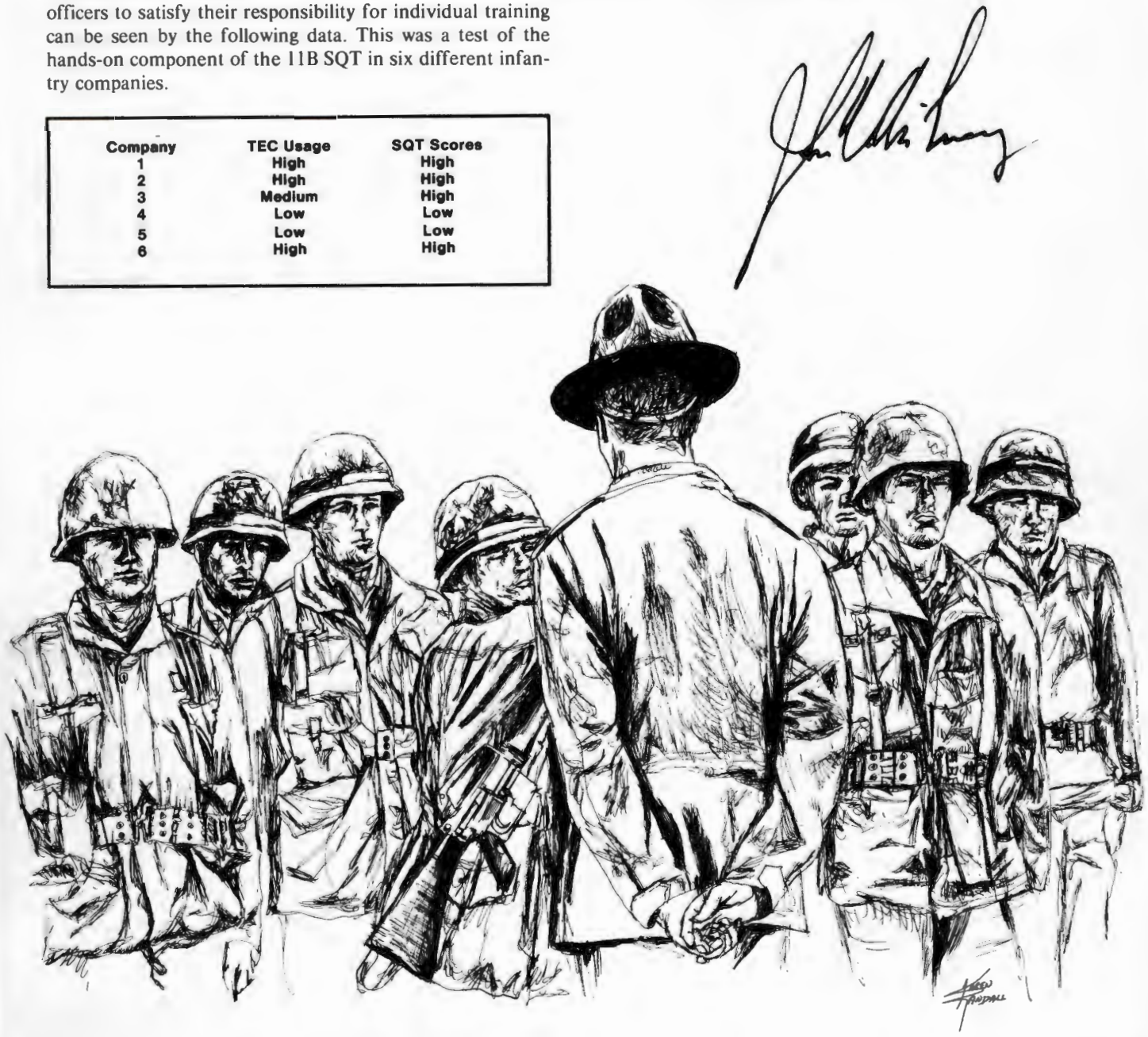
Does this mean that large blocks of time need to be scheduled for individual training or SQT preparation? The answer is no. Most of it needn't be scheduled if it's properly done. The noncommissioned officers should use the dead time that exists in most units and training activities to maximum advantage. Most of our young soldiers now are bored to death waiting for major events. While the leaders or one group are doing something, most of the soldiers are inactive. It's this waiting time that provides the greatest time resource for individual training. With Soldiers' Manuals, TEC lessons, and other references, soldiers can be given truly individual training on a self-paced basis under the guidance of their first line supervisor.

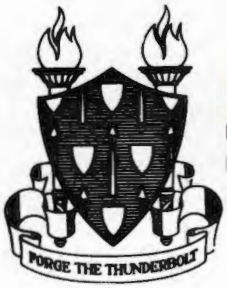
The value of TEC lessons in assisting noncommissioned officers to satisfy their responsibility for individual training can be seen by the following data. This was a test of the hands-on component of the 11B SQT in six different infantry companies.

Company	TEC Usage	SQT Scores
1	High	High
2	High	High
3	Medium	High
4	Low	Low
5	Low	Low
6	High	High

The true test of the professionalism of our noncommissioned officers will be the SQT which replaces the MOS tests of the past. It will be the noncommissioned officers' responsibility to see that our soldiers are prepared for the SQT's. Noncommissioned officers should be and will be rated according to the performance of their soldiers. Division, brigade, and battalion commanders should not have to schedule extensive review periods in preparation for SQT's. Preparation for SQT's should not be an annual event. It's got to be continuous throughout the entire year.

The approach to training that I have outlined is not unique to Armor. It will be instituted throughout the entire Army. If officers and noncommissioned officers embrace this approach and enthusiastically accept the challenge, our Army will be far better prepared than it is today. The key is for our officers to provide training resources and for truly professional noncommissioned officers to accept the responsibility for training individual soldiers.





FORGING THE THUNDERBOLT

MASTER GUNNER PROGRAM UPDATE

The Master Gunner concept was proposed as a method by which Armor units could increase gunnery expertise in the field. In 1974, senior officers from the U.S. Army Armor School examined the use of Master Gunners by British armor units and consequently visited CONUS commanders in the field to ask if the U.S. Army could use a similar system. This proposal was enthusiastically received and, as a result, TRADOC tasked the Armor School to develop a Master Gunner program of instruction.

The overall goal is to place one school-trained Gunner per battalion/squadron and company/troop within a two year timeframe beginning 2 March 1976 with a completion date of 11 September 1978. Based on projected class completion dates, fielding of Master Gunners will progress as indicated in the following table.

	M-60A1	M-551	M-60A2
100% of Army need*	1 May 78	30 May 78	11 Sep 78
50% of Army need	2 May 77	29 Mar 77	30 Jan 78
25% of Army need*	8 Oct 76	7 Dec 76	28 Jan 77

***On these dates the Armor School will have trained one Master Gunner for each company or troop.**

Thus far, USAARMS has graduated 133 Master Gunners. Listed below are the units and number of Master Gunners assigned to each:

Fort Benning
2d Bn, 69th Arm 1

Fort Bliss
1st Sqdn, 3d Cav 1
2d Sqdn, 3d Cav 2
3d Sqdn, 3d Cav 3

Fort Hood
2d Sqdn, 1st Cav 2
2d Bn, 5th Cav 2
1st Bn, 7th Cav 2
1st Bn, 8th Cav 2
2d Bn, 8th Cav 1
1st Sqdn, 9th Cav 2
1st Bn, 66th Arm 1
2d Bn, 66th Arm 2
1st Bn, 67th Arm 4
2d Bn, 67th Arm 0
3d Bn, 67th Arm 0
1st Bn, 81st Arm 0

Fort Lewis
2d Bn, 77th Arm 1

Fort Polk
4th Sqdn, 12th Cav 0
1st Bn, 40th Arm 1
3d Bn, 77th Arm 4

Korea
4th Sqdn, 7th Cav 0
1st Bn, 72d Arm 2

1st Armored Division
1st Sqdn, 1st Cav 2
1st Bn, 13th Arm 0
1st Bn, 35th Arm 2
3d Bn, 35th Arm 2
4th Bn, 35th Arm 0

Fort Bragg
4th Bn, 68th Arm 2

Fort Carson
1st Sqdn, 10th Cav 4
6th Bn, 32d Arm 4
2d Bn, 34th Arm 2
1st Bn, 70th Arm 0
4th Bn, 70th Arm 1
1st Bn, 77th Arm 1

Fort Knox
2d Sqdn, 6th Cav 4
D Trp, 10th Cav 1
5th Bn, 33d Arm 1
4th Bn, 37th Arm 2
USAARMS 1

Fort Riley
1st Sqdn, 4th Cav 1
1st Bn, 63d Arm 2
2d Bn, 63d Arm 2
4th Bn, 63d Arm 2

Fort Stewart
2d Sqdn, 9th Cav 0

3d Armored Division
3d Sqdn, 12th Cav 2
1st Bn, 32d Arm 1
2d Bn, 32d Arm 2
3d Bn, 32d Arm 2
1st Bn, 33d Arm 2
1st Bn, 37th Arm 1
2d Bn, 37th Arm 1
2d Bn, 81st Arm 1

Berlin Brigade
Co F, 40th Arm 1

1st Infantry Division (M) Fwd
C Trp, 1st Sqdn, 4th Cav 2
3d Bn, 63d Arm 2
4th Bn, 73d Arm 2

3d Infantry Division
3d Sqdn, 7th Cav 1
1st Bn, 64th Arm 1
2d Bn, 64th Arm 3
3d Bn, 64th Arm 2
4th Bn, 64th Arm 1

11th Armored Cav Regiment
1st Sqdn, 11th Cav 3
2d Sqdn, 11th Cav 4
3d Sqdn, 11th Cav 3
2d Bn, 33d Arm 1
3d Bn, 33d Arm 2

8th Infantry Division (M)
3d Sqdn, 8th Cav 1
1st Bn, 68th Arm 0
2d Bn, 68th Arm 2
3d Bn, 68th Arm 1
5th Bn, 68th Arm 2
4th Bn, 69th Arm 1

2d Armored Cav Regiment
1st Sqdn, 2d Cav 1
2d Sqdn, 2d Cav 1
3d Sqdn, 2d Cav 3
Wisconsin National Guard (Advisor) 1

7th ATC 2

USMC 2

The purpose of the Master Gunner program is to prepare highly selected noncommissioned officers to assist battalion/squadron commanders and company/troop commanders in the planning and implementation of tank gunnery training programs. The prerequisites of the course require the student to be a member of the active Army or Reserve Component in the grade of E6 or above. He must have a minimum of 2 years service as a tank commander on that particular vehicle and have passed the TCQC within the preceding 24 months. The individual must be a volunteer for the program and selected by his commander. The student is required to possess a SECRET security clearance and after completion of the course, be eligible for retention in his unit for a minimum of 2 years in the duty of master gunner.

The Master Gunner's primary mission is to assist the commander in managing a year round tank gunnery training program. He is trained in the preparation for and conduct of range firing and the evaluation of tank gunnery training and qualification. The Master Gunner should train the leaders, crews and units in tank gunnery and integrate gunnery training devices and new techniques into unit training, enabling the unit to maintain year round gunnery proficiency.

Although this program is only one year old, the Armor School has identified some problem areas through student and field comments. One problem is that Master Gunner students are not being stabilized in their unit for 2 years upon completion of the course. Since USAARMS nor the using unit has control over future assignments of Master Gunners, an unprogrammed or thoughtless PCS move usually results in gross misuse of this highly trained individual. Unit leaders must insure that the 2-year retention is confirmed with DA MILPERCEN *prior* to the selectee being sent to the course. It is also interesting to note that of the 133 Master Gunner graduates, only 17 have their ASI's recorded in the Master file at MILPERCEN. Ongoing actions have been initiated to correct this problem.

Another problem area is the selection process used to determine whom the unit will send when it receives a quota from their major command (TRADOC assigns school quotas to FORSCOM and USAREUR). It is essential that the caliber of the Master Gunner attendee be top rate. Success in terms of how well the Master Gunner is able to serve his unit depends in a great degree on the motivation and quality of the student who enters the course. He must possess a basic knowledge of tank gunnery, for he is tested shortly after entering the course. (In many cases, it is found that the student cannot properly boresight, place the rangefinder into operation and other basic gunnery related tasks). He should be able to brief, instruct and influence his superiors and peers. His success in his unit will, to a large extent, depend directly on his credibility with his superiors and peers. USAARMS has found that again in some cases, the unit sends less than the desired student. An individual who has a drinking problem, financial trouble or is lacking in motivation will not serve the unit well and is simply a detriment to the entire program.

In order to successfully complete the course, the student must present a year-round tank gunnery training program. He is required to develop this program specifically for his unit after examining the previous year's gunnery after action report and the projected training program for the upcoming year. Rarely do we find that the student is able to produce these items from his unit. (Reasons are that the unit does not have a projected training schedule or the student just did not bother to bring it).

The Master Gunner concept was developed to correct serious gunnery shortfalls in today's armor battalions and armored cavalry squadrons. Without good gunnery, armor units cannot accomplish their mission or be expected to survive on the modern battlefield. The Master Gunner is playing a significant part in eliminating shortfalls in tank gunnery. Field commanders have expressed the need for Master Gunners. After receiving a Master Gunner graduate from one of the first pilot courses, General John W. Vessey, Jr., former 4th Infantry Division Commander, stated in a letter to General Bernard W. Rogers, "My goal is to place a minimum of one Master Gunner in each of my tank battalions. The gain in the combat effectiveness of the division makes the Master Gunner a necessity rather than a luxury." Since this time, Master Gunners have been fielded at battalion level and those undergoing instruction will subsequently be assigned at company level.

FIELD FIX FOR M-533 WRECKER

During wet weather operation, the *M-533* Wrecker crane unit may start to swing out of control to one side or the other. This problem is caused by moisture in the swing control box.

An effective field fix that will prevent entry of moisture into the control box can be accomplished by installing a gasket. This gasket can be made from unserviceable innertubes, waterproof packing material, or gasket paper. These items are commonly found around motor parks and can be installed by operators or mechanics.

To install the gasket, remove the swing control lever and place a piece of gasket material, approximately 4 x 6 inches, underneath the lever and center the material over the shaft. Make sure the shaft goes through this material. Place a piece of material approximately 3 inches in diameter over the shaft in the same manner. Secure the control lever on the shaft. The large piece of material will be visible.

Once this is completed and the control box is reassembled, remove the cap screws securing the control box to the mounting bracket. Run the cap screws through the part of the large piece of material that protrudes from the control box, and secure it to the mounting bracket with the cap screws. Though not a finished factory product, this field fix will prevent water from entering the swing control box, preventing possible personnel injury and damage to equipment by a runaway boom.

HOME OF ARMOR ACCREDITED

The Armor School became a fully accredited institution in December 1976. The announcement was made by the Southern Association of Colleges and Schools (SACS) during its annual Delegate Assembly in Atlanta, Georgia, 12-15 December.

The Commission on Occupational Education Institutions (COEI) of SACS granted USAARMS its accredited status on the basis of a thorough evaluation which determined that USAARMS meets not only the needs of students, but also the standards of quality of the Occupational Commission.

The evaluation process included a comprehensive self-study by the staff and faculty of the school and review by a visiting team of professional educators representing member institutions of the SACS from throughout the south. Dr. Theodore Koschler, Vice President emeritus, Miami-Dade Junior College was chairman of the visiting team. The team visit occurred in February 1976.

The self-study was managed by a steering committee comprised of Colonel Sidney S. Haszard, Colonel David R. Hampton, and Dr. Charles W. Jackson. Working committees evaluated all areas of the schools operations pertaining to each of the COEI standards. Activities of all working committees were coordinated by Major (P) Paul Funk. Committees and chairmen are listed below.

Mr. Bruce R. Kille, Jr. — Institutional and Community Characteristics
Dr. Keith L. Baughman — Philosophy and Purpose
Major Glenn W. Morlock — Organization and Administration
Mr. William Sanders — Educational Programs
Major J. G. Garvey — Financial Resources
Lieutenant Colonel David J. McKinley — Staff
Lieutenant Colonel Kenneth G. Nielsen — Physical Facilities
Lieutenant Colonel Cyril W. Appel — Equipment and Supplies
Major James E. Smock — Student Personnel Services
Lieutenant Colonel John A. Simpson — Community Relations
Major Michael D. Keating — Long Range Planning
Dr. Norman M. Shumate — Learning Resource Centers
Colonel A. D. Davis, III — Placement and Follow-Up

What is the significance of accreditation? First, it means that USAARMS is a better institution as a result of improvements made during the self-evaluation. Secondly, it means that USAARMS now bears another widely recognized symbol of quality. It means that other institutions, both military and civilian, are more likely to regard instruction received at USAARMS as high quality instruction comparable to that received at accredited colleges and universities. For example, Western Kentucky University has just completed an evaluation of USAARMS courses and has agreed to award college credits as shown below.

COURSE	SEMESTER HOURS CREDIT
Track Vehicle Mechanic	24
Sheridan Turret Mechanic	14
Tank Turret Mechanic	12
Missile Tank Turret Mechanic	17
Motor Officer	3
Armor Officer Basic Course	17
Armor Officer Advance Course	17*
NCO Basic Infantry/Armor	18
NCO Advance Infantry/Armor	19
Master Gunner (M-60A1)	3
Master Gunner (M-60A2)	4
Master Gunner (M-551)	3

*Six hours graduate credit will also be awarded for the AOAC course.

In short, accreditation has resulted in better training that is more widely recognized as high quality training by both the civilian and military educational communities.

The SACS was established in 1895 and is a voluntary non-governmental agency composed of more than 10,000 colleges, universities, secondary schools, elementary schools and occupational institutions. It is one of six regional accrediting associations in the United States and encompasses 11 southern states from Virginia through Texas.

Pages from the Past

A PREDICTION

Among the great discoveries of recent years the aeroplane, in its present efficient form, must be included, and, in view of its latest performances, it has a right to be regarded as a serviceable war material. It can travel by its own power for over 4 hours continually, covering over 125 miles, taking its own course through the vast ocean of atmosphere without once resting on earth, attaining a maximum speed of 60 miles an hour, and rising easily to a height of 3,000 feet or more. (At Indianapolis recently, Brookins rose to 4,384 feet.)

The rapid progress already made in the development of the aeroplane leads us to believe that the maximum performances above referred to will very soon be average performances for such machines, and experts in this subject predict that before the end of the year the following records will be made, namely, a maximum endurance flight of ten hours, a range of 450 miles, a speed of 62.5 miles an hour, and a height of 6,000 feet. The only factor that interferes with its development now is the aeroplane motor, and it is only a question of time when this will be made as perfect and reliable as the present automobile motor.

The Cavalry Journal
November 1910

CAVALRY VEHICLES

It may and probably will be necessary, by reason of the cost of specially designed armored vehicles, as well as by reason of the time required to build them in sufficient quantities, to adapt to our use existing commercial vehicles, if we are to take the field early and strike before stabilization again robs us of the right to take part as Cavalry in future conflicts. No Cavalryman can contemplate such a state of affairs with equanimity, nor will he cheerfully submit to the loss of that mobility both mental and physical that has always characterized the American variety.

The ideal vehicle for certain missions typically of a cavalry nature would be one which combines to the greatest extent the strategic mobility necessary to fit it for use as mobile reserve for a large force and a tactical mobility necessary on the battlefield.

Armor is heavy, and we don't need it.

Weight reduces mobility, which we do need.

A ton of armor can be replaced with a ton of ammunition.

No mobility, no Cavalry.

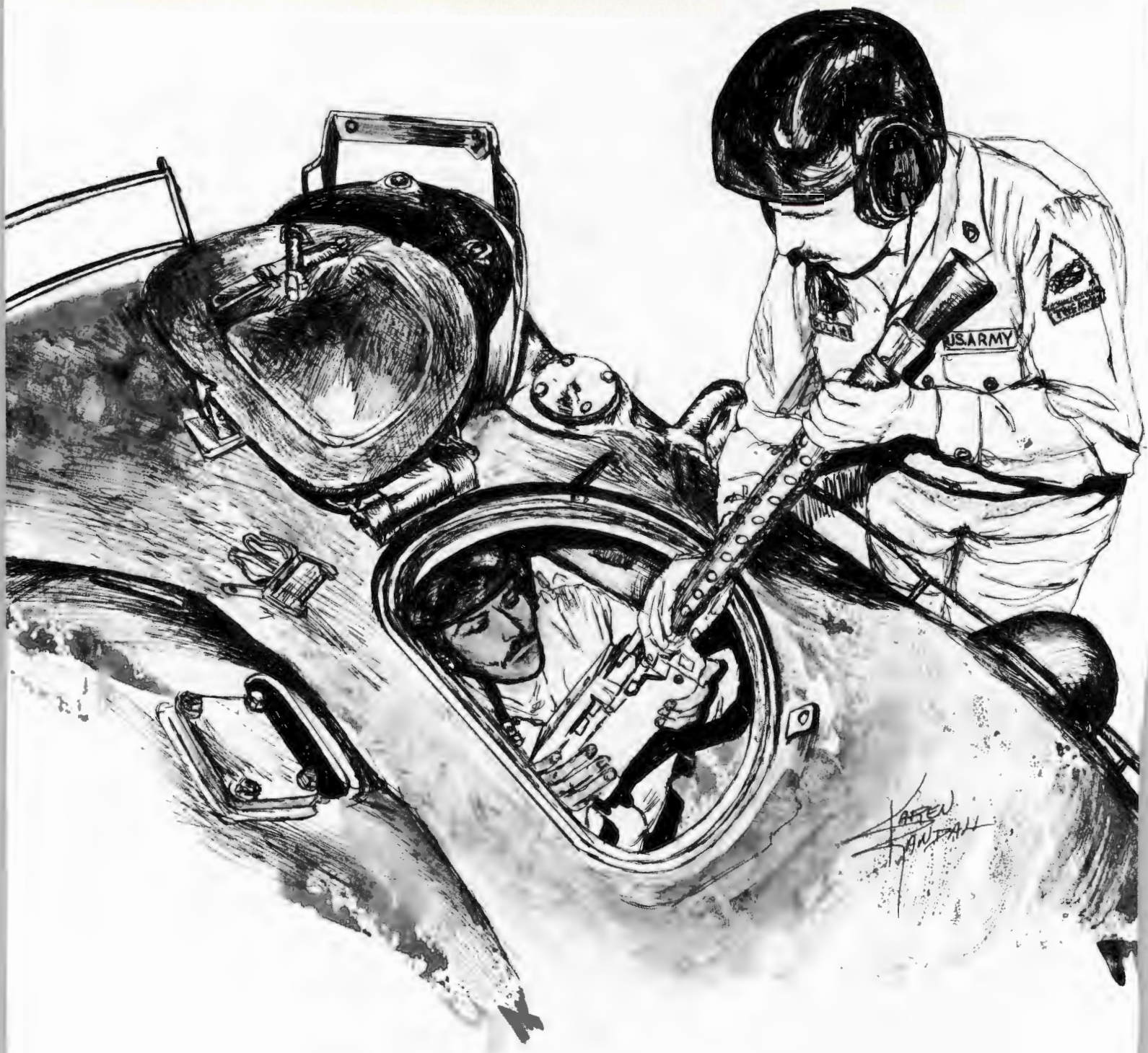
Mobility, Fire Power, and *Shock,* and the greatest of these is *Mobility.*

The Cavalry Journal
March-April 1933

MINE REMOVAL

When an armored unit is stopped, due to roadblocks, mines or lack of bridges, it is governed by the speed with which the Engineers can overcome these obstacles. To improve on these facilities is a joint challenge to both Engineer and Armor personnel and it is urged that steps be taken now to correct these deficiencies. As long as the speed of mobile units is reduced to the tempo of the foot soldier sapping for mines, they will not realize the fullest potential for which they (the mobile units) were created. That mine removal must be speeded up is a challenge to both Armor and Engineer alike.

ARMOR
May-June 1954



WHAT IS SQT?

by Captain D.A. Connell

It's a cold, dreary night, rain pours down by the ton and worse yet, it's the end of the month. Since nearly all his money is spent, PFC Young Hero sits in his room staring at the centerfold queen taped to the inside of his wardrobe door. Finally, turning his weary eyes away from the now familiar likeness of the forgotten dream that never came true, Young Hero spies a thick black and white volume jammed between his skivvies and a mutilated box of cake rolls. Mistaking it for his misplaced copy of The Sensuous Woman, he extracts the text from its obscure resting place only to find that he has unearthed his Soldier's Manual.

By now you have certainly heard about Soldier's Manuals and the Skill Qualification Test, or SQT. It's just another time wasting commitment dreamed up by some overpaid civilian trying to justify his existence. Right? If you ignore it, it will go away. Right?

Wrong.

SQT is not going to go away. It is here to stay in one form or another. Why? The SQT has an integral place in the Enlisted Personnel Management System (EPMS). Further, its creation was a logical step in the progression of the latest training philosophy.

From Whence Came SQT?

Successfully passing annual training and readiness tests remains a major objective of tactical units. Prior to the Army Testing and Evaluation Program (ARTEP), we had the Annual Training Test (ATT), and in some cases still do. The ATT's contained "laundry lists" of so-called "normal and standard required tasks" which were used by evaluators to rate unit performance. Several of these tasks would inevitably be inane, ambiguous, subjective requirements upon which raters would have to make personal judgements. For instance, they would be asked to determine if a tank unit's use of infantry was "effective" and if their reaction when fired upon was "aggressive." Without guidelines to follow, the elevator rated the unit from personal opinion. Not surprisingly, such rulings usually led to heated arguments during critiques.

Have you ever heard a soldier ask why the Army doesn't train like it tests? In part to alleviate this complaint of the training system, and partly to better define objective, necessary performance requirements, a revised training program was initiated.

Several years ago "the word" began to pour from the highest echelons to the units in the field. Trainers at all levels were directed to examine their daily operations to insure that only training which enhanced unit readiness was presented. Time utilized for end item maintenance was scrutinized with a vengeance. Later, Performance Oriented Training (POT) became the buzz word of the times.

It was during this period that we were initially introduced to the concepts of *objective, condition,* and *standard.* Trainers were directed to apply the technique in daily training.

Meanwhile, behavioral science experts were being hired to develop critical task lists which would identify those specific requirements that each type of unit must accomplish during the performance of its various missions. Once the lists were developed, the Army studied, revised, and evaluated the tasks *ad infinitum* resulting in documents labeled Army Training and Evaluation Program (ARTEP). The trainer and the unit evaluator now had a document available to them that replaced the antiquated ATT with more accurately defined critical tasks *(objectives)* by which they could measure the desired performance requirements *(conditions* and *standards).*

The first step toward training like we test was taken. It was a logical progression to apply this concept to individual training and testing.

While training programs were being revamped, reform of the contemporary personnel management system for enlisted members was being proposed. The Military Personnel Center (MILPERCEN) had divined that the military occupational specialty (MOS) evaluation test results did not accurately portray the level of skill competence the examinee had attained. The Enlisted Evaluation Report (EER) was also attacked as being too subjective and was, therefore, considered an inadequate management tool.

General Abrams, then Chief of Staff, directed that a study be conducted to analyze the existing system, detect and correct inadequacies, develop a more objective EER program, and design a system in conjunction with the training managers that would combine the goals of personnel management and individual training programs. Thus the Enlisted Personnel Management System Task Force was born.

The program that the task force presented aligned the requirement for a "balanced grade structure" with career development and promotion mobility. Congressional manpower constraints clearly dictated the necessity for the Army to eliminate MOS mismatch, the ageless drill of forcing square pegs into round holes. The task force decided that each soldier has to be classified by MOS and skill level (degree of competence within that specialty) prior to unit assignment. Accurate classification requires standardized job training and accurate, standardized evaluation. Training conducted at training centers, service schools, and at the unit must be directed toward teaching the students those tasks which he will be required to perform upon course completion. Besides learning the task requirements of the assigned skill level, they must be exposed to the skills required for the next higher skill level. Before the soldier is awarded a skill level identifier, he must demonstrate his grasp of the job requirements by passing a standardized evaluation. Promotion is to be the result of classification into the next higher skill level, not the reverse as in the past. This higher classification is accomplished by the individual demonstrating his ability to perform the job requirements of that higher skill level; his past performance as reflected by the scores of the new efficiency report, the EER and SEER, is also evaluated.

The EPMS classification system allows those responsible for assignment and personal management to be responsive to unit replacement requirements. Vacancies can be filled with individuals who have demonstrated their ability to perform the tasks of the skill level they hold. That will eliminate the problem of wasting valuable training time preparing a soldier to do the job he or she is assigned.*

That is how EPMS was designed to operate. Fulfillment is still in the future. The first priority has to be the individual training and evaluation, which must by definition precede classification. That is the purpose of the SQT system.

Why a Soldier's Manual?

The SQT program is designed to supplement school training, assist in unit training, and to standardize individual performance requirements and evaluations.

Following the ARTEP format, critical tasks and their acceptable minimum performance standards and conditions were identified, given a task number, and then compiled into volumes segregated by skill level. These individual ARTEP's are titled Soldier's Manuals (SM). A manual will be produced for most MOS's by the proponent service schools.

*A more detailed explanation of EPMS can be found in THE DA SCENE, published by the Office of the Chief of Public Affairs, HQ DA, dated Summer 1976, entitled *EPMS: A Way to the Top.*

SQT Update

The Department of the Army announced in the closing part of 1976 that normal MOS testing would be discontinued 1 January 77. MOS tests will be given only on "demand" before the SQT program begins to individuals who have never had a test in their primary MOS or had failed the last test.

TRADOC officials announced the following dates for distribution of the SQT Soldier's Manuals (SM's) and the dates of the first SQT for each career management (CMF). Listed below are some of the more common combat arms MOS's, which are included in the CMF's:

	SM's in the field	SQT Active Army
EPMS GROUP I:		
CMF 11-11Z	Oct 77	Apr 78
CMF 63-45N	May 78	Jan 79
45P	May 78	Jan 79
45R	May 78	Jan 79
63C	Jun 77	Jan 78
CMF 12-12B	Oct 77	Oct 78
12C	May 78	Oct 78
12E	Mar 78	Oct 78
12Z	Mar 78	Oct 78
EPMS GROUP II:		
CMF 13-13Y	Oct 78	Apr 79
13W	Oct 78	Apr 79
13B	Oct 77	Apr 78
13E	Oct 77	Apr 78
13Z	Aug 77	Apr 78
CMF 15-15B	Oct 77	Apr 78
15D	Oct 77	Apr 78
15E	Oct 77	Apr 78
15F	Spt 77	Apr 78
15J	Oct 77	Apr 78
CMF 17-17B	Oct 77	Apr 78
17C	Oct 77	Apr 78
82C	Oct 77	Apr 78
93F	Oct 77	Apr 78
EPMS GROUP IV:		
CMF 67-67G	Mar 78	Jan 79
67N	May 78	Jan 79
67U	Jun 78	Jan 79
67V	May 78	Jan 79
67W	Apr 78	Jan 79
67X	Apr 78	Jan 79
67Y	Mar 78	Jan 79
67Z	Jun 78	Jan 79
68B	May 78	Jan 79
68D	Jun 78	Jan 79
68F	Apr 78	Jan 79
68G	Apr 78	Jan 79
68H	Jun 78	Jan 79
45Z	Aug 77	Jan 78

The Soldier's Manual is then a guide which identifies the job requirements of a given MOS, by skill level. It can also be used as an aid in training management and proficiency evaluation. The SM also explains the EPMS, the Army training system, MOS career progression and promotion in easy to understand terms. Reference material and courses of study which apply to the various tasks are included. The first page identifies which soldiers should receive the manual. Each individual should have the SM's for the skill level he holds as well as that for the next higher skill level. For example, a soldier with the MOSC 11E10 must possess Soldier's Manuals for skill levels 1 (E1-E4) and 2 (E5) for MOS 11E. Those with the MOSC 11E20 should have Soldiers' Manuals for skill levels 1, 2, and 3 (E6), and so on.

When the soldier needs another manual, for whatever reason, he can request it through the proponent service school's training literature department. (USAARMS is the proponent for 11D, 11E, 45N, 45P, and 45R.) If the unit wants copies of any manuals, it can order them through normal publications channels. Information concerning publication dates of SM's is available through your G-3/S-3. In the future, a Commander's Manual for each MOS and an SQT Leader's Guide will be published.

What does SQT evaluate?

The SQT test elements are designed to identify soldiers qualified at the assigned skill level and the next higher skill level. A passing score will accomplish the former, a "high pass" the latter. The soldier takes the SQT for the next higher skill level. For example, the 11D10 takes SQT 2; the 11D20 takes SQT 3.

There are three major components of the test; a written component (WC), a hands-on component (HOC), and a performance certification component (PCC). An SQT may be comprised of one, two, or all three components.

Approximately three months prior to a test quarter, an SQT Notice will be sent through the local SQT agency to the soldier. These notices announce the test quarter, identify which components are to be administered, declare the critical tasks to be evaluated in the written component, and give the details of the exact tasks and standards for the hands-on component and the PCC.

The written component will be administered quite the same as the MOS evaluation test. It is the test format that is different. The old test broke down its questions into major areas (weapons, maintenance, field activities, etc.). The questions asked might have been general or specific in nature and followed no logical order. On the other hand, the SQT is segregated into specific critical tasks, such as, "Call for and adjust indirect fire (use grid coordinate method of target location and the bracketing method of adjustment)." Each task is identified by the task number in the Soldier's Manual. A general situation is given, and questions concerning the task are asked in a logical sequence.

The hands-on component requires the soldier to perform tasks manually within the limits of the acceptable minimum standards as defined in the SQT Notice, and described in the SM.

The performance certification requires the soldier's immediate supervisor or commander to evaluate and verify the individual's performance at a task or tasks. The rating is then transposed onto a mark-sense form. The soldier receives the signed certification; the mark-sense form is forwarded to the local agency responsible for SQT administration. The difficulties experienced with the PCC instructions and mark-sense forms during the system shakedown are being corrected.

Component scores are collected by the SQT agency and forwarded to TRADOC where the results are fed into computers. The machines print the test results into a manageable form, producing copies for company through brigade level commanders.

The system is new and flaws are to be expected. Assistance from the field can speed up the process of correction. Comments concerning the Soldier's Manuals or test questions should be directed to the proponent service school using the form located in the rear of the Skill Level 1 manual. Questions concerning test administration matters should be addressed to the local SQT agency.

So far we have seen how SQT impacts on the soldier's career and have looked at the elements of the SQT system. SQT is also designed as a training management tool. Besides the test results print-out, other system materials can be used at the unit productively.

Let us return to 'A' Company of the Umpteenth Armor, PFC Young Hero, and the rest of the battalion to look in on what happens next.

Young Hero stared at his Soldier's Manual with disdain. After all he had been involved with Army stuff all day. On the other hand, he had also skimmed through the room's "girly books" so many times that many of the photos were worn through or blotted by food stains.

With a sigh he plopped down into his VOLAR chair and began flipping through the pages of the book. He halted his wandering on a page marked "Operation and Maintenance of the Widgit." Scrawled underneath the title was a Grandma Moses-type drawing. Hero recognized the image. He had seen the object just today inside the turret of his tank. He had wondered at the time what the thing was and what it did. His curiosity triggered, he began to read.

A short while later there was a knock at his door. SSG Hardcore, Hero's TC, peeked in and entered. "How goes it, Y.H.?" he asked. "And what is this? Are you reading an SM?"

"Everything's cool, Sarge. And yeah I'm reading this manual. I read it all the time," returned our boy. "Say, I'm going over this task on the widgit in here, and I'm not too sure I understand what the widgit does. How about a hand, Sarge?"

"Let me see what you have here," Hardcore answered as he picked up the volume and scanned the page. He looked up to Young Hero and said, "The problem, Y.H., is that to find the info that you want you have to go to the TM. This just tells you how to put it into operation and check it to see if it needs maintenance. Look here," the sergeant said, pointing to the page. "Right here where it says *reference.* Then it has the TM number. That tells you to go to the TM for more information. All you really have to know is what the SM says you have to be able to do."

"OK, Sarge. That's fine. But I still want to know what the widgit does," said Young Hero.

"I'll show you tomorrow on the tank. Better yet, I'll have the platoon sergeant make this task his 'Nugget of the Day'," Hardcore stated. "In the meantime, the widgit is attached to the dingaphram, like it shows in the picture here. See? Well, when the hydraulics are turned on . . ."

The next day at the battalion headquarters, Sergeant Major Brickwall strolled into the battalion commander's office lugging a heavy cardboard box. "Hey, Sir," he bellowed, "Baltimore just sent us some of the Soldier's Manuals we ordered for our library.

Lieutenant Colonel Dragon looked up from his barren desk. "Got any of the eleven echo books there?"

"Yes sir," answered Brickwall pulling out a skill level 1 test. "We have two books for each of the first four skill levels. They haven't printed the level five book yet," he announced handing the book to the CO.

"Hmm," mumbled Dragon as he scanned the pages with furrowed brow. He stopped at one page, read a while, and finally proclaimed, "Sergeant Major, I just had a real fine idea for using these books and at the same time getting everyone else to use them."

He picked up the telephone receiver, dialed, paused a moment and then grumbled, "Maintenance? Colonel Dragon here. Let me speak to Mr. Craftsman." He paused again. "Yes Chief, how about stepping up to my office? I want to talk about widgits."

Later that morning LTC Dragon entered the motor park. The Maintenance Warrant and the CSM followed. Spying the 'A' Company Commander, the threesome veered in his direction.

"Captain Mann," Dragon called, "Tell me, what is the status of Alpha's widgits?"

Not having the faintest idea of the status, the experienced young officer replied, "They are all working fine, sir."

"Excellent! Then you don't mind if we do a little spot-checking do you?" Dragon asked. "Chief, hop aboard this tank here and have a look," he directed, pointing to A35.

CPT Mann groaned as the warrant climbed the front slope. He rubbed the palms of his hands on his trousers in nervous reaction as Craftsman stuck his head into the cupola. Who should poke his head up out of the loader's hatch but PFC Young Hero.

"Can I help you, Chief?" he asked.

"Young man," the warrant addressed the PFC, "Is the widgit in this tank operable?"

"Yes sir," Young Hero beamed. "We just finished pulling PM on it."

"That's fine," Dragon said. "Now what about the rest of the platoon?" he asked no one in particular.

"The rest of the platoon's widgits are OK," piped up a voice from behind the adjacent tank. From that direction emerged SFC Tracker, the platoon sergeant, and SSG Hardcore.

"Someone must be reading my mail," said Dragon.

"No sir," laughed Tracker. "I guess it's just a coincidence that we were checking widgits the same day you were. I did it as part of my 'Nugget of the Day' Program."

"Your what kind of program?" said Dragon.

"Well sir, what I do is pick a task, or subtask or two from the 11E Soldier's Manual," explained Tracker. "Then the platoon practices the task. I usually shoot for about 10 minutes of work a day. This morning Sergeant Hardcore told me that Young Hero here had asked about widgits. So I decided the platoon would practice the task on widgit operation and maintenance. I try to remain flexible."

"Nugget?" asked Dragon.

"As in 'golden,' sir."

"Super idea, Sarge," exlaimed Brickwall. "That way everyone learns their critical tasks, and they won't have to scramble come SQT time."

"That is the idea, Sergeant Major," replied Tracker.

"Yes. I agree," said Dragon. "Chief, let's go see what Bravo is doing this morning. I wonder how they are using the Soldier's Manuals. Come along, Sergeant Major."

As the three departed, CPT Mann turned to his troopers. "I think the Colonel has been thumbing through his SM too. It will behoove 'A' Company to remember the Old Man is interested. By the way Sergeant Tracker, I think the whole company should have a 'Nugget of the Day' Program."

The company commander started to formulate a plan in his head as he trekked off toward his orderly room. "Troops can learn tasks every day. That will make them more proficient in the basics and provide a base for platoon and company tasks. The troops prepare themselves for SQT, and at the same time they help the unit prepare for ARTEPs and gunnery. *And. . .*" he mumbled to himself as he tramped through the mud. So Alpha marched on to bigger and better things.

The more training in critical MOS tasks soldiers receive, the more proficient they become. They better their chances for a "high pass" score, which means qualification in the next higher skill level, which leads to promotion.

It makes sense that better qualified individual soldiers make better qualified crews. Once the system begins to operate as intended, classification by MOS becomes more accurate and allows the requisition system to place qualified personnel in existing vacancies. Units that use the Soldier's Manuals and ARTEPs in conjunction with an organized plan for training supervised, run, and controlled by officers and non-commissioned officers, are on the right track toward becoming a more effective fighting team.

CPT D.A. CONNELL was commissioned in Air Defense upon graduation from Rutgers University in 1967. He served in Vietnam and USAREUR as a mobile advisory team leader and company commander. An AOAC graduate, he served as XO, 18th Training Bn, and S-4 and XO, BCT Committee Group, USATC, Fort Knox. Captain Connell is currently Deputy Chief, Training Assurance Div, DPT, USAARMC.

Battleruns

by Major John B. Whitehead

Who needs battleruns? Armor does—desperately.

The Armor community has been talking about battleruns since September, 1975 when they were introduced as Tables IX and X in TC 17-12-5, "Tank Gunnery Training." Unfortunately, talk has abounded and not much else has been done in the field to implement this sorely needed training. There are exceptions—notably the 3d Armored Cavalry Regiment, 4th Infantry Division (Mech), III Corps, Fort Hood and USAREUR.

The 3d Armored Cavalry Regiment commanded by Colonel David K. Doyle, now Brigadier General Doyle, began firing battleruns in 1974 as part of their tank gunnery program and overall desert training. Their battlerun course was the first to be designed and set up before the doctrine was disseminated worldwide.

Fort Carson quickly followed suit by setting up an abbreviated section battlerun course at range 7 X-Ray. Brigadier General William L. Mundie ADC-M, now Major General Mundie, was the catalyst in getting this range set up. He followed the tanks on each run through the course, and, in fact, took a *personal* interest in the debriefings and critiques. At times, his jeep had to maneuver in order to avoid live machinegun fire! I know, I was in the back seat.

The three Armor battalion commanders and one divisional squadron commander of the 4th Infantry Division fired a section battlerun while acting as tank commanders on their respective tanks. After completing the course, the commanders admitted that controlled movement is difficult, distribution of fires is tough, and communication is a knotty problem. These three senior officers commented that battleruns were far more challenging, interesting, and useful than a tank marksmanship course such as a Table VII.

Armored Cavalry platoons of the 3d ACR initially experienced similar problems, but were quickly able to cut the time required to fire a platoon battlerun from 1 hour plus to approximately 35 minutes. Considering that supporting mortar fires and dismounted infantry were used throughout the scenarios, this is quite a feat. One could not help but be impressed by the spirit and surging enthusiasm exuded by these young cavalrymen as they completed a battlerun—*they were fired up!*

If we must fight outnumbered in the next war let's stop fooling ourselves—let's *train to win* outnumbered. Perhaps we, the collective Armor community, should insist that the Army regulation requiring a tank to qualify on Table VIII be amended to require platoon qualification on Table IX. But, before we man the bulldozers and take entrenching tools in hand, let's pause to ask questions.

Has Table VIII outlived its usefulness? How large should a battlerun

course be? Can the Reserve Component units fire a battlerun? What can we do about the outdated safety regulation, AR 385-63? Can air cavalry and mechanized infantry be integrated into the battleruns? Where do we get the ammunition? I propose to answer these questions as well as propose a commonsense approach to solving the safety problem which has been haunting us for years.

Table VIII, the qualification table, is an absolute necessity for measuring tank crew performance. Regardless of the arguments which have surfaced in recent years about Table VIII being or not being the Omega point of realistic combat training; it is needed in order to train and test *individual* tank crews *before* attempting to fire a battlerun on Table IX. Without Table VIII, the battlerun would be a loosely controlled melee of tanks pumping expensive ammunition down range. Table VIII is a means to an end, and, for the time being, Table IX appears to be that end.

"Battleruns" are not new. In fact, many of our senior officers and NCO's used to fire platoon battleruns at Bergen Hohne and Hohenfels in Germany in the 1950's and 1960's. In the late 50's, the U.S. Army was no longer able to use the Bergen Hohne training area, and in the early 60's the use of Hohenfels was also lost.

Although the need for a platoon battlerun still existed, attempts at setting up a platoon offensive course at Grafenwoehr resulted in Range 20, the site for the tank company/team in the attack. In 1963, this range was eliminated because the safety restrictions and space available began dictating unrealistic training. From 1963 to 1975, no formal requirement existed in our tank gunnery programs to train and test either sections or platoons in tank gunnery. TC 17-12-5, "Tank Gunnery Training," introduced offensive section and platoon battleruns; however, no ammunition was specifically allocated for Tables IX and X nor was any mention made of any requirements to fire these tables. The reason is simple. With the exception of a few installations, no battlerun range existed either in the continental U.S., Korea, or Germany. *The training pendulum is swinging quickly.*

FM 17-12, Tank Gunnery, recognizes the *requirement* to fire a platoon battlerun Table IX for the active Army and *allocates sufficient ammunition to do so.* The section battlerun was dropped since movement could not be practiced with another section. The new tank gunnery tables are designed to incorporate the necessary gunnery skills in a platoon subcaliber table, Table VP, *long before* firing the main gun or maneuvering as a platoon.

Reserve Component units will be able to fire subcaliber Table VP (Platoon) but most Reserve Component units *will not* be able to fire Table IX, the Platoon Battlerun. Again the reason is obviously *simple.* Major training areas (MTA's) are not available to most Reserve Component units, nor is there sufficient time allocated in their annual training periods to conduct such extensive training. Reserve Component units colocated with active Army units may be able to negotiate Table IX, but this will be the exception rather than rule.

The doctrine is written and the requirement is placed on our shoulders. Where do we go from here? First of all, a lot of persuasion is needed at the senior officer staff level to construct these ranges. The post commanders, engineers, and armor commanders need to put their collective heads together and agree on the priorities needed to "get with the program." The same officers who fired these platoon battleruns in the 50's will be the ones who will tell you that the range cannot be built. The "Nay Sayers" will read you a laundry list of obstructions beginning with money, and ending with unrealistic range completion dates. The human research personnel are *still* trying to analyze the qualification table in quantifiable job objectives. We should not let the "tail wag the dog." You, the "battle captains" will man the tanks in the first battle of the next war. Let's insist that you be given the opportunity to train *as a team* for a change. Chances are that you have *never* controlled the fires of a section or platoon, other than in a dry-run exercise.

Now we will assume that the battlerun ranges are approved for priority construction on each major installation and we will clear up some misconceptions about the construction and operation of battlerun ranges. The dimensions of the range may vary from those for the so-called abbreviated "battleruns" that are 1,000 meters wide and 3,000 meters long to full blown "super" ranges that are 10,000 meters wide and 10,000 meters long or larger. The limiting factor for determining size is *not* the maximum effective range of the tank nor the type of main gun round fired, but rather the *maneuver space* required for a platoon of tanks. Surely, each installation must tailor the range to meet both their mission and unique requirements.

For example, Fort Knox has designed a Table IX for platoon battleruns which will be built in the next year or so. The size of the range is approximately 1,500 meters at the widest point and almost 6,000 meters long. It is designed to be fired with a cal .50 subcaliber device such as the *Telfare* device but can also be fired with main gun ammunition. Fort Knox has elected to use the subcaliber device simply because of the large number of student officers and NCO's who will fire Table IX as part of their institutional training. Money is simply not available to support main gun firing of this magnitude. However, the TOE units at Fort Knox will fire this Table IX with main gun ammunition.

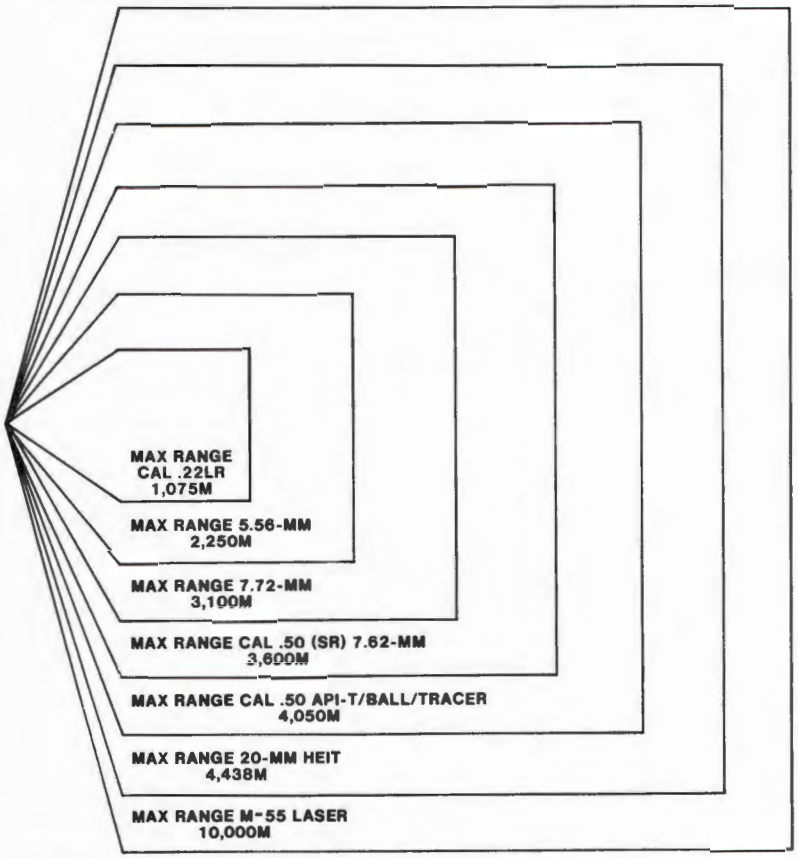
The design of Table IX at Fort Knox includes the use of ½-scale targets on

ALL THINGS CHANGE

Simply because the regulations now say a thing is thus and so is no reason it should always remain thus and so. If a new idea is worthy, it will be properly tested and approved. There is plenty of room for initiative and ingenuity, only here it is properly guided. The officer may conduct his own studies, may make his suggestions, through proper channels to higher authority, and may receive intelligent criticism and adequate recognition. If his ideas receive favorable judgment, they are likely to be incorporated into the training regulations of the Army and to supersede such portions of those regulations as they may contradict.

The Cavalry Journal
April 1922

IMPACT AREA REQUIREMENTS FOR SUBCALIBER FIRING



IMPACT AREA REQUIREMENTS ARE COMPUTED USING 10 DEGREE MAIN GUN SUPERELEVATION. WEAPONS MUST BE FIRED SINGLE SHOT WHEN USING THESE RANGES. WHEN INCORPORATING MACHINEGUN FIRE, IMPACT AREA MAXIMUM RANGES USED WILL BE THOSE IN AR 385-63. LATERAL RANGE LIMITS WILL BE THOSE SPECIFIED IN AR 365-63.

Figure 1.

the smaller battleruns to simulate longer ranges. The decision to use ½-scale targets was based on the fact that the maximum effective range of caliber .50 devices is limited to 1,200-1,600 meters—beyond that range, dispersion is too great. Additionally, it should be noted that the cal .50 device requires less impact area when fired single shot using caliber .50 API-T. Figure 1 shows the reduced surface area requirement when firing tank gunnery subcaliber devices in a single shot mode.

Okay, so you've sold the "old man" on a battlerun course and found the necessary funds. How do you set up a range after the real estate is dedicated and you have figured out the dimensions of the course run? Here are some suggestions:

- Planning and layout require the services of no more than one or two officers and NCO's familiar with the unit's equipment, safety regulations, firing tables, and the Threat organization.
- Programming the Threat target sequence and planning the scenarios (offensive or defensive) should be thoroughly wargamed on paper before attempting to emplace targets.
- Targets should be emplaced *sparingly* throughout the course area. Although the U.S. expects to be outnumbered in the next war, the Threat forces will use cover and concealment as we will, therefore, do not saturate the target area. *Targets should not be fully exposed unless they are moving.*
- If no pop-up target capability exists, fire at armored targets *no larger than T-62* turrets. Exceptions to the rule will be the "hard" targets and lightly armored vehicles. Full size stationary flank or frontal targets in the open will be of little value on a battlerun. It is more productive to have fewer targets which are emplaced properly, than a large number of targets in a meaningless "turkey shoot."
- *Remember* you now have the added dimension of *movement* which is as important as the *fire.* One must assume that if the tank crew has achieved reasonable success on Table VIII, it has proven its capability to *kill* targets.
- Control in the strict sense of the word is *not* critical. Tank crew examiners riding on the back deck of each tank are *not* necessary. The tank commander should be the safety officer. Let's put the safety responsibility on the shoulders of the tank commander where it belongs. The platoon leader should *not* be the safety officer; *he should be training his platoon.*
- If supervisors are needed, let the company commander be one of the evaluators, for he alone is responsible for the performance of his troop or company. Note that I have mentioned *only* one evaluator so far. One other is needed, but more about him later.
- Battleruns should be oriented and initiated by a platoon frag order. *Requirements should be stated as missions not tasks, conditions or skills.* Tank gunnery skills are tested on Table VIII.
- *Dry runs are the key* to successful battleruns. Platoon leaders and section leaders will find this tedious repetition to be the big payoff in the live-fire battlerun. As long as the interface of *fire* and *movement* is an *art* as well as a *science,* practice the movement, for it will surely help you to survive as well as improve the *speed* and *accuracy* of fire. Initial dry runs should be *simple* and *uncomplicated,* progressing in complexity.
- Air Cavalry, Mechanized Infantry, and supporting fires should be used only after extensive dry runs.
- Oversupervision and overcontrol on the platoon radio net will be inevitable. Individual tank commanders will become frustrated when trying to relay spot reports even within the platoon. Coordination with battalion or squadron communication nets is, for practical purposes, impossible at this point.
- The platoon and section leaders will benefit from the dry-run phase more than anyone else since the primary responsibility for supervision of movement lies with them. However, don't forget that the individual TC plays a critical role. He alone must make the decision whether targets *can be* engaged or should be engaged based on his *initiative.*

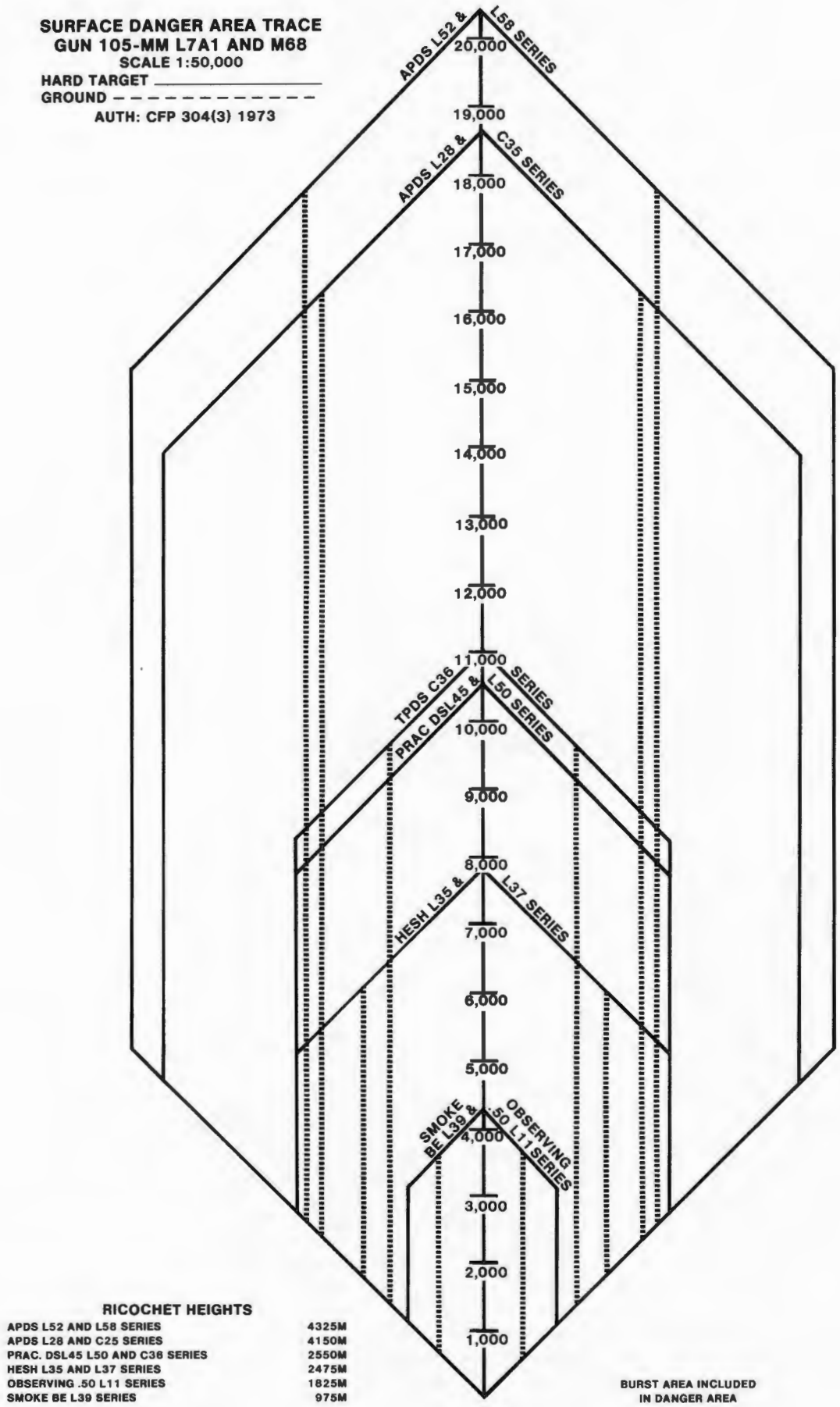

SURFACE DANGER AREA TRACE
GUN 105-MM L7A1 AND M68
SCALE 1:50,000
HARD TARGET
GROUND
AUTH: CFP 304(3) 1973
APDS L52 &
L58 SERIES
20,000
19,000
APDS L28 &
C35 SERIES
18,000
17,000
16,000
15,000
14,000
13,000
12,000
11,000
TPDS C36
PRAC DSL45 &
L50 SERIES
10,000
9,000
8,000
HESH L35 &
L37 SERIES
7,000
6,000
5,000
SMOKE
BE L39 &
4,000
OBSERVING
.50 L11 SERIES
3,000
2,000
1,000
RICOCHET HEIGHTS
APDS L52 AND L58 SERIES 4325M
APDS L28 AND C25 SERIES 4150M
PRAC. DSL45 L50 AND C36 SERIES 2550M
HESH L35 AND L37 SERIES 2475M
OBSERVING .50 L11 SERIES 1825M
SMOKE BE L39 SERIES 975M
BURST AREA INCLUDED
IN DANGER AREA

Figure 2

• Integrating Air Cavalry adds a dimension to the battlerun few of us recognized at first. Because of the inherent capability of the helicopter to maneuver NOE more or less *freely* and *quickly,* it can be integrated into the control of the exercise. Further, Air Cavalry can more readily acquire targets and relay the information to the Armor elements. Primary control i.e., command and control as we knew it in Vietnam, is senseless since it relieves the ground elements of most of its inherent responsiblity to make substantative decisions.

• Mechanized Infantry should be integrated into the battlerun as an integral part of the combined-arms *team.* Initially, Mechanized Infantry will slow down the pace of the battlerun, unless the commander insures that prior planning delineates clear, concise and definitive missions. Armored Cavalry units are usually more proficient in handling a battlerun course, including supporting fires, since their missions are more diverse and their organization more flexible.

• Supporting fires must be planned carefully and sparingly, both day and night. Mortar and artillery fires are normally *never* fired over the heads of friendly troops, regardless of whether the troops are inside or outside of their vehicles.

• The "other" controller I referred to earlier should be *in the target area* (dry run) until he feels that the movement is beginning to flow smoothly and correctly. Using REALTRAIN equipment will help the controller to determine which Armor and Mechanized Infantry elements are tactically weak and need improvement prior to live-firing the platoon battlerun.

• Ultimately battleruns should be a major element in ARTEP evaluations.

These are some, but not all of the training hints I acquired while participating in and observing battleruns. USAREUR has problems unique to 7th Army, specifically, obscuration caused by 2,000 plus tanks using the same range, but the 7th Army Training Command is attempting to come to grips with that. Conversely, USAREUR is able to establish and maintain high standards across the board since all tanks in Europe fire at Grafenwoehr on the same range and under the same relative conditions.

For a minute, let's assume that you are the S-3 of an Armor Battalion and are writing a tank gunnery letter of instruction (LOI). You have just completed scanning a copy of AR 385-63, Regulation for Firing Ammunition for Training, Target Practice, and Combat. Are you sure you have the *latest* regulation, Feb, 1973 including change I? Dig a little bit deeper into the files and find the June, 1968 version of the same regulation. Certain portions of either regulation are useable and you must have *both* regulations in order to plan your tank gunnery program. The first thing you notice about the safety regulation (either version) is how general and nebulous it is. For example, in chapter 14, "Tank Cannon," paragraph 14-2, subparagraph c states, "When tank combat ranges with less than the prescribed safety limits must be utilized, the restrictions will be determined by competent authority based on allowances permitted by local terrain." That extracted statement seems simple enough. Try this. Call a few of your peers together and ask them what the statement means. After you arrive at a consensus, call your local range safety office and ask them what it means. You might be surprised. The regulation is replete with such general type paragraphs. It is up to the range branches at each installation to decipher these paragraphs into specifics. *Interpretation is the problem with this regulation,* at all levels. Much more importantly, the regulation is not consistent with our new doctrine. In the last calendar year, three major waivers had to be obtained in order to shoot our new tank gunnery tables. These waivers are:

• Moving a stabilized tank down range with a preloaded main gun round.

• Firing TPDS-T at (hard) armor targets.

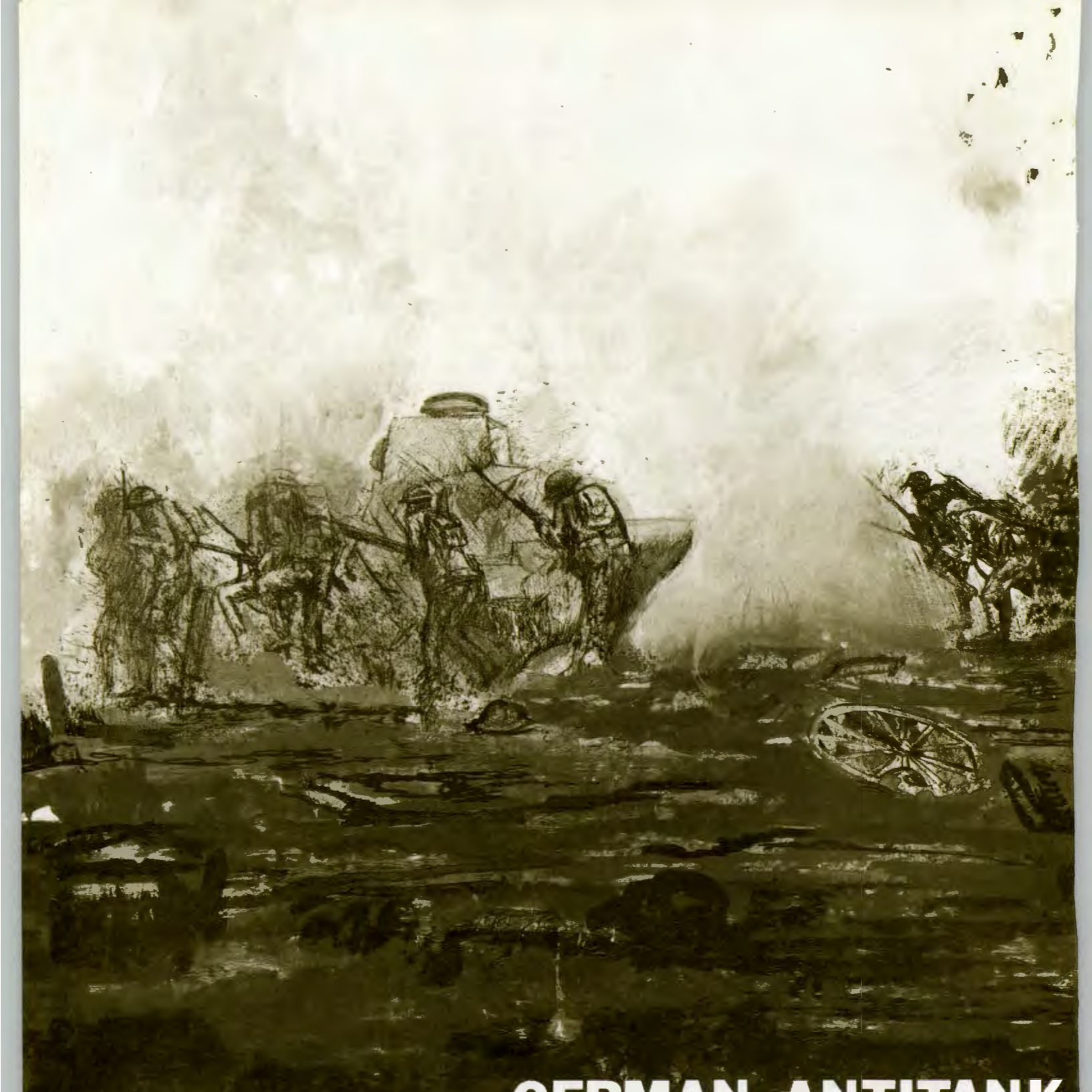
• Reducing the impact area when firing subcaliber single shot, i.e., scaled range firing using a *Brewster* device and 5.56-mm ammunition, or *Telfare* device with caliber .50 API-T.

A new regulation should be written from square one in a language that anyone can understand. It should be concise and specific enough so as to obviate interpretation. The regulation should be written by the tanker, staffed with the Armor community in the *field,* and written so that *doctrinal changes in tank gunnery will not be hindered.*

The Canadians use a simple template (figure 2) to figure their range safety limitations, projected range size, and the like. Instructions for its use are simple and concise. Their basic safety regulation, Canadian Force Pamphlet 304(3) is much less complicated than ours. Even our M-68 tank cannon is included on this template which would facilitate its adoption by our Armor forces. Note that the template is designed to be plotted from a single point instead of a firing line which AR 385-63 specifies. Only one of our tank gunnery tables (Table VI) is fired from a static firing line (main gun); the remainder are either fired subcaliber or require that the tank move down range, therefore why use an antiquated method such as ours? Perhaps we should opt for something similar to the Canadians. It would certainly make it simpler for the S-3's and range control personnel who must plan, design and implement these ranges.

If the U.S. Army is serious about winning the first battle of the next war and believes that realistic training is a necessity not a luxury, then the "training straitjacket" must be removed before its too late. To Major Robert Harry's apt "We didn't come just to qualify," (*ARMOR* May-June 1976) I would like to add—"Table VIII may qualify you to shoot, but Table IX will teach you how to fight."

MAJ JOHN B. WHITEHEAD was commissioned in Armor from West Virginia University in 1966. A graduate of AOAC and Rotary Wing Flight School, he served as aero scout platoon leader and operations officer in air cavalry troops in the First Cavalry Division, Vietnam, and company commander and S-3 of an Armor battalion in USAREUR. A former member of CATB, Major Whitehead is now Chief, Armor Training Task Force, USAARMS.



GERMAN ANTITANK

by Robert

In order to completely understand tanks and their role in modern technical warfare, a comprehensive view of antitank weapons and tactics must be taken by the serious student of armored fighting vehicles.

Modern arguments against the tank as an integral component on the present and future battlefield hinge, in part, on the supposed ability of nonarmored or semi-armored opposing troops to destroy tanks with various types of specially designed antitank weapons. To support or attack this argument therefore, an individual must be as knowledgeable about antitank theory and practice as he is about the armored fighting vehicle itself.

A close review of history during the beginning of the technical age and warfare on land brings to light some interesting

MEASURES - WW1

P. Arnoldt

facts. During World War I, which saw the birth, and death, of many weapons, theories, and practices, tanks first entered the arena of combat. Developed concurrently by France and Great Britain, armored fighting vehicles were initially thrust upon the unsuspecting Germans at the battle of Cambrai in 1916. The Germans reacted with several antitank measures, a few of which were surprisingly similar to modern tank-killing techniques. Varying degrees of success with certain weapons and combinations of weapons were achieved during 1916 through 1918 on the Western Front. At no time however, did unprotected, or even semi-protected German troops seriously blunt large tank-led offensives with the existing antitank measures at their disposal. This lesson in history must be understood and applied by those today who

do not see the tank as a key to victory in any future "conventional" conflict. Therefore, a look at the facts of antitank warfare in World War I from the German side, is in order.

From the very first moment of British and French tank operations, the German army was put in the position of having to deal with a brand new menace. After the initial shock had passed, it was discovered that ordinary infantry weapons, that is rifles and machineguns using standard ammunition, gave no immediate solution to the tank problem. The only "on hand" weapon that could be brought into successful use without delay was the standard German field piece, the 77-mm *M-1896*.

This weapon was ideal for antitank work as the gun was relatively light and fired an explosive, steel-capped shell weighing 15 pounds—a projectile more than capable of destroying any allied tank fielded during World War I. As soon as the Germans became aware of the armored threat in its true proportions, special batteries of these 77-mm guns were set aside as "flying squads" with limbered horses, ready to rush to a tank-threatened area.

A new artillery piece was also designed by the Germans specifically for use as an antitank gun. The weapon was small in size and weight, fired a 37-mm shell and had unique open sights, much like a rifle. This sighting arrangement enabled the gunner to lay the weapon on a moving or stationary tank with little difficulty. Even though the gun had a short barrel and relatively small bore, it was more than sufficient to penetrate and destroy any British or French tank of the period. Few of the weapons saw action however, as production did not begin until shortly before the end of hostilities.

Special developments in ammunition for small arms also became useful in "tank-busting." A special tungsten-carbide cored round, known as the *K* bullet, had been in the hands of German snipers and assault troops since early in 1915. This round was heavier, flew farther and was more accurate than a standard lead-cored bullet. The *K* also penetrated through thicker defenses, like sandbags and log redoubts, than its lead cousin. The British *Mark I* and *II* tanks, it was discovered by the Germans, had extremely thin front, side, and back plating (.20 to .40 of an inch). The value of the *K* round as an armor piercing instrument was immediately perceived. Captured British tanks, often riddled by *K* rounds, told the story quite vividly. At ranges of 130 yards or less, a *K* bullet, fired to strike at right angles, would penetrate the armor, bounce around inside the tank and cause crew and equipment casualties. Each German infantryman was immediately issued 5 rounds of *K* ammunition, and each machinegun crew a complete belt of 50 to 100 rounds. This ammunition was for antitank use only. As the thickness and quality of British armor were improved however, the *K* bullet in its original form became useless.

Another infantry weapon found to be effective against the tanks was the German trench mortar. A new carriage was designed, enabling the weapon to be fired at a lower angle, thus bringing the slow-moving tanks under direct fire. On many occasions, combinations of rifle, machinegun and trench mortar fire were responsible for high tank losses. As the tanks own offensive machinegun fire was effective only up to 300 meters or less, the trench mortar's 500 to 800 meter effective range gave this weapon a distinct tactical edge.

Germany also developed a special antitank rifle. The firm of Mauser redesigned the basic 7.92-mm infantry rifle (model 1898) to bring it to a 13-mm round size. Although weight was increased to 26 pounds, the weapon's tungsten-carbide cored bullets could penetrate the latest British *Mark IV* tank at 80 meters if the round struck at a right angle. This rifle gave one man the ability to stop a tank single-handedly and forced Allied tank crews to be cautious even when artillery or mortars were not in evidence.

The key ingredient in antitank work was, of course, the courage and discipline of the men facing the tanks. No matter how good the weapons at their disposal, the men had to stand and service those weapons. That meant that they had also to stand and face the mechanical monsters rumbling towards them.

Individual courage extended also to personal attacks on tanks by infantrymen and sappers armed with grenades and small arms. Men would, in desperate situations, leap onto the attacking tanks and affix bundled grenades or explosives to hatches or engine vents. The ensuing explosion would allow the attacker(s) (if he—or they—survived the concussion and avoided the tracks) to then fire into the tank and kill the stunned crew. Phosphorous grenades were often used to set fire to the vehicles or to simply suffocate crew members with the fumes of the burning chemical. On a few occasions, German flamethrowers were used to stop tanks, and they proved to be effective antitank weapons when used at close range, from 20 to 40 meters.

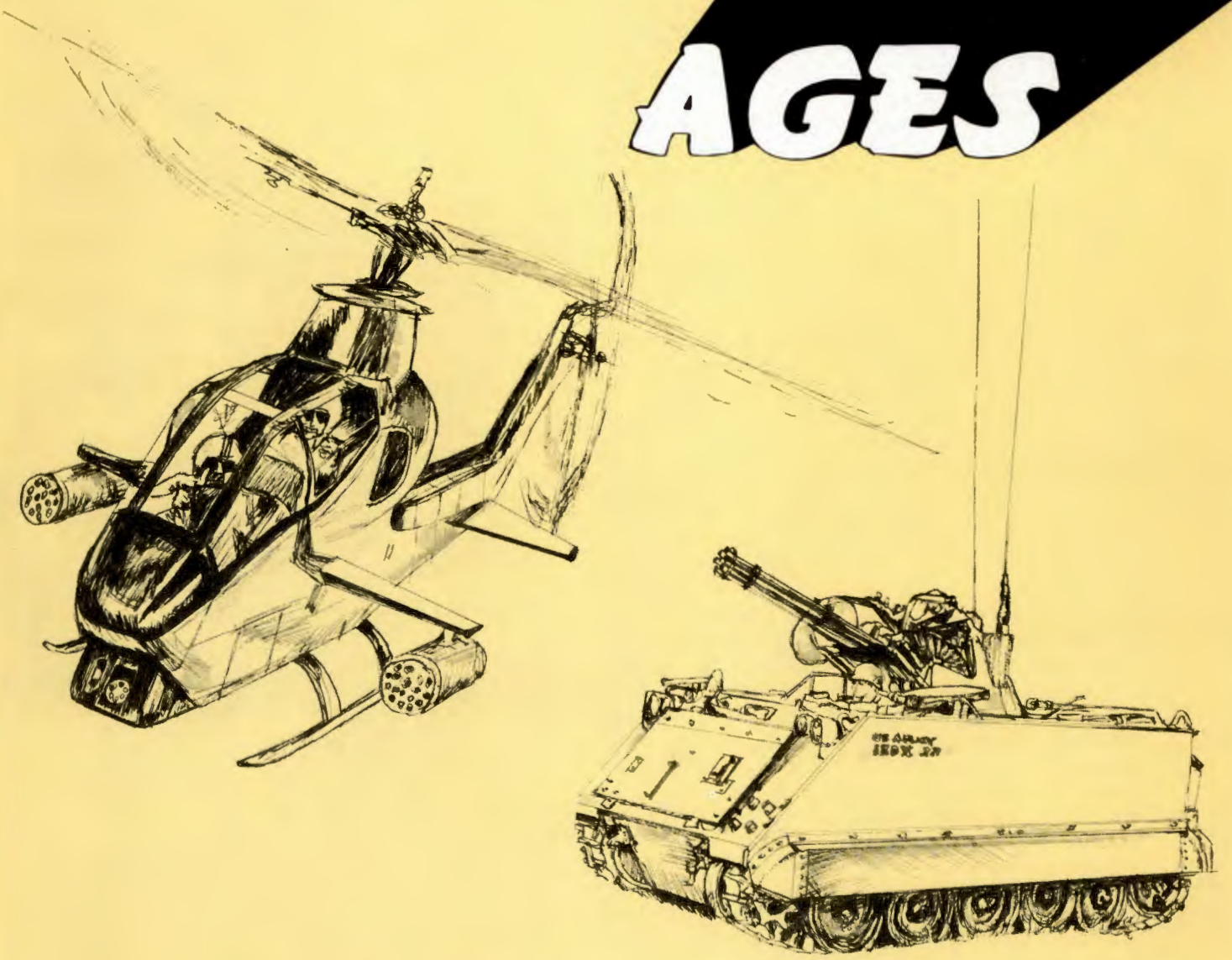
The underlying situation however, was that Germany had, for all practical purposes, no tanks of her own. All her efforts were *reactions* to the British and French introduction and use of armored fighting vehicles. This reaction, no matter how effective, was not sufficient to blunt the tank-led Allied offensives of 1917 and 1918. The concept of the tank as the best of antitank weapons was still just a concept, and antitank warfare was still a haphazard affair, with makeshift weapons and individual courage being the main ingredients.

Had Germany possessed "panzers" in sufficient numbers to face the British and French on equal terms, World War I would probably have ended quite differently.

The main point to be considered, both in 1918 and in 1977, is that the side without numbers of tanks as part of a combined-arms force must lose to the side with sufficient armored fighting vehicles committed to this vital combat role! This most important fact must be faced by those who have responsibility for planning for victory in the next war.

ROBERT P. ARNOLDT, a former enlisted man in the U.S. Army, served in Vietnam as an Infantry soldier with the 1st Air Cavalry Division and with Headquarters, 6th Army, CA. A B.A. graduate of Elmhurst College, Mr. Arnoldt is currently pursuing a Master's Degree in history from Northeastern Illinois University.

AGES



by Major Marion G. Long, Jr.

To exploit the potential destructive capability of the attack helicopter against armored targets, it is necessary for the attack helicopter to fire fast and first. In an engagement between armored vehicles and attack helicopters, firing first with accuracy while minimizing exposure time is critical to aircraft survivability. The paramount maximum in minimizing vulnerability to enemy fire is the proper use of concealment and cover. Exposed attack helicopters will be destroyed unless they effectively employ their weapons at maximum effective ranges and use terrain to reduce vulnerability.

The necessity of mastering the ability to fire first with accuracy and the ability to maximize cover and concealment while maneuvering is most often acknowledged but not actually appreciated until the inevitable initial hostile rounds inflict their havoc. Subsequently, the axioms are learned through the carnage of unnecessary and unacceptable losses of irreplaceable men and equipment. Axioms which could have been learned in the training environment are learned through the expenditure of courage and resources on the battlefield.

The salient issue is how to replicate the motivation of combat so that the skills of fire and maneuver may be learned in the training environment. During training exercises, crews have generally maneuvered with the confidence instilled by being impervious to the consequences of their own battlefield improprieties.

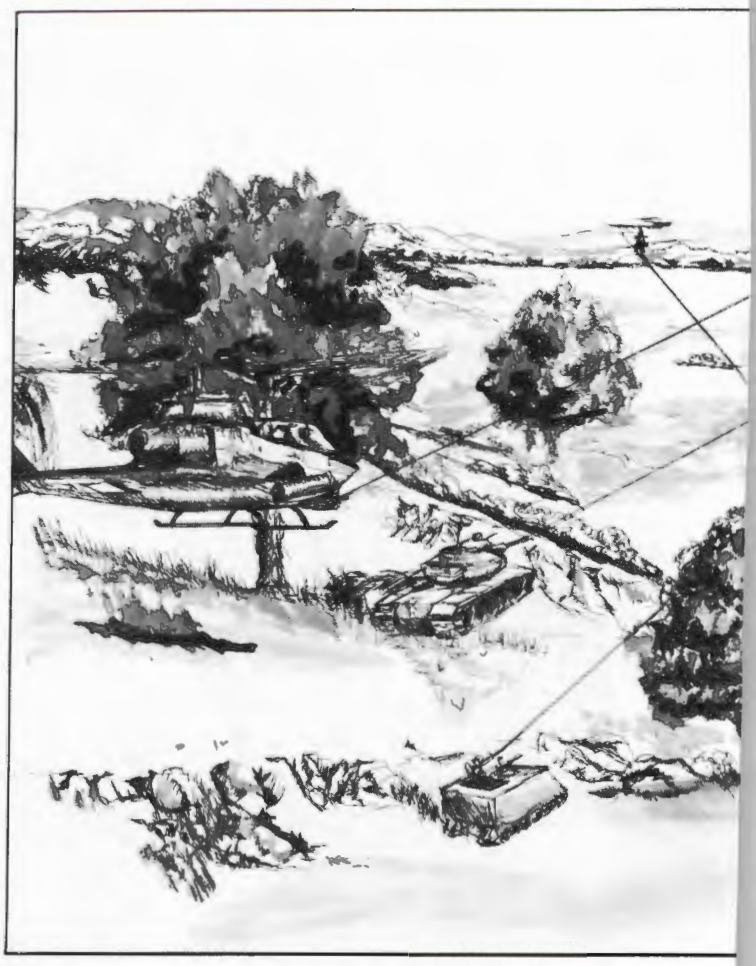
The Air/Ground Engagement Simulation system (AGES) is designed to provide a means of realistic real-time casualty assessment for aviation and ground units participating in engagement simulation training exercises. The system applies laser technology developed for the Multiple Integrated Laser Engagement Simulation System (MILES) to the spectrum of air and air-defense activities. By mounting laser transmitters and detectors on aircraft, the inherent operational and lethality characteristics of aviation weapon systems, to include the vulnerability of aircraft to opposing air defense weapons, may be employed with ground units. When ground maneuver units are equipped with similar MILES devices, a situation is created whereby aviation and air-defense units can effectively participate in battalion-level combined arms tactical training exercises. The AGES system

integrates Army attack, observation, and utility aircraft, and air-defense artillery weapons systems with combined-arms maneuver force weapons system. This provides the commander the means to simulate air-to-air, ground-to-ground, and air-to-ground target engagement, along with the ground-to-ground target engagement. The total engagement simulation program will provide an effective interface of the major weapons systems available on the modern battlefield so that targets may be engaged in a manner which simulates the characteristics and lethality of actual weapons systems.

The AGES system evolved from a tactical training effectiveness study conducted in 1970 under the supervision of the Board for Dynamic Training headed by then Brigadier General Paul F. Gorman. The study, conducted by a commercial contractor, concluded that the use of laser technology offered the optimum means of conducting weapons engagement simulation exercises in a tactical training environment. This conclusion, as applied to the air-to-ground and ground-to-air environment, was validated by a joint U.S., Canadian, and Federal Republic of Germany Attack Helicopter Evaluation conducted at Ansbach, FRG. The evaluation utilized laser transmitters and detector devices on scout and attack helicopters and armor weapons systems. Along with the many lessons learned from the Ansbach Test, the evaluation demonstrated the potential value of laser technology for real-time casualty assessment as applied to the training environment. Simultaneously with the Ansbach Test, the Combat Arms Training Board was involved in developing a system (MILES) using low-power, eye-safe lasers for use in engagement simulation by combined-arms maneuver units. The potential value of the results of the Ansbach Test in relation to the Combat Arms Training Board MILES program was recognized; therefore, a weapons engagement simulator requirement for helicopters was combined with the MILES concept.

The AGES system is being developed as a joint TRADOC school effort among the U.S. Army Aviation Center at Fort Rucker, the U.S. Army Air Defense Center at Fort Bliss, and the U.S. Army Armor Center at Fort Knox. The Armor Center has been designated as the AGES system proponent with the overall project being supervised by the Engagement Simulation Program Manager, TRADOC. In addition to Army helicopters and air-defense artillery, the system is ultimately designed to include attack aircraft of the U.S. Air Force Tactical Air Command.

The Air/Ground Engagement Simulation System is about to enter advanced development with program development divided into two phases. Phase I is designed to provide an interim, relatively low cost, low fidelity, non-laser system to the field by FY 77-78. The Phase 1 system is based upon the concepts and technology developed by the Army Research Institute (ARI), the U.S. Army Armor Center, and the U.S. Army Infantry Center for the REALTRAIN program. REALTRAIN provides a means of casualty assessment by employing a system using controllers and requiring visual identification of numerical panels on Infantry and Armor targets. Controllers with appropriate units verify that the proper engagement sequence has been followed during engagement, confirm target identification panel number, and relay engagement simulation results to the target and controller information center.



Data collected in USAREUR during four months of platoon level training in Europe with REALTRAIN indicates that as exposure to REALTRAIN training increased, units became significantly more adept at detecting targets, engaging them first at greater ranges, "killing" more of the opposing force, and suffering fewer casualties of their own.

Despite the REALTRAIN limitations of day only engagement, platoon level only training, and training conducted within the confined training areas of West Germany, the following results were produced after 3 weeks of REALTRAIN training:

- 55 percent increase in first detection,
- 153 percent increase in first engagements,
- 26 percent increase in survivability of tanks, and
- 49 percent increase in tank-killing prowess.

The REALTRAIN concept is being modified to include Army helicopters and air-defense assets. The techniques and methodology which have proven so successful for REALTRAIN appear to have the same potential positive benefits for helicopter and air-defense unit training.

The 101st Airmobile Division has developed the Vulcan Engagement Simulation (VES) system which is being considered for the AGES Phase I system. A sealed beam, high-intensity spotlight is mounted coaxially on the 20-mm Vulcan sight support arm and a red warning light is mounted behind the radar reflector. The spotlight is electrically connected with the trigger mechanism of the Vulcan so that when an aircraft is engaged by the weapon, a visual cue is

provided to the aircraft indicating an engagement is occurring. Simultaneously, the red warning light is activated, altering the controller (normally a rated aviator) located with the Vulcan that an engagement is in progress. He then uses a score card to evaluate the crews performance and makes the appropriate casualty assessment assuming a successful engagement. The controller notifies the aircraft crew by radio and the aircraft is removed from the problem play.

The Phase I AGES system is considering the use of a controller-activated, radio link device which will activate smoke on the aircraft when a hit is assessed. Visual identification panels are being developed for the aircraft to assist in the identification and engagement process. In addition, strobe light devices are being developed for use on the armament systems of the attack helicopter so that aircrews will have the capability to conduct engagements with its onboard weapon systems. It is visualized that an airborne controller for the aircraft will function in the same capacity as the ground controller for the air-defense weapons. It must be emphasized that in the Phase I system, all weapons systems available will have the capability of mutual engagement. Armored vehicle weapons can engage aircraft with the same devastating results as air-defense weapons systems. Operational testing of the Phase I system is tentatively scheduled for the 1st quarter of FY 78 with distribution to the field programmed for the 4th quarter of FY 78.

Phase II is designed to use laser technology for real time casualty assessment. Two competitive laser systems, discrete detection and retroflection, are being considered for use in the Phase II system which will be in the field in the FY 80-81 time frame. The discrete detection system incorporates eye safe, low-power, gallium-arsenide laser transmitters which are pulse coded to provide a hierarchy of weapon effects. Detection devices are located on each target (e.g., soldier, tank, aircraft) which include a logic package capable of decoding each laser engagement. The detector logic package decodes each received beam, determines if the weapon engaging the target has sufficient lethality to obtain target destruction, and finally, assuming that the weapon is capable of target destruction, transmits a kill message to the target. The kill message initiates a logic sequence whereby the probability of kill is determined for that munition in relation to the target engaged. When the logic package designates a kill, the target's weapon system laser transmitter is deactivated. A device is automatically activated to produce a cue for the target (individual or crew) and attacker that destruction has occurred (e.g., tank releases red smoke). A second important feature of the Phase II program is that the laser transmitters transmit two beams simultaneously. The first beam (the narrower beam), assuming a hit, transmits a kill message to the target initiating the aforementioned logic sequence. The second beam (the wider of the two beams) provides a cue to the target that a near miss has occurred if the target is missed by the narrow beam but is illuminated by a wider beam.

The retroflection system uses a laser transceiver capable of transmitting pulsed laser beams and receiving laser radiation from the target. Using two laser beams, the first activates the logic device which discriminates lethal and non-lethal coded pulses. The second beam is initiated by the transceiver and sends a "kill" code to the target logic package. The logic package determines the probability of kill and initiates the activation of the visual cues indicating a vehicle kill as appropriate.

The AGES system in conjunction with MILES provides the commander a real time means of casualty assessment without impeding the fluid-foreplay characteristics of mobile maneuver units. The AGES system, once deployed to the field, will allow the integration of aviation and air defense with other engagement simulation programs. An integrated, effective engagement simulation program will decisively increase the standards of performance and the status of combat readiness in Active, National Guard, and Reserve components.

MAJ MARION G. LONG, JR. was commissioned in Infantry upon graduation from the Citadel in 1966. He has served as a platoon leader, company commander and operations officer in Infantry, Mechanized Infantry and Armored Cavalry units. Qualified in both fixed and rotary wing aircraft, he has had flight assignments in Vietnam and at the U.S. Military Academy. Major Long is currently assigned as a Project Officer, Directorate of Training Developments, USAARMS, Fort Knox, KY.

Four F's of Force Ratio

by Major (P) David W. Daignault

FACT: The Soviet/Warsaw Pact Forces outnumber the NATO forces in force ratio.
FICTION: The Soviet/Warsaw Pact Forces outnumber the NATO forces in force ratio of 6 to 1.
FALLACY: Force ratio is the best method of measuring the relative strength of combat units.
FANTASY: You can attack successfully at 6 to 1 and defend successfully at 3 to 1.

The military has traditionally sought for a quantifiable set of data that would provide the answers to the unknown, existing on any battlefield. The most recent champion of this noble quest has been the *force ratio.* A force ratio is a simple hypothesis of comparing the composition of opposing forces to arrive at a ratio which represents the relative strength of the two forces and hence forecasts the success or failure of one side or the other. This sounds perfect until one looks behind the facade and discovers a teaming mass of worms, so entwined around each other, that it is difficult to sort out the truth. If one takes the time to unravel this conglomeration, the complexity of this hypothesis begins to unfold, and we arrive at the purpose of this article—to discover the real facts, use, intent, and value of force ratios.

For example, all of the following are true:

REINFORCED TANK BATTALION

ITEM	RATIO U.S.	THREAT
Tanks	1.19	1
APC	1.3	1
ATGM	1	7.3
Rifles	1.98	1
Hv mg	3.5	1
Personnel	2.26	1
Plat	1	1.2
Co	1	1.3

REINFORCED MOTORIZED RIFLE BATTALION

ITEM	RATIO U.S.	THREAT
Tanks	1.3	1
APC	1	1.25
ATGM	1	7
Rifles	1.6	1
Hv mg	1.7	1
Personnel	1.54	1
Plat	1	1.09
Co	1	1.3

However, do they really mean anything?

Can you compare the *BMP* with the U.S. APC? Are the *SAGGER* and the *TOW* equal as far as weapon systems?

The answer to these and other questions raises some doubts as to the validity of force ratios which only compare raw numbers of similar systems. Therefore, in some force ratio studies, another factor has been added—a firepower score. This factor provides a weighted score for weapon systems which are not equal in capability. For example, one might give the APC a firepower score of 1 and the *BMP* a firepower score of 3. The weighted force ratios in this case would be:

REINFORCED TANK BATTALION

ITEM	RATIO U.S.	THREAT
APC	1	2.3

REINFORCED MOTORIZED RIFLE BATTALION

ITEM	RATIO U.S.	THREAT
APC	1	3.75

Now, instead of the 1 to 1 ratio in APC's in the reinforced tank battalion, there is a 2 to 1 and almost a 4 to 1 ratio in favor of the Threat in the reinforced motorized rifle battalion. Yet this still does not give the true picture because one of the two forces will usually be attacking and one will usually be defending. Thus, our ratio must be further manipulated by yet another weighting factor. If, as it is generally agreed, the defender has an advantage, the attacking unit receives a 1; the defending units a 3. Using these factors, a new force ratio develops:

REINFORCED TANK BATTALION

ITEM	RATIO U.S. (ATTACKING)	THREAT (DEFENDING)
APC	1	6.9

ITEM	U.S. (DEFENDING)	THREAT (ATTACKING)
APC	3	2.3

REINFORCED MOTORIZED RIFLE BATTALION

ITEM	RATIO U.S. (ATTACKING)	THREAT (DEFENDING)
APC	1	11.25

ITEM	U.S. (DEFENDING)	THREAT (ATTACKING)
APC	3	3.75

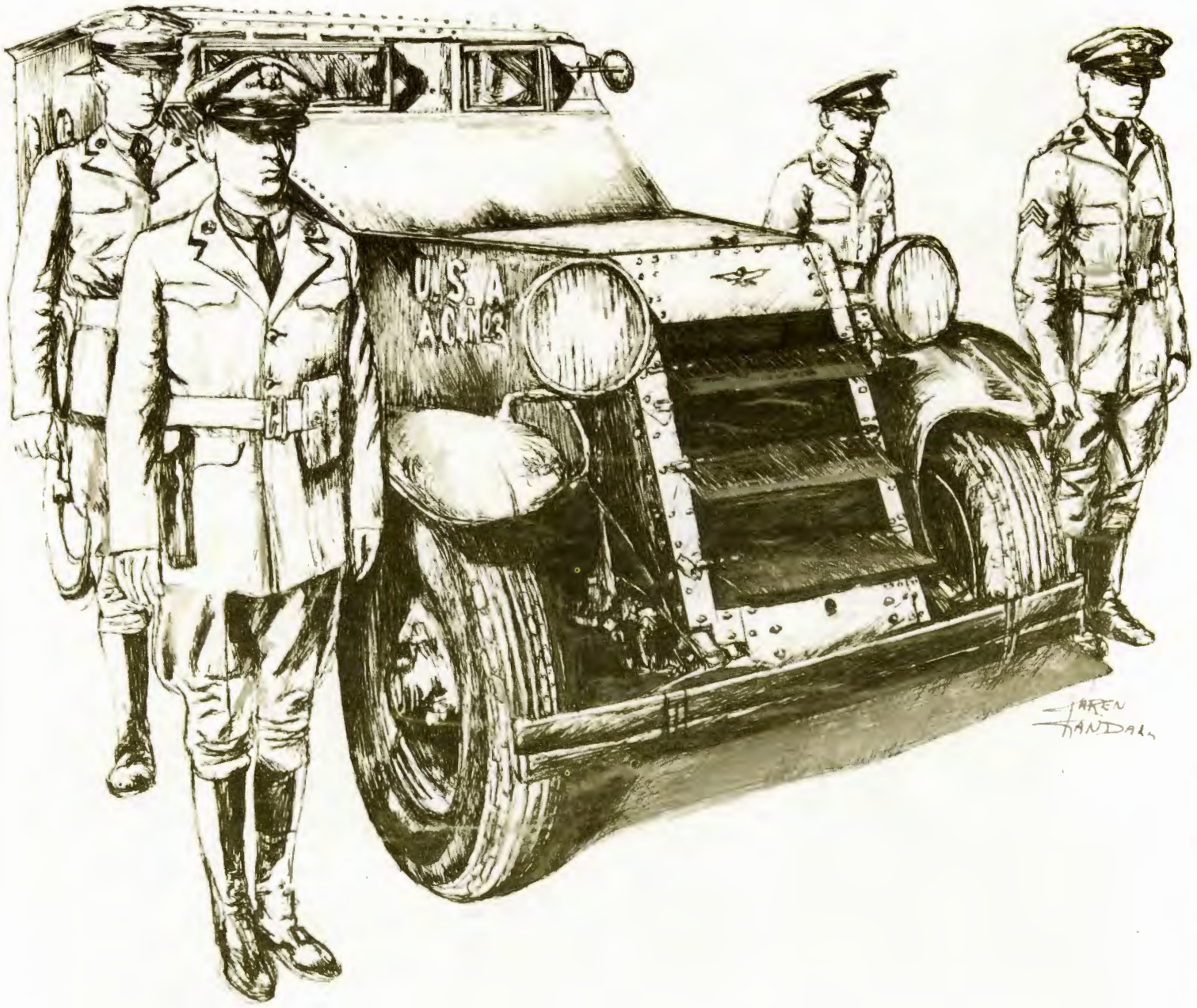
The force ratios are becoming a little more clear, but yet another worm enters the bucket—the concentration of forces. How many Threat battalions are facing the U.S. battalion, or how many U.S. battalions are facing the Threat battalion? This is a problem that really does not have an answer—it has several! Do you count only those forces in contact? Reserves? Second echelon? Flank units? This leaves you with any number of alternatives and resultant force ratios. You now have a situation where you can design or devise any force ratio you wish, dependent upon preconceived notions or issues to be proven.

The four F's of force ratios must be exposed. Everyone must understand what type of force ratios are being discussed; what their true value is; intended use; how they can be misused; and how unprecise they are in attempting to explain an action, unless there is an agreeable point of departure prior to any discussion.

Force ratios should be placed in the position they rightfully occupy, being simply one of many factors which must be considered when assessing the modern battlefield. Taken by itself a particular force ratio neither forecasts defeat, nor victory. History is replete with examples of outnumbered forces both winning and losing.

In summary, if you are required to work with force ratios or you are given a study which contains force ratios, insure that you have a clear understanding what that particular force ratio contains: ***Fact, Fiction, Fantasy, or Fallacy.***

MAJ (P) D.W. DAIGNAULT was commissioned in 1961. He has served as an Artillery Battery Commander, Research and Development Officer, MID Commander and Division G-2 operations officer in Vietnam. A graduate of C&GSC, he recently was the Fort Knox and USAARMS Threat Requirements Director. Major Daignault is now serving in United States Forces Japan in the J-2 Section.


U.S.A.
A.C.D.

THE

CAVALRY JOURNAL

Vol. XXXIII JANUARY, 1924 No. 134

Armored Cars with Cavalry

BY

Major G. S. PATTON, Jr., Cavalry

GENERAL CARBON, I think the battle is ripe. Direct the 2d DEATHBOLTS to charge the enemy left.'

"So are the fates of nations settled!

"By this simple order, Lieutenant-General Alonzo B. Gasoline, seated at his green-lit desk in the gas-proof seclusion of his command car, loosed the two million pounds of petrol-propelled hate on the tottering flank of our doomed opponents.

"But how can a human dictaphone describe the inspiring majesty of the sight which soon unfolded itself before our eyes on the screen of our radio motion-picture projector, whose lense, high above us in the observation helicopter, commanded a complete view of the battlefield?

"As we gazed in haggard expectancy to the extreme right, our screen showed only the scorched hills, their blasted vegetation looming ghostly through the green haze of the gas clouds. In an instant, however, the line of our scout tanks appeared over the crest and dashed on the foe, while behind them, in perfect order, came the three ranks of our incomparable 2d. Long, solid lines of flame poured from their twin exhausts, attesting to the top R. P. M. of their motors, while the air above them frothed with waste oxygen from their fighting compartments.

"Instantly the enemy guns spotted them; great geysers of sand and mud burst in their ranks. One, I noted, cracked open like a walnut, while its doomed crew hurtled from it, only to sink like charred embers in the reek of the all-consuming gas.

"Despite my staff training, the battle lust grew on me. Moved by an unaccountable impulse, I switched on the auditory microphone, so that the sounds of the distant battle were as clear to me as were its sights. On thundered the tanks. Shell fire was impotent to check those dauntless chauffeurs! The enemy, too, realized this and played his last card. From the charred draw on his left appeared the solid mass of his reserve tanks, charging straight at the now disorganized DEATHBOLTS.

"Pandemonium broke loose. To the tock-tocking of the whirling caterpillars, the roar of the guns, the shriek of the motors, and the all pervading hissing of the gas was added the high, staccato hum of airplanes, as our supporting squadrons, flying low over the 2d, squirted liquid fire into the eye-slits of the enemy.

"All this takes long to dictate, but happened with amazing quickness. Nearer and nearer waddled the opposing lines, their rate of approach approximating 50 miles an hour. Could steel and rubber stand the shock? Then, with a slithering roar, they met. Sparks flew; track plates, shivered in a thousand fragments, filled the air, and so terrific was the impact that many tanks simply exploded, completely dissipated by the shock.

"The chaos of the mêlée lasted a full minute. Then we saw the third line of the DEATHBOLTS sweep through the ruck and on, over the enemy position, to victory."

Shall such battles occur? In view of past experience, it would be a bold man who would deny this possibility; but a bolder, perhaps, who would look for its immediate realization.

Yet there are soldiers, men of high mentality and war experience, who dream of such battles, while from these enthusiasts—insane, perhaps—on the one hand, the notions of mechanical warfare grade down to another class, to whom history and invention mean nothing and who banish all thought of mechanical achievements from their concepts of future wars. They, too, are insane.

As ever, the truth lies between—nearer, perhaps, to the lower than to the higher mark—at least for our generation.

Let us examine, in the first place, how mechanics has affected, or may affect, war; and then, pruning our fancies with the heartless shears of Fact and Finance, let us see how we may use some of the obtainable possibilities.

Ever since man first banded together with the laudable intention of killing his fellows, his movements have depended on means of communication. War has depended on roads. From very remote times, man has used wheels to aid his progress or the progress of his stores. The improvement of the vehicle and of the road has only affected this with respect to the rapidity and volume of traffic, not with respect to the direction of movement. Roads are, then, a very restrictive influence.

No matter what sort of wheels he uses, if there are no roads, he cannot move. If the roads are poor, he is little better off than in his bull-cart days. For example, it is quite safe to say that had General Grant possessed all the trucks in the A. E. F., he none the less could not have supplied an army in the Wilderness campaign much larger than the one he supplied with wagons. From a supply standpoint, then, wheels are no better than the roads. Ten per cent of the roads in the United States are improved. Tactically the same is true, with this added consideration: that while wheels add to the mobility

of troops on the march, they give no battle mobility. The cargo must dismount to fight, and that well out of range. Even rubber tires have not changed war beyond recognition.

We must now consider a more advanced wheel—the caterpillar tread. With such, we are not bound to roads and have, therefore, a great increase in mobility to the battlefield and on it. To move and feed great armies over roadless lands, we need but caterpillars. To augment our horse-borne squadrons with armored comrades, we need but caterpillars. To place our heaviest guns how and where we will, we need but caterpillars. *But*—one can almost hear the snipping of those fateful shears, Fact and Finance. Have we got the numbers or the type? Will we afford them? I have no brief against roadless tractors, nor do I hold with that churchmanlike conservatism too common in all armies; hence I am willing to admit that the time may conceivably come when, in the immutable cycle of military endeavor, we shall see small professional armies of highly trained mechanical soldiers, operating simple yet powerful machines, again dominate the battlefield as did their prototypes, the heavy cavalry of the armies of Belisarius and Narses. Or, again, we may see the roadless machine, with all its apparent potentialities, sink to a position analogous to that occupied by the submarine, which but a few years since was so touted as the future mistress of the sea. Who may hazard a guess?

From the standpoint, however, of practical soldiers of an economic nation; remembering, too, that we have a vast plant on different lines ready to our hand, it seems better to follow the maxim of Disraeli and "Compromise." Nor is this all. Should our enthusiasm for the novel and the mechanical carry us too fast, we might conceivably find ourselves in the situation of the lobster who, having in his haste for new glories sloughed off his old armor, finds himself forced to seek the seclusion of some rocky cave until his new plates have hardened. A cave for a nation of our size is hard to find, and a soft-shelled America might find many with an appetite for its unprotected abundance.

In seeking for the compromise above referred to, we shall endeavor to see how we may utilize certain mechanical means now existing and within the means of our limited financial resources. It would be interesting to pursue this study to all means and for all branches of the service. This, however, were over long for such an article and, further, presupposes a general knowledge far greater than that possessed by the writer.

We shall then simply confine ourselves to the cavalry for the arm, and to the armored car for the mechanical means, regretfully snipping off the tank from this discussion because, at the present time, *there is no tank available for issue in this country which can keep up with any unit of cavalry.*

It is true that an armored car such as we contemplate does not exist either, but it can be easily and cheaply constructed from existing motor vehicles, limited armor-plate, and machine-guns. It is simply an assembly proposition, not one of manufacture.

The armored car contemplated here is not one of those armored forts miscalled cars in Europe. They are too heavy, too expensive, and have unnecessary gun power. Such assault machines may be useful, but not for cavalry. For our purpose, we desire an armored car consisting of a stock chassis of some commercial two-ton truck, thus insuring an abundant and ubiquitous supply of spare parts; the engine, gasoline tank, driver, and gunner to be protected by armor capable of stopping rifle fire at 100 yards; pneumatic tires and demountable disk wheels, with one air-cooled machine-gun, preferably with all-round fire. There should be no roof to the gun compartment and no protective floor to this machine. It is realized that such simplicity will arouse the ire of every inventor. Unfortunately, inventors don't have to fight the things they make. Every ounce of extra weight put on an armored car or tank reduces its fighting strength many percent.

The question may then be asked: Why use armor at all? It is an apt question. The British light car patrols were unprotected Fords, mounting one machine-gun. They did excellent service. The protection above referred to would make these cars much more formidable than the Ford without greatly reducing its mobility. The expectation of life of the crew would be very high. We base this assertion on fact. On inspecting many tanks—British, French, and Americans—just after battles, we have frequently been unable to find even a single hit. The reason for this seems to rest on the following facts: Battle is not very dangerous—that is, the fire in battle is nothing like the fire of the target range; fire is a great defense. If you shoot rapidly at a man, with fair accuracy, he loses interest in his aim. Troops do not like to fire at tanks (or armored cars) at short range, because they somewhat erroneously think they will be destroyed. At long range, their fire is not effective and their bullets have little penetration. Movement! A quail is not doomed to death because he has no armor, neither is a destroyer. An armored car with cavalry is a land-destroyer.

There is no gainsaying the fact that an inch and a half of steel all around would be comforting. A No. 2 field range would also be most handy to a cavalry soldier caught at meal time far from camp. Both are unattainable comforts and for the same reason—weight.

To add further emphasis to a point apt to arouse controversy and also to accede to our national penchant for voting, it is confidently asserted that if men who have fought tanks in action were asked to voice an opinion, they would willingly dispense with 50 per cent added protection in order to secure 5 per cent added mobility.

Having described our weapon, let us by a series of concrete examples demonstrate its usefulness.

With a reconnoitering detachment: Such a detachment varies in size from a platoon to a squadroon, and precedes by, perhaps, a day's march large masses of cavalry. It acts with patrols covering its immediate front and, on advices given by them, secures information of the enemy main body. The detachment

itself advances by bounds, insuring its local protection by an advance guard, etc. Suddenly the point of the advance guard of our reconnoitering detachment, advancing as described, tops a rise and is fired on by enemy cavalry, who at once retire to the cover of the next rise, some thousand yards to our front. Lacking an armored car, our point must form as foragers and gallop the distance to where the enemy disappeared. In so doing it may sustain casualties from fire; in any case it will fatigue its horses. Were an armored car present with the main body, it could come up in short order, and, moving at speed and with comparative immunity, solve the situation as to the condition of the next ridge. At the same time its normal position with the main body would in no way add to the visibility of the point while en route.

There is, of course, the bogy of a concealed gun on the ridge in question, which, placed there by the supernatural acumen of the enemy, will blow the car to bits. Would it do less to the members of the original point? Or are the lives of four men in a car more worthy of protection than those of eight on horseback? Do we find isolated guns with small cavalry units? Of course, there is danger; but that is the common condition of war.

The last situation cleared up, the march resumes. Shortly, from the right front, comes the sound of distant firing. The commander of the detachment remembers that "knowledge is power." The speediest way to get the knowledge is to send the car. Again, it may be hit; so might a mounted patrol on the same mission. In fifteen minutes the car has made the round trip of six miles to the patrol and returns with a full report—perhaps also a corpse for identification.*

Shortly after this the detachment approaches a hill situated a mile and a half to the left of its route; rather too far for a security patrol to go; yet the map shows that from this hill a good view can be obtained. Again, the car goes quickly to the hill and has a look and rejoins the column without difficulty.

Next, on topping a long rise, the point gets its first view of the RED RIVER, a mile to its front, and on the white road, half a mile beyond the bridge, sees about a platoon of probable enemy advancing at a brisk trot. Clearly the possession of the bridge is vital to the continuance of the mission. The car, rushing at thirty miles an hour, reaches the bridge and delays the enemy until the main body arrives, and is ready to charge if he is still in a nasty mood.

During the course of the day the reconnoitering detachment finds itself more and more crampted by the enemy cavalry. Finally its patrols can make no progress, and a regiment of the enemy has been definitely located. Here is a case where the cavalry mass in rear must intervene and remove the obstacle, so that the reconnoitering units may progress. The pack wireless is put up, but there is too much "static." A motorcycle messenger might be used, but in enemy country he may be sniped. The armored car will be safer and fully as quick.

* The Editor may be pardoned for recalling an occasion on which the author of this military fantasy did himself bring back an important corpse on his unarmored car—for identification.

At 8 a. m. the next day the 1st Cavalry arrives with Troop A, 1st M. G. Sq., and the 1st plat. A. C. Tr. No. 1 (three machines) attached. By 10 a. m. the enemy is met, and attack, using combined action, has been decided upon. The pivot of maneuver will consist of the advance guard and Troop A, 1st M. G. Sq., which will attack along the axis of movement.

The best fire position is a little rise occupied by the point. Just as the machine-guns move toward it, a troop of the enemy cavalry gallops for the position. The armored cars, however, reach it first and hold the enemy in play until the machine-guns are established.

The 2d Squadron moves under cover by a road to attack the enemy left; perhaps the cars precede it to insure the occupation of the departure position; roads permitting, they might even follow the charge, or else they might be held to lend fire strength to the pivot of maneuver, and, in the event of a successful envelopment, might later move up rapidly along the axis to join in the pursuit.

Many other situations suitable for the use of armored cars with cavalry can be imagined; such as in parallel pursuit, speeding ahead to harrass the enemy and delay him until the cavalry can cut him off.

In raids they would be useful for pivots of maneuver, distant reconnaissance, messages, transporting explosives, etc.

In delaying actions in rolling or wooded country, armored cars will be most valuable.

But, to be useful in any of the above capacities, the car must be mobile, practical, and simple of repair—not a costly, hypothetical monstrosity.

Now, bearing in mind our remarks as to wheels and their limitations, it is evident that our armored car must of necessity pertain to a cavalry force of such a size that some portion of it will always be on a road. This limits the permanent attachment of cars to calvary brigades and higher units. A suitable unit for a brigade would be an armored-car troop of nine cars divided into three platoons of three cars each.

They should be permanently of the cavalry, imbued with its spirit, ready to accept losses, and must remember always that their duty, in common with that of all cavalry, is TO CLINCH AND DESTROY.

TANK EVOLUTION

by Captain John Lee

During the brief history of Armor, it is very apparent that its evolution has been quite dramatic. Constantly adapting itself to the needs of current doctrine, Armor again finds itself caught in the current of evolutional change. This change, of course, is being brought about through the continuing analysis of the Mideast conflict and our role in Europe. Although modifications are currently taking place in tactical doctrine, its eventual impact will be felt in all aspects of Armor philosophy. This article will carry the evolutional process to an extreme. It may never be adopted, but it is hoped that by discussing the extreme, some thoughts and considerations will be discovered along the way. Before discussing extremes, however, some factual basis must first be established.

Although there are many factors which influence current tactical doctrine, there are three which tend to be the main driving force of this doctrine. First, long-range, high-velocity tank cannons and antiarmor missile systems dominate the modern battlefield. Though it may be argued that direct-fire range is a function of terrain, as well as weapon capability, the defender who has the option of selecting terrain will certainly choose areas which optimize his direct-fire capability. Second, U.S. forces must learn to fight outnumbered. This has long been understood, but as a result of the Mideast conflict, it can now be said that numerical superiority does not dictate success. Third, firing first in a tank vs. tank/antitank engagement is essential. Statistics have remained unchanged since World War II in regards to this fact, and will most likely remain unchanged in future conflicts. These, then, are the aspects of tactical doctrine which will govern technical requirements and training goals of the future.

Of interest and concern today are the technical and training requirements needed to enhance the speed and accuracy of initial direct fire engagements. There has been a growing interest recently in adopting battlesight gunnery techniques. Although this is an area which has long been overlooked, it should be viewed in its proper perspective. Our main advantage in defeating numerically superior forces still remains in our technical ability to inflict punishment on those forces at extended ranges. We may be able to adopt methods of battlesight gunnery equal to any in the world, but this should not be done at the expense of current gunnery techniques. The matter equates to a battlefield requirement of reducing enemy strength beyond the battlesight range through conventional gunnery application and destruction of the remaining forces within the battlesight area using appropriate battlesight techniques. This certainly results in a significant increase of current training requirements and may be a price we cannot afford in an already inflated training cycle.

Though gunnery presents many problems for the trainer, reduction of vehicle size creates more perplexing problems for the designer. Current doctrine states that if a target can be seen, it can be hit, if it can be hit, it can be destroyed; therefore, if a target is small and very agile, it is harder to see; if it is harder to see, etc. Even though the introduction of overwatch principles represents a significant step forward in tactical doctrine, procurement of a smaller, quicker vehicle certainly enhances the application of these principles. Reducing vehicle size is, of course, more difficult than it appears, involving trade-offs which have been argued since Armor began. Sacrifices in armor protection, calibers of weapons, number of rounds carried, and crew comfort all enter into the reducing problem. We are, unfortunately, approaching the breaking point on most of these areas and will, no doubt, need a shoehorn to get crew members into future vehicles without significantly reducing vehicle size. Perhaps it is again time to reconsider the reduction of total crew members. The elimination of crew members has caused armor commanders to become ill ever since the British *Mark I* crew was reduced from eight to seven in 1918. Realistically though, if technological advances can increase vehicle effectiveness and/or reduce vehicle size with a high degree of reliability, then these advances should be strongly considered, even at the expense of total crew strength. This is a difficult statement to digest, and further analysis is required. The automatic loader has

been damned by all who understand its present disadvantages, but we should not curse the idea because of a poorly stated requirement. Let us rather restate the requirement more clearly. The automatic loader should provide the following design characteristics:

- Combustible ammunition feeding through a magazine assembly.
- Type ammunition placed on both sides of the floor divided by the main gun path of recoil.
- Selective feeding system to provide type ammunition to the breech assembly.
- A feeding assembly that automatically pushes another round into the main gun breech.
- A back-up electrical or hydraulic system and a capability of manual loading during emergency operation.

The caliber of the gun and reduction in the size of ammunition may offer the chance to reduce vehicle size in the future. If it is feasible, and I understand it is, then the adoption of such a system should be considered.

With ammunition stored on both sides of the gun system on the floor, the gunner's station will require relocation. The obvious location would be the loader's present position. The tank commander, on the right, and gunner, seated on the left side of the gun, would be equipped with identical fire control accessories. This would enable crew duties to be shared or individual engagements pursued in the event one crew member cannot identify the target or is incapacitated. In addition to identical fire control, each would have a driving capability, thus eliminating an additional crew member—the driver. An added benefit of this system would be the crew's ability to share driving responsibilities during prolonged travel, thereby reducing fatigue.

Adopting a two-man crew raises much criticism in current thinking, but I am attempting to project an idea that is not totally unrealistic. Will a two-man crew be capable of maintaining an air watch? Will this crew be able to maintain 360° observation? Will the crew still function even if one is incapacitated? Can security be maintained? Will maintenance be performed adequately? These points can be seen more clearly when viewed individually.

Air watch is traditionally the loader's responsibility; however with the introduction of modern air-defense weapons, the survivability of aircraft operating higher than a few feet above ground level is questionable at best. Tactical doctrine, in regards to aircraft employment, is being modified throughout the world. This doctrine, simply stated, is that high-performance aircraft will operate below 50 feet at speeds in excess of 400 knots, while helicopters will operate below tree top level employing nap-of-the-earth (NOE) flight techniques. This doctrine places the air threat in the ground environment and negates the necessity for a crew member to provide an air watch. Additionally, current air-defense artillery (ADA) thinking envisions placing ADA assets, specifically *Vulcan* cannon sections, as low as company/team level. This not only increases team-level air-defense capabilities, but further reduces the need for an air watch by tank crew members. This in no way infers that tactical air and attack helicopters will not be a threat to ground forces; it simply means that tank crews must be cognizant of from where this threat is coming.

Observation responsibilities for tank crews are quite specific, but upon closer evaluation, these, too, must be questioned. Drivers of present tanks are positioned extremely low in the forward part of the vehicle, resulting in a poor field of vision, restricted to a very short distance directly to the front. The gunner, buried deep within the vehicle has even more difficulty fulfilling his observation responsibilities. Unable to observe the terrain over which the tank is traveling, he is incapable of adjusting his body to the jostling of uneven terrain. This results in a high fatigue factor for any gunner who attempts to observe while on the move. This fatigue factor is compounded because his eye must continually be focused through optic devices. As can be seen, observation in current vehicles is restricted to the personnel at the top of the turret. With a crew of two located at the top of the vehicle, observation capabilities would not be significantly reduced.

Because vehicle operation will be performed by one of the two crew members, it may be argued that the driver is incapable of observation due to driving pre-occupation, but just as the person operating an automobile has an infinite capacity to read road signs, billboards, and monitor traffic to the sides and rear, the properly trained tank crewman will be capable of driving and observing simultaneously. Additionally, unit standard operating procedures can designate specific areas of interest to provide all around observation, compensating for any minor shortcomings in unit capabilities.

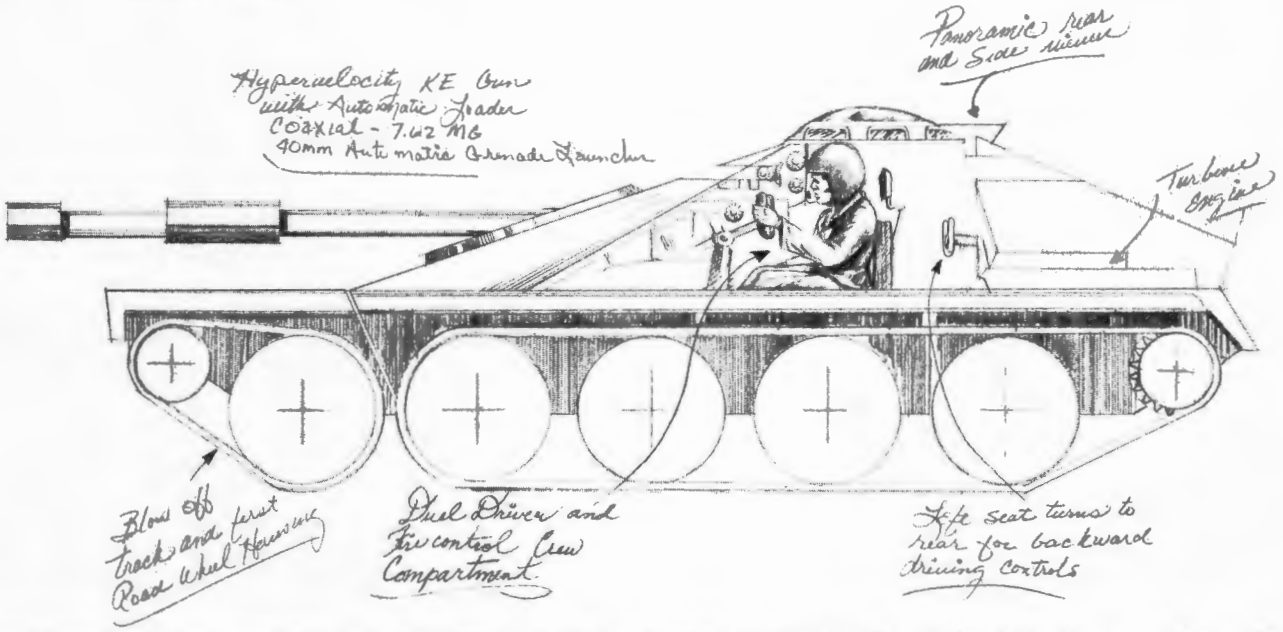
Current tanks with crews of four appear to have a significant advantage in their ability to operate in emergency conditions. But is this really the case? The present tank can really only lose one crew member and still function effectively. Because of the multiple capabilities of the two-man crew, it can also operate effectively with the loss of a crew member or its automatic loader. The loss of both crew members does, of course, mean a loss of combat effectiveness of the tank. This is certainly a disadvantage, but the same is true when we lose a flight crew.

Every unit, regardless of its size, is responsible for its own security and defense. This certainly is a potential problem for tanks with only two crew members. It is important to point out that this is an equal problem in present armor units. TOE 17-37H, one of the TOEs for the tank company, provides augmentation of a 10-man security section to compensate for this security difficulty. This augmentation would also be a requirement in units manned with two-man tank crews.

These crews will not only require proficiency in tactical matters, but will be required to perform maintenance on their vehicles. Since the purpose of reducing crew members is to reduce vehicle size, it should be possible to reduce maintenance duties proportionately. Additionally, systems engineering is continually improving reliability and maintainability of existing systems, and will be optimized in future vehicles to reduce man-hour maintenance requirements. Of more significant interest, however, is the organizational maintenance responsibilities of analyzing and repairing extremely complex fire-control systems.

With the ever-increasing sophistication of fire control systems, the ability of organizational maintenance personnel to effect repairs is becoming more difficult. In regards to fire control, it appears that organizational maintenance is becoming a processing station for unserviceable fire-control subassemblies, resulting in excessive down time awaiting

Vehicle Concept by Editor



supply action. This area requires a great deal of thought, but every effort should be made to bring the echelon of repair closer to the user. It may be required of future tank crews to analyze system malfunctions in depth, while maintenance personnel effect repairs currently performed at higher levels.

It would seem appropriate at this time to restate the main points covered thus far. First, there is a need to train crews in the employment of battlesight gunnery, as well as conventional gunnery techniques. Although this is a requirement, it may be impractical in an already crowded training program. Second, there is a need to reduce vehicle size. There are many ways of accomplishing this; however, the most effective method may be in reducing total crew strength. Third, there is a need to bring the echelon of fire-control repair closer to the user. This will require analysis and possible realignment of current organizational functions performed. These three areas form the basis for the extreme mentioned at the beginning of this paper.

The extreme is to fill these two-man crews with warrant officers. In short, the creation of an Armor Warrant Officer Crewman Training Program. Before discarding this extreme as utter nonsense, consider the two advantages the warrant officer possesses. A warrant officer can attain a technical and tactical knowledge during a very early phase of his career. The 9-month aviation Warrant Officer Training program has done this, with a large degree of success, for a number of years. The warrant officer, unlike commissioned and noncommissioned officers, possesses a long-term utilization potential. This potential in Armor will certainly be a desirable characteristic in our ever-increasingly complex field. *If it can be accepted that technology will dominate the tank of the future, then it should be the technician who dominates that technology.*

The program would focus its attention on maintenance, small unit tactics, gunnery, and related subjects. Because the newly graduated warrant officer would be thoroughly trained in crew functions upon arrival at his unit, the unit commander could focus his attention on unit training proficiency. For example: a unit would be capable of commencing gunnery training on the existing tables thus providing sufficient time to fire two or three additional tables of a more complex nature without increasing the total time currently used. With the warrant officer's technical ability to solve more complex fire-control problems, the company armament section could focus on a higher level of repair. The Armor Warrant Officer Training Program, in short, may be an extremely efficient method of coping with the sophisticated battle tank of the 21st Century.

The evolution of Armor is indeed dramatic. The reduction of total crew strength may be inevitable in our search for a small, agile combat tank. When this eventuality occurs, a training program and career development pattern must be established to enhance the capabilities of tank units of the future. The Armor Warrant Officer Crewman Training Program may be a desirable future step in Armor's continuing growth.

CAPTAIN JOHN LEE received a direct commission in 1969 and has served with Air Cavalry and Attack Helicopter units in Vietnam. Additionally, he has been a motor officer, tank company commander and S-3 Air of an armored battalion. Captain Lee was graduated from Officer Advance Course at Fort Knox in July 1976 and is now the executive officer of Troop D, 2-1st Cavalry, 2d Armored Division, Fort Hood, Texas.

IS THIS RUSSIA'S TANK KILLER?

Within the past 5 years, the Soviets have developed, deployed and modified the world's most heavily-armed helicopter, the "Hind."

This helicopter represents a significant departure from other Soviet helicopters in that it was built for speed and contains a retractable landing gear—a first for the Soviets in the area of helicopters.

This multi-purpose machine was built to carry ordnance, troops, or a combination of both. It is anticipated to be used in a combat-assault role as well as in a tank-killing role.

It is much larger than the *Cobra* helicopter, for example, and probably carries 12 fully-equipped combat troops in addition to a full external armament load.

The accompanying photographs clearly show the type armament this helicopter is intended to carry. Seen on the two inboard pylons are four 32-shot rocket pods. These pods fire unguided missiles that are the rough Soviet equivalent of our own 2.75-inch rockets. The Soviet unguided rockets are believed to be equipped with blast-fragmentation/armor-piercing warheads.

At the bottom of each of the two wingtip end plates can be seen four rails (two beneath each wingtip). These rails are assumed to be the launch rails for four antitank guided

missiles. These antitank guided missiles are believed to have a range of about 1½ to 2 miles under ideal conditions.

Seen in the photographs which show the helicopter with the conventional cabin ("Hind-A") is a single-barreled 12.7-mm machinegun. This is roughly the equivalent of our .50-caliber.

It had been anticipated that the Soviets would improve this helicopter, and in the latter half of 1976, we began to see a highly modified version of the "Hind" the "Hind-D" (lower right).

Readily apparent is the extensive modification to the nose. The cabin has been modified to a "double-bubble" configuration which separates the pilot and gunner. It is obvious that some type of Gatling gun has replaced the single-barreled machinegun. The Gatling gun is probably a four-barrel, 12.7-mm gun. The Soviets may elect to equip this helicopter with a 23-mm cannon in lieu of the Gatling gun.

With a full ordnance and troop load, this helicopter probably has a top speed of in excess of 150 knots and a range greater than 200 nautical miles. It is also suspected of being armorplated. As is the usual Soviet practice, continuing improvements to this helicopter are anticipated.

A SWARM OF LOCUSTS

Every major army relies on the combat power of the tank. The U.S. Army's emphasis on its own tank corps and its antiarmor weapons is evident in our doctrine. But, should we fight the armies of the Warsaw Pact, our forces could face enemy tanks up to six times in number greater than ours. How can we expect to lessen these odds?

In the past we used our technological capability to produce overwhelming supplies of war machines. The next time we should not expect to have sufficient time to crank up our factories. Current and anticipated restrictions on the military budget may bring us some sophisticated equipment, but not great numbers of costly items. The traditional American concepts of a small standing force also inhibits an expansion of our combat power prior to a conflict.

Yet the Army is sparing no effort in making the current strength more effective and efficient. We're pushing readiness for the total force. Innovations in training are increasing the immediate use of both active and reserve component units. The military budget, inexorably rising with higher prices and inflation, takes cuts in deserved personnel benefits to gain more money for combat effectiveness.

But even with increased training, outstanding leadership, and improved tactics, can we meet and defeat an armored force which might outnumber us six to one on the battlefield? Of course we think we can. In fact, we must think we can. And we must consider all means of permitting us to win.

One way to consider is to tap the tendencies of our society towards sports, particularly sports which could have military application. Precedents abound: hunting, martial arts, camping, marksmanship, and so forth.

We suggest the development and promotion of a light, sports helicopter. With a bit of encouragement and affordable price, our consumer-oriented society could create a swarm of potential military pilots capable of instant conversion to a tank-killing force.

Armed helicopters can be very effective against tanks—that has been tested and proven in combat. This additional firepower could significantly increase our tank and antiarmor capability.

An active, organized sports program centered around an inexpensive helicopter, readily adaptable to an antitank role, could easily be promoted. The skills developed by these sportsmen might even surpass those possible in a well-trained Regular Army unit.

For those who doubt the potential, read about the creation of the German Air Force by a similar sports program before World War II. In the Soviet Union, "military sports" and "sports with military applications" are expanding. General I. J. Pavloskly, deputy minister of defense, said that "at the

basis of all forms of physical training should be an applied military orientation."

Of course, Americans would probably not agree with the Russian view that military-technical sports "should be looked upon as a most important state matter." Another Soviet writer claims that military sports train sportsmen who "form a wonderful reserve... for the Soviet army and navy."

Similar benefits can and do accrue to our Army through sports with military adaptation—the sports helicopter could become a prime example.

The sports helicopter, of course, must shy away from the sophistication, complexity, and expense of the Army's attack helicopters. Our 'copters are getting bigger, require a 2-man crew, and need the pilot's hands and feet to fly. Like the hippopotamus needs tickbirds for help, our attack helicopters require scouts to direct them to the enemy. In the 1960s, Lockheed demonstrated the Hummingbird—a small, fast helicopter with a rigid rotor system—which could do loops, barrel rolls, and other aerobatic maneuvers. Since then, the Army has built only slower and bigger helicopters.

We need small, fast, low cost, highly maneuverable, simple, highly stable, 1-man helicopters.

The pilot must be able to fly the machine easily, perhaps with one hand. Each should be armed with four "fire-and-forget" missiles—no machineguns or other weapons. Flying with one hand frees the pilot to aim and fire the antitank missiles.

The helicopter should have only minimal armor protection and be equipped with only the simplest 2-way radio, a radio direction finder, and a radar detector for antiaircraft defense. The fuel supply, stored in a drop-off pod for fire protection, need last only 1 hour.

The essential design factor must be affordability, both to the sportsman and to the U.S. Army. Manufacturers are already offering to consumers helicopters costing less than $15,000. A basic design, development, and purchase by the U.S. Army would cause a spin-off production within the consumer's means. Competitive events for flying skills and marksmanship with subcaliber devices could be sponsored by the Army. Those who competed could win prizes and be reimbursed for expenses, thus spurring the interest in this military sport. In case of war, the Army could buy the aircraft and offer warrant commissions to the owners. A volunteer group of performance-tested tank killers could immediately be put into the fray.

Another possible benefit of helicopters as a military sport is product improvement. Any observer of sporting events, such as car racing, is impressed by the ingenuity applied by the drivers and mechanics to develop and improve their machines and techniques.

If such a military sport is organized, the Army would be able to draw from an experienced pool of mechanics and trained pilots who can fill the skies with an antitank capability. Like the "Archers of Aguincourt," our sportsmen, with little more protection than their shirts, their speed, their mobility, and their number, can destroy a great many of the lumbering armored war machines of the foe.

JOHN C. BAHNSEN, JR.
Colonel, Armor
Chief of Special Study Groups, TRADOC
and
PETER F. BAHNSEN
Lieutenant Colonel, Infantry
Commander, 1st PSYOP Bn, Ft. Bragg, N.C.

IMPROVED TRAINING

Several articles appearing in recent issues of *ARMOR* are worthy of further thought and comment. Specifically, "Shoot First and Win," (November-December 76); "Changes in Tank Gunnery," (May-June 76) by Major General McEnery; "Mini-Ranges Pay Big Dividends," (November-December 76) by SP5 Stark; "Telfare Device" and "Another Use for the M-55 Laser," (September-October 76) in the "Forging the Thunderbolt" section, "Tank Crew Proficiency Training," (September-October 76) by Lieutenant Colonel Prall; "New Subcaliber Device" and "Magee Device," (July-August 76), also in "Forging The Thunderbolt" section; "Tank Design," Parts I - IV, (September-October 75 through March-April 76) by Lieutenant General Starry; plus the numerous articles on the *PI M-60A1,* the *M-48A5,* and the *XM-1* are some of the commentaries of interest.

If one might be allowed to extract two of the major underlying themes, even concerns, of these numerous authors, one would conclude that armored vehicles in general are becoming more complex and deadly. Secondly, one would conclude that crew training, specifically crew gunnery training, needs attention.

Further, as Christie, that fount of innovations, was to discover much to his dismay, that the procurement of Army material is accomplished by committee, even committees of committees. In fact, this committee approach is used to formulate and promulgate Army training and doctrine, and all too many times, all of these committees are disjointed and antagonistic. This committee concept of program management is in direct opposition to the principle of unity of command so necessary on the battlefield.

With these thoughts in mind—the effectiveness of modern armor, the concern over crew training and the realities of Army management—the results of several important, but little known, studies carried out by the Armor and Engineer Board with HUMMRO, HEL, TRASANA and AMSAA support should be considered.

In one of the tests it was shown that material improvement costing some quarter of a million dollars per vehicle improved the performance of the armored vehicle about *10*

percent over the baseline system. In comparison, improved crew training was to show about a *50 percent* improvement in performance over the baseline system (with crews of average ability).

In another test, material modifications, costing on the order of $50,000 per vehicle, improved the performance by approximately 5 to 10 percent, but improved crew training more than offset this gain. In yet another study, carried out with the aid of an AIT class, showed that gunnery training supplemented by training with the SIMFIRE device, limited only by time, showed a very marked improvement in crew performance over those crews trained using the standard Tables I - VIII training program (limited by ammunition).

The obvious conclusion that can be drawn from these tests is that a properly trained, motivated, and led tank crew can outperform a crew with mediocre training and the world's best tank. If one has any further doubts about this statement, one need look no farther than the front pages of recent newspapers to see what Israel accomplished with dated *Shermans* against modern *T-62's!*

Another little known item of interest is that the *XM-56* hit-kill indicator (HKI) (U.S. version of SIMFIRE) program was killed for lack of funds ($500,000), not to mention the lack of interest. The modern MILES system has yet to surface. However, the Israeli Army, unquestionably one of the best trained armies in the world, just recently purchased the British SIMFIRE system to aid in the training of their tankers, while we "make do" with "Yankee know-how" and "field expedients" like the Magee and Telfare devices.

We spend millions, perhaps billions of dollars on new material to improve our capabilities, but we do not even expend one tenth of that amount in money or efforts to bring our training aids and training programs to the same "state of the art" as our tanks. An effort that is unquestionably needed, desired, and by all accounts, the most vastly rewarding of all programs. This is a glaring ommission to say the least.

We have to overcome some of the limitations of committee planning, such as being done by DARPA'S STAGS, HIMAG, HIMAG II series of program for material definition. We should do the same for training aids and procedures. Perhaps Lieutenant General Kalergis' Tank Force Management Group will fill the vacuum.

The Army, perhaps more importantly, *we,* as taxpayers, can not afford to have this most "cost-effective" of approaches relegated to the background any longer. Therefore, it is incumbent upon the Army to have an integrated materiel, training-aids, crew-training, doctrine program! A program which will allow the U.S. to field the most cohesive and effective combined-arms team on the future battlefield.

ALLAN H. WEGNER
Captain, Armor, USAR

JAMMING AND AERIAL SURVEILLANCE

It is written that David slew the giant Goliath with a stone delivered by his sling to Goliath's most vulnerable spot—an unprotected spot between his eyes and near the middle of the forehead. Ancient man thought of this spot as a third eye from which powers of good or evil eminated. A blow at that spot would cause an enemy to become blinded and confused.

In modern parlance, a well placed missile can render an Army in the field helpless and impotent. For example, a shot from a marksman from Michigan felled the great General J.E.B. Stuart, the eyes, ears, and processor of intelligence data for General Robert E. Lee. Thereafter, misjudgements and miscalculations plagued the Army of Northern Virginia to the very end.

It may not be of great importance in the future as to who fires the first shot, as there is only political significance in this and the winner will write history as he chooses. Rather, it should be of concern as to how we shall be the first to deliver the missile that strikes the most vital nerve center of our enemy. Lenin stated that a war is won before the first shot is fired, thus we see the sense in avoiding a confrontation with our enemy's forces until victory is certain. However, we must concern ourselves with the military realities we may face should our enemy become blinded and miscalculate our determination and the dedication of the American people. Victory, even in a limited war, will not be certain for our enemies if we use our capabilities and remain watchful. Our aerial surveillance and electronic eyes and ears must be ever vigilant.

We expect the same vigilance from our enemies so that they will not miscalculate. The Soviet recon platoon is expected to do the yeoman's share of work in providing tactical information for the Soviet ground forces. The main communication means used at the recon level is quite unsophisticated in the sense that the Soviets use the unmodulated carrier wave (c.w.) and morse code. They don't have the fancy FM, VHF, and UHF, etc, which was so easily jammed in the Sinai during the October 1973 War. The fact is that simplicity is an advantage and requires a trained operator.

Yet, we insist on refined equipment and ease of training and operation. We overlook the fact that in World War II we trained radio operators by the thousands each year to use morse code at the rate of 30 words per minute. This took as little as 6 weeks per man in training time. The obvious advantage in the use of the simple methods of communication, even though it seems archaic, is that c.w. is difficult to jam and the lower frequencies can be transmitted to great distances with low power. If we expect to jam at great distances, we must use enormous antennas and great power.

I am inclined to believe that morse code communications would be faster and with fewer errors than sending code groupings by voice commo. With a minimum amount of training, the operator can be taught to use calculations to determine skip distance for lower frequencies and avoid the close range jamming coming from that thing across the border that looks like a soccer scoreboard.

In the process of jamming our communications, the Soviets know that they would jam their own channels if they were in the same spectrum as ours, so it makes sense for them to use the lower frequencies. Bear in mind, however, that in a limited atomic confrontation, it is likely that clouds of radiation would interfere with all communication by electronic means.

During a recent orientation I attended, it seemed to be understood that all communication would remain as is and by the use of highly directional antennas, we would be able to coordinate the use of firepower and maneuver elements in the field. Being a little skeptical, I asked the obvious question about jamming and what would happen. The frantic answer was that we can string wire by helicopter. Of course we should do this in the first place *if* that is the *only* answer. The next alibi is that we will have lasers for use in communication (the quicker the better, of course), but that is down the road "a piece." The nonelectronic mode of that sort will evade electronic jamming and its directional qualities will require some precision for operation.

The Soviet jamming is vulnerable to missiles that can home in on the jamming devices and devising them is relatively simple. If we don't have them yet, it may be too late! This ploy would not stop the Soviets from communicating, but merely keep us in business a while longer. However, it would not solve our more serious problem of target acquisition for Artillery and the operations officers who will have some anxiety about what is in front of them and what sort of hardware is on the way to their sector.

Target acquisition drones have been suggested, but it does not seem to be a feasible solution because of its obvious vulnerability to ground-to-air rockets, and again, the mode of communication is chiefly electronic. The idea of a drone or a Mohawk with the capability of giving the FDC and the S-3 and G-3 an instant, secure, live read out is the answer on the modern battlefield where seconds may be the deciding factor between survival and annihilation.

Presently, SLAR mounted in the Mohawk, flying a relatively safe distance back of the area of contact seems to provide some of the answers, including the instant live read out. But again, it has hang ups because of the wide range of jamming and deception techniques the Soviets can use. Infrared photographs provided by the Air Force fill in some gaps, provided the Soviet Air Force and missiles do not prevent overflight of their positions. Weather and atmospheric conditions must also be taken in consideration.

Any vehicle that can operate in the stand-off mode, such as the Mohawk with SLAR, has the advantage of being close to the console that will receive the transmission. Highly directional antennas have the advantage of being relatively free from interference, no matter what mode is used, provided the intelligence is obtained in the first place.

No discussion of this subject would be complete without some vision of what the future might hold for the concept of gathering intelligence for tactical operations. The use of laser beams in very much the same way as the present electronic equipment is used may some day be profitable. It is also relatively easy to envision high flying aircraft or spacecraft that skim near the top of the earth's atmosphere, scanning the area of enemy activity with occilating laser beams and transmitting vivid pictures back to monitors for immediate live read out and copy for the FDCC and target acquisition elements on the battlefield. Interpreters could give accurate briefings to commanders with no worry about timeliness caused by a lapse between collection and dissemination of intelligence.

However, the state of art has not yet considered such grandiose things. The time is near and many discussions have dewelled upon the use of laser beams and how AT&T has developed a way to bend laser beams in glass fiber.

Yet, despite all of this, the combination of all existing modes of solid intelligence can provide what we need if we eliminate the jamming devices. Soviet General A. A. Siderenko states in his treatise, *On the Offensive,* that company commanders will fight the next war. Let's hope they will not have to use hand signals or semaphores.

EARL S. SCHULTZ
Major, MI

EMPLOYMENT OF THE ATTACK HELICOPTER

Destroying armored formations by aerial means is not newly attributable to the Vietnam era helicopter or the Bell-Hughes *TOW-Cobra* system. It pre-dates these aircraft to World War II when both German and Russian units employed fixed wing aircraft in the antiarmor role. The attack helicopter has given the ground commander a third dimension to his battlefield, brought the desire for close air support much nearer to integration in the combined-arms concept, and provided a highly reliable, terrain-free, tank-killing vehicle. Employment techniques and characteristics must be fully understood by units working with attack helicopters to insure proper utilization, successful employment, and the necessary integration needed for all elements to work effectively as a team.

The primary role of the attack helicopter is to destroy armor. In conjunction with this, the aircraft possesses a self-defense turret system and a 2.75-inch rocket capability designed to provide desired assistance in accomplishing the primary mission. While its best employment considerations are toward a defensive posture with enemy armor moving to it, the attack helicopter will always act aggressively, seeking exposed enemy units and destroying them prior to detection. This weapons system is an effective, rapidly deployable, support platform that, when given proper consideration and adequate intelligence, will greatly aid a numerically inferior force in defeating a numerically superior enemy advance. It is, however, up to the commander at battalion, brigade, or division level to comprehend proper employment concepts and utilize this valuable asset to its best advantage. One thing is certain, however. Although the attack helicopter possesses an ability to rapidly shift around the battlefield, it should not be used as a "fire-fighting" force, reacting to

every threatened area without sustained employment, prior planning, or a specific mission.

In the offensive phase of operations, the attack helicopter should initially be considered a reserve component to be used in exploiting a breakthrough. It is not practical to assign attack helicopters the mission of forcing enemy units from prepared defensive positions. With the light armor and limited staying power of the attack aircraft, its losses would prove unacceptable and its success marginal. The attack helicopter is not equipped to assault prepared defensive positions. Once initial stages of the battle have been breached, enemy units will begin withdrawing to new defensive positions or attempt reinforcement of heavily engaged elements; here the extreme stand-off range and rapid maneuverability of the attack helicopter proves a vital asset. Exposed enemy forces moving to or from the front are ideal targets for *TOW* aircraft. The concept of overwatch enables attack helicopters to provide accurate fire support to advancing units thereby reducing resistance and allowing the advance to gain momentum.

A breakthrough and pursuit operation can be greatly enhanced by attack helicopters. The ability to move ahead and increase confusion as the enemy withdraws is an important mission to be performed by helicopters. Ambushing withdrawing enemy units and forcing them in other directions is another. The screening of an assailable flank as friendly elements move forward is a third mission appropriate for attack helicopter units.

The raid is a special mission to be given careful consideration by the division commander and weighed against potential losses and effectiveness. This mission will be a high-speed, low-level penetration into a rear area in an attempt to create confusion among rear echelon forces. Probable targets for such actions include armored assembly areas, refueling and rearming points, and headquarters elements. The raid is a mission not to be taken lightly nor employed unless good intelligence is available. Target location, terrain considerations, and existing or forecast weather conditions should greatly influence the decision to undertake such an action. If all factors suggest the feasibility of such actions, the commander must then consider the effect such a commitment will have on the overall objective he is currently seeking to attain. Defensive operations involve indepth planning, utilizing the factors of mission, enemy, terrain and time (METT) and maximizing available assets to offset enemy advances. In this planning phase, careful consideration should be given to employing attack helicopters along likely major avenues of advance and tying in their capabilities with ground defensive plans. In conjunction with the ground defensive plan, the attack helicopter unit commander will evaluate the best possible firing positions and areas of concentrated fire and direct his elements to those positions. In this manner, kill zones are established where the combined firepower of armor, artillery and attack helicopters can concentrate all efforts to inflict maximum enemy casualities with minimum friendly losses. Because terrain is not an obstacle, the helicopter can fire from positions not tenable for ground vehicles. This advantage permits the aviation asset to force the enemy to be channeled into the most desirable avenues for engagement.

Mobility and the rapid capability to shift sectors is a critical advantage in the active defense. Aircraft can lay waiting for enemy units as they move up an otherwise lightly-defended road and engage with surprise and maximum standoff. They can be held continuously on station by the commander as he rotates them in and out of refueling and rearming points or he can elect to mass the entire company for a limited period of time and concentrate heavy aerial firepower against the major enemy thrust in a sector. When this option is selected, the ground commander must realize that at the end of a specific massed engagement the attack helicopter elements will be removed from the battle for an extended period of time to rearm and refuel.

The arrival of the attack helicopter in the Army inventory has given the ground commander a vital new asset to employ in his battle plan. The helicopter has added a third dimension to the battlefield which, when properly employed, will yield highly successful results. The most important single key to the maximum use of attack helicopters is intelligence. Ground commanders must recognize the aviation asset they have available and immediately give information on enemy locations, strengths and movements. Friendly forces must know when supporting aircraft are in the area to avoid accidental engagements. Information must be as accurate and as timely as possible to allow a reduced time for target acquisition and maximum effective flight time.

A new organization of well trained, aggressive soldiers can be called upon to assist the ground commander. The attack helicopter troop is prepared to work in close conjunction with ground elements to help defeat the enemy. The ground commander must appreciate this desire, the firepower he has at his disposal, and the need to engage the enemy in the most critical area. It can be employed in an offensive role or defensively to assist as planned or where necessary. It should not be shifted continuously across wide expanses of terrain or command sectors but be retained within a sector of brigade size, moving as necessary to co-ordinate assaults against exposed enemy units. Should a shift in supported units be deemed necessary, the commander must anticipate a time lapse before engagement. A more thorough understanding of attack helicopter employment, its advantages and disadvantages must be acquired by ground commanders to reduce the time lapse between engagements, increase integrated fighting effectiveness, and permit aviation assets to assess maximum enemy casualties.

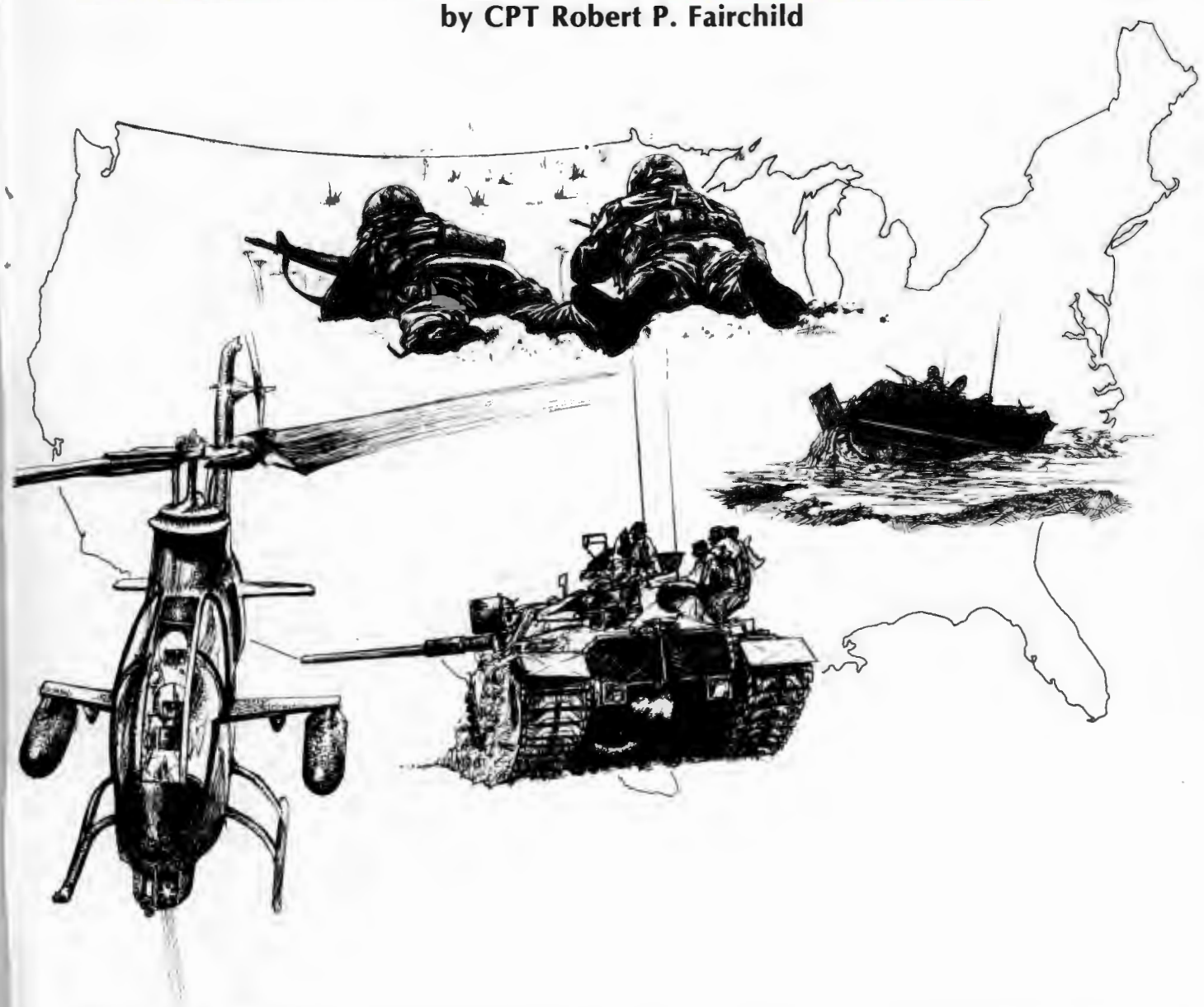
ROBERT M. HEFFRON
Captain, Armor

▲

Where and When?

TRAINING GUARD AND RESERVE DIVISIONS

by CPT Robert P. Fairchild



The active Army-Reserve Components "Track III" affiliation or roundout program is a significant advance toward realizing the One-Army Total Force concept. But a glance at a troop list of affiliated units (table 1) shows they are typically in the "sunbelt" areas, having the convenience of nearby-based active major commands and installations. Furthermore, integration of regular and reserve elements for extended periods is achieved only during the reservists' 15 days of annual active duty for training. Combined exercises are seldom or never conducted during the winter months or in northern-humid areas.

Current mobilization and contingency plans, however, call for reinforcement of NATO forces in Western Europe, where the most likely threat to vital U.S. interests could occur. Conditions there are not at all like Forts Stewart, Polk, or Ord. They are more similar in mean monthly temperatures, rain, and snowfall to Camp Ripley, Minnesota, or Fort Drum, New York, i.e., humid continental climate—at least one month with an average temperature above 71.6°F. and one cold month with an average below 26.6°F., and nearly 40 inches annual precipitation.

Table 1. New "Track III" Affiliations for 1976

ACTIVE ARMY PARENT DIV	R/C AFFILIATED BRIGADE
24th Inf Div, Ft Stewart, GA	48th Inf Bde (Mech) GAARNG
5th Inf Div, Ft Polk, LA	256th Inf Bde LAARNG
7th Inf Div, Ft Ord, CA	41st Inf Bde, Oregon ARMS
	8-40th Armor Bn USAR-Arizona

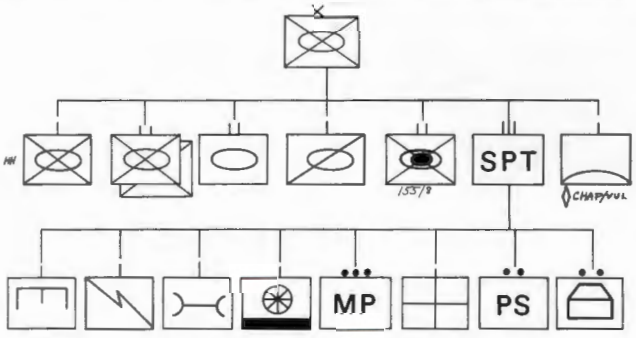
The resulting soil and road conditions place frequent constraints on employment of wheeled vehicles; even tracked

ones in certain situations. But most of our training today, conducted during the fair-weather months, fails to acquaint our troops with how they would have to maneuver, maintain equipment, and keep themselves dry and warm in north temperate Europe.

FORSCOM operates the U.S. Army Northern Warfare Training Center (USANWTC), Fort Greely, Alaska, which conducts courses of 1 to 6 weeks duration. However, only 266 of 2,021 spaces were allocated to reservists during FY76 and FY77; these entirely to Oregon and Minnesota Guardsmen. Travel of maneuver units from various other states to USANWTC would be expensive, but improved readiness of those successfully completing training there would be a worthwhile payoff.

A less costly alternative, toward achieving the same readiness goal, is to locate Active Army divisional or separate brigades (with augmentation in direct support units) at northern installations nearer to most Guardsmen and reservists. As training cadre, in the role of our present Army Readiness Region personnel, they would play host to a succession of weekend-training Guard and reserve units. The latter would benefit from on-ground contact with the latest equipment and doctrine. Active commanders would have latitude in granting time off during the week to their troops who trained on weekends with the reservists.

Specific installations where these affiliations could result in positive improvement in Reserve Component readiness include: Camp Keyes, Maine; Camp Johnson, Vermont; Fort Drum, New York; Fort Indiantown Gap, Pennsylvania; Camp Grayling, Michigan; and Camp McCoy, Wisconsin.



MANEUVER BRIGADE

How would a composite Active/Reserve Component Division be structured? I suggest that the RA in-house elements comprise a maneuver Brigade shown above.

This brigade would be self-sufficient during its own maneuver training (conducted more frequently than that of other Division elements), yet still contain enough of each type combat and support unit to assist the visiting reservists. The latter would marry up with their active branch counterparts for each weekend's training, becoming well-acquainted with them after a few months.

The reasons why I propose to leave Division, two of three brigades, Division Artillery, and Support Command headquarters in the reserve component(s) are:

- The division headquarters already exist in eight states: Massachusetts, Pennsylvania, Indiana, California, New York, Minnesota, Texas and New Jersey, with subordinate divisional brigade headquarters in six others: Connecticut, Ohio, Michigan, Iowa, Illinois, and Vermont.
- Economy of manpower costs, which now comprise 57 percent of the Department of Defense budget outlays, and certainly a higher proportion within the Army, a people-intensive, rather than an equipment-intensive service like the Navy or Air Force. The division, brigade and equivalent headquarters staffs are expensive to maintain on active status. I would suggest, however, that the assistant division commander for support be an active component member in residence at the northern installation. This would insure command and control authority to facilitate the successive weekend marryings-up described above.
- Upon mobilization, the Selective Service system would probably reappear, providing input to the training centers, with the mobilized divisions "fleshed-out" to full strength for deployment within a few weeks. Again, this avoids the long-term personnel costs of maintaining high numerical strengths during peacetime.

Specific aspects of training which could be accomplished better than at present include:

- Maneuver in wet terrain, on snow, over ice-covered rivers or lakes.
- Use of lower-viscosity engine oils and other lubricants in vehicles and generators.
- Employment of active visible and infrared light sources, sights, telescopes, periscopes, ATGMs and *Redeye* under adverse conditions of fog, rain, snow reflection and glare.
- Use of space heaters in field automotive maintenance tents and only those other medical or aviation support facilities where accepting risk of an airborne-detectable heat signature is justified.
- Improved troop awareness of the means and importance of properly using TA-50 individual clothing and equipment to maintain dry body surfaces and conserve metabolic heat.

I doubt whether our potential adversaries in Europe neglect these aspects of training by sending their units to the Southern Caucasus or Armenia each year, instead of to the Siberian Lowlands and Chinese border region. It is in these latter areas, our reconnaissance tells us, that dozens of Soviet divisions train year-round.

Neither should we accustom ourselves to the balmy beneficence of sunny latitudes, when the likliest contest of arms we may meet is on more traditionally blood-spattered ground.

CPT R.P. FAIRCHILD, a distinguished military graduate of Cornell University, was commissioned in Armor in 1966. He served in various artillery, Cavalry, and Armored units in Vietnam and the Panama Canal Zone. From 1970 to date, he has served with the New York National Guard, and is currently enrolled in a non-resident course at The Command and General Staff College. Captain Fairchild is employed in civilian life as a science teacher with Syracuse City School District, NY.

A COMPARISON OF U.S. AND U.S.S.R. TECHNOLOGY

A strengthened and vigorous program of Defense Research and Development (R&D) and modernization investment is absolutely fundamental for the maintenance of stability and peace in the years ahead. The quality of the United States' program today—and decisions on its scope and magnitude—will directly influence the balance of power in the 1980's and beyond.

During the last several years we have made substantial progress, but we still have problems and concerns.

The trends with respect to the Soviet Union are especially sobering and portray a potentially grave situation in the mid-1980's. Given an extrapolation of current trends, and without appropriate action on our part, *the Soviet Union can achieve dominance in deployed military technology in the 1980's.*

At a time when we are critically dependent on maintaining technological leadership, we find that we no longer have a corner on technological innovation and change. We have, in fact, consistently underestimated the progress of our competitors.

Because we are competing with a closed society—one not given to debating publicly its defense rationale and programs—there are questions which could have the most profound significance for our own defense posture in the future. As an example—*"What is the real meaning and potential significance of the large Soviet civil defense and industrial survival effort?"* The answer to this question could fundamentally alter our assessment of Soviet strategy and, in turn, alter our own deployments and research and development (R&D) programs.

I note that the acceleration of technological change has increased the danger of technological surprise. I am less concerned about the appearance of unforeseen new weapons, *per se,* than with innovative uses of technology based on a superior understanding of technology's ultimate significance to future warfare. In our highly complex society, our vulnerabilities can be great. The possibilities of surprise are numerous and staggering; and the consequences could be disastrous.

Technology Balance Posture

The United States continues to hold a technological lead over the Soviet Union in most areas critical to our national security. But that lead has been diminishing. In some important areas, it is gone and the Soviets are ahead.

Moreover, the technology balance is dynamic. *Trends* are more important than a static snapshot at a point in time. Our ability to perceive trends and to assess and project properly their underlying significance are fundamental to our future security, as well as to our survival. The decisions we make now, based on these perceptions and assessments, will determine our relative posture in the world in the 1980's.

The Soviet Union has a very large and determined effort. They are inexorably increasing their level of technology relative to ours and are, in fact, seizing the initiative in important areas.

The Soviet effort is dominated by their often-stated national goal of surpassing the United States in science and technology. From this commitment is derived the continuity of effort, the sizable production of first-rate scientists and engineers, and the large and growing investment which they feel necessary to achieve this goal. A very large, high-technology military production capacity has been built. All measurable indices of activity are at record levels and growing. The military R&D effort is in transition from the conservative incrementalism of the past to innovation and bold new undertakings in speculative but high payoff areas, such as high energy lasers, wing-in-ground effect vehicles and high pressure technology.

In the Strategic Area

A powerful and asymmetric counter-military capability clearly is coming into existence with the deployment of their new intercontinental ballistic missiles (ICBMs) and with more rapid progress in their high-accuracy guidance technology than predicted a year ago.

Having reduced our lead in some strategic areas and forged ahead in others, Soviet R&D is emphasizing the search for revolutionary technologies which could seriously upset the strategic balance. A momentum and an overall size and diversity of effort have been established which inevitably will have long-range implications and could lead to surprise.

In Space

Our space technology overall is far superior to that of the Soviet Union. However, they do have an active and growing program with about eight times our number of military launches (in 1975). They have proven that their systems are capable, or soon will be capable, of providing world-wide direct support to their forces and command authorities.

They have now mastered the difficult technology of

routinely placing strategic warning and communication satellites in geostationary orbit.

They have developed two new classes of satellites for global ocean surveillance and possibly for target information to be used by their missile ships and attack submarines. One of these systems uses active radar. We have no similar system.

In General Purpose Forces

The Soviets have anticipated the trends of the technology explosion in conventional warfare. The number of areas in which we hold a decided technological edge has shrunk. Equally significant is their large military production capacity that successfully translates the results of Soviet research and development into deployed military capability facing U.S. and North Atlantic Treaty Organization (NATO) forces. Some examples are:

- Mobile field army air defense. Five new surface-to-air missile systems in the last decade; the *SA-8* is more sophisticated than any in the U.S.; plus mobile, rapid-fire guns having a secondary role as a direct fire weapon.
- Impressive new armored fighting vehicles, tanks and armored personnel carriers, each with new guns, night-vision devices and protective systems for operating in a war involving chemical, biological, and radiological munitions.
- An impressive integrated command and control system, fire-control systems and electronic warfare systems not matched in the U.S. and particularly in NATO.
- Improved artillery—greater range and fire power than our own—rapid fire rocket launchers and mine-laying systems, all massively produced and providing, in total, an unprecedented suppression capability.
- A fundamental change in Soviet theater aircraft ground attack capability—a four-fold increase in payload and a two-and-one-half increase in range.

Overall, the Soviet surge in capability we are now witnessing is the result of a steady program of research and development over the last decade which we have consistently underestimated in scope and intent.

Their program has weaknesses, but these can be resolved in time. Their R&D effort has continuity and is gaining momentum. It is there for the long haul—and the trends are there for us to see. Today, throw-weight; tomorrow, accuracy. Today, rapidly increasing quality and quantity; tomorrow, a clear possibility for superiority.

This is what leads me to the conclusion that a simple continuation of present trends could lead to dominance by the Soviet Union in deployed military technology in a decade.

I want to make it clear that this statement is not a prediction. It becomes so only if we do not act appropriately. Neither is it a cry for increased spending willy-nilly. Rather, it is a sober assessment of current trends—trends which are not immutable if we maintain an appropriately strong program of our own with a sense of long-range commitment.

We must recognize that the technological competition is real and urgent. We have no real choice but to compete and there is no question in my mind about our ability to prevail.

In response to the clear capabilities and strategies of the Soviets, we focus much of our planning around two high-priority complex threats, namely,

(a) a breakthrough "blitzkrieg" campaign by the Warsaw Pact in NATO central region involving unprecedented massed armored forces and firepower, and

(b) the interdiction of our sea lines of communication.

Our job is to develop the neutralizers and to achieve the flexibility demanded by our defense strategy in meeting these threats.

In land combat, we will need to counter massed and highly mobile armor and artillery with superior weapons systems. Programs which will provide this capability by supplementing already developed hardware include the *XM-1* tank; an improved *M-60* tank; the advanced attack helicopter (AAH): the close air support *A-10* with its *GAU-8* cannon; laser and imaging infrared *Maverick; Hellfire;* and laser-guided artillery projectiles *(CLGP).*

Our air defense against continually increasing saturation air-attack potential will be provided by Air Force/Army collaboration. On the ground, *SAM-D* will provide an entirely new plateau of capability against high and medium altitude threats. It will be integrated with *AWACS* and tactical air for mutual enhancement. *ROLAND* continues as our vitally needed all-weather, short-range, mobile and dispersed antiaircraft system for the future and is being developed with our European allies. The man-portable *STINGER* will replace *Redeye* and provide an order-of-magnitude increase in capability against low flying attack aircraft.

Our tactical mobility will be multiplied by the UTTAS utility helicopter; by the *CH53E* cargo helicopter; by the *MICV* infantry combat vehicle; by modifications to the *CH47* cargo helicopter; by stretching the *C-141;* and, eventually, by the Advanced Medium *STOL* Transport *(AMST).*

Reliable and accurate location of targets will be achieved by artillery and mortar locating radars now successfully demonstrated (TPA 36/37); by the remotely monitored battlefield-area sensors *(REMBASS);* by *RPVs;* and by an advanced scout helicopter *(ASH)* now in its initial planning.

For the tactical air forces, we are conducting R&D directed toward the following improvements:

- As mentioned, powerful "look-down" real-time surveillance, target acquisition, and battle control will be provided by *AWACS* and by improved *E2C.* These are real "force multipliers."
- The Air Force *F-16* and Navy *F-18* air combat fighters are progressing well, with rigorous cost targets which I believe can be achieved. They will provide a new dimension of *affordable* high-performance aircraft/avionics capability to replace aging multi-mission *F-4's.*
- Night ground attack capability will be provided by infrared night vision target acquisition and weapon delivery systems.

I have tried to present a balanced assessment of our technology posture vis-a-vis the Soviet Union. If that

assessment is somber, it is because the trends are not in our favor. The principal question facing the United States is whether we will have sufficient capability to deter the Soviet Union in 1985 and beyond. And in addressing this question, it is hard to escape the conclusion that the Soviets appreciate much better than do vocal critics of U.S. defense, the importance of technological leadership in preserving the power that permits nations to control their destinies.

Condensed from an article by Dr. Malcolm K. Currie, Director of Defense Research and Engineering, appearing in the publication, Command Information.

THE PRESENT ROLE OF THE AMERICAN SOLDIER

I have been wrestling with my role as a professional soldier for quite some time. Each time I have begun the process of trying to determine my contribution to national defense, the thoughts have become submerged under the weight of superpower politics, detente, summit conferences, shuttle diplomacy, and the massive destructive power of modern nuclear weapons. When contrasted with these, and other equally dominating concepts, my contribution as an individual invariably comes out either as insignificant or, at most, less than meaningful. This is not a very self-assuring conclusion. Can it be that the need for and role of the American soldier has diminished with the development and use of present weapon systems and superpower diplomacy?

At first, the answer almost certainly appears to be yes. The value of the American soldier is at a low point, and this should be accepted as part of the inevitable process of history. Nor is this new, for the perceived role and need of the American soldier, over the 200 years of the Army's existance, closely resembles the sharp peaks and deep valleys of a roller coaster track. Whenever the nation has been confronted with an acknowledged threat, the soldier has found himself the object of praise and popular support. Once the threat disappears, however, the supporters have been prone to reverse their position and vigoriously call for reductions in force levels and roles for the soldier.

An Element of Deterrence

U.S. post-World War II strategic defensive policy vis-a-vis the Soviet nuclear threat has been based on deterrence. Simply stated, deterrence is offensive in that a potential opponent is prevented from becoming an actual opponent because of his belief that aggressive actions on his part will result in counteractions by the attacked; which will inflict greater damages on the attacker than are the gains to be obtained by the considered aggression. It logically follows that deterrence has failed if a nation is attacked by another which was supposedly deterred. Assuming that deterrence does work, then there can be no wars or conflicts.

Deterrence, however, is predicated on the *belief* that, if an aggressive action is undertaken, an appropriate counteraction will be forthcoming. What one *believes* is largely a function of *perception,* and *perception* is a function of the *image* that one has of his environment. Images, perceptions and beliefs—of such things is deterrence made, and the American soldier is a vital link in the deterrent chain.

The deterrent capability of a nation may be viewed as the sum total of the elements of power possessed by the nation. The military is an element of vital importance. The U.S. military element of power is composed of strategic, general purpose, and reserve forces. It may seem that, in our competition with the Soviets, the primary role would be reserved for the strategic nuclear forces and that the others are regulated to lesser roles. I would argue that this was true up to the time that the United States acknowledged Soviet parity in nuclear weapons. Before U.S.-Soviet parity was achieved, the Soviets undoubtedly were more concerned with the image projected by the strategic nuclear forces. But parity, by definition, neutralizes the nuclear forces as an effective instrument of power in the U.S.-Soviet relations—that is, we and they are deterred above the nuclear threshold.

The Soviets are rapidly developing a global deterrent capability in the general forces range and can be expected to use their newly found option to further Soviet goals. When this condition matures, subtle pressures will be exerted in selected areas with the knowledge that an effective military force is backing Soviet action. A nation, so pressured, is faced with the choices of resistance, compromising, or submitting, unless there is a likelihood that an effective counterforce is known or thought to exist. If such a force is present, then the Soviets will have been deterred from initiating the action from the first, and stability would not have been threatened.

This is the role of the American soldier in the national defense equation. Under these conditions, he fights only if his primary role as deterrer has failed. To deter, one must project an image that convinces the potential opponent that, if he pursues an aggressive action, the costs will be more than the expected gains. How are we to go about developing this image?

There is no all-encompassing answer to this question, but part of it lies in understanding the environment and how it affects us. Modern communications systems have the means to flash a picture around the world. Allies, looking at the American soldier, ask: "Is he dependable; can he do the job; should I risk a confrontation in view of his abilities to support me?" The American public and Congress are asking these same questions, but they are also asking: "What kind of return am I

getting for my tax dollar; would I get more with missiles; would I want my child to serve in that organization?" Potential opponents are measuring our capability with questions such as: "Is he as good as his equipment; will he be able to respond effectively in time; will he fight or break; is he a match for my soldier?"

The answers will have an impact on the future world peace. In arriving at the answers, the audience is looking at the "guts" of the Army: the tanker, infantryman, artilleryman, support troops, mechanics, truck drivers, everyone. And how are they arriving at the conclusions? By determining if the tank runs, if the crew can fire and hit a target, if the mechanic can repair it, if the noncommissioned officer can handle his men, if the officer can organize and direct the unit toward a particular goal; in other words, can we and are we doing our job? They are arriving at their conclusions through their perception of the image that we are projecting. A positive image will contribute toward a favorable answer, and a negative image will have an opposite effect.

Understanding this will go a long way toward helping us do the job at hand. The soldier must be able to perform in combat, and he must convince others of that capability. By now, the question of how to go about developing and projecting the positive image must be of concern. And the answer, I would submit, is neither novel nor radical. It is simply, do your job in a professional way and understand the importance of the image that you are projecting to a world audience, both on and off duty. If a vehicle breaks down on an autobahn, a crew cannot hit the target, a radio operator cannot transmit correctly, that is bad. Conversely, if everything goes well, the vehicles are clean and perform properly, the soldier looks physically fit and can perform his job well and the unit appears to be a cohesive, disciplined organization, that is good.

Condensed from an article in the Military Review, April 1976, by Major Robert F. Helms II.

THREE BLADED HUEY

The title "Three-Bladed Huey" implies increased aerodynamic efficiency. However, in this tale, the three-bladed *UH-1* significantly reduced aerodynamic efficiency to the point of near disaster.

One December morning in the Republic of Vietnam, a lieutenant inspected a *UH-1D* in preparation for a milk run to a nearby outpost. The mission was to deliver five salvageable main rotor blades to be used in construction work.

After preflight, the lieutenant walked over and inspected the unusual sling load—five blades fastened together by iron construction rods driven through the blades and the rods crimped together. The thought of aerodynamic forces acting upon the blades when passing through effective translational lift flashed through the lieutenant's mind. However, this thought was partially erased after inspecting the iron rods to see that they were securely holding the blades.

The lieutneant told the crew chief to constantly monitor the load after takeoff. Since it was a short flight within the local area, no copilot was used and a maintenance supervisor flew left seat. During runup checks, the lieutenant determined that the electrical sling release was inoperative, so a number of mechanical release checks were made to ensure proper sling release.

Before translational life was reached, the crew chief reported "load stable." Passing through translational lift, the aircraft began rocking and the lieutenant heard a garbled cry over the intercom that sounded like, "blades separating!"

At that moment, with airspeed about 50 knots, a loud crack was heard from the right side and the aircraft became momentarily uncontrollable. The cyclic tried to sweep the cockpit and the aircraft rocked violently as it yawed sharply to the right.

The lieutenant, who assumed that the load had swung up and made contact with both the main rotor system and tail rotor system (making the tail rotor system inoperative), had two priority actions in mind (to say it mildly)—to jettison the load which was done manually, and to get more forward airspeed because of suspected tail rotor failure.

The aircraft became fairly stable upon jettisoning, but vibration became more severe with increased airspeed. The lieutenant accepted 50 knots and checked tail rotor pedals, surprisingly finding the aircraft could be controlled. Because of severe vibration throughout the aircraft and knowing he had tail rotor control, the lieutenant elected to make a forced landing straight ahead into a rice paddy.

After shutdown it was discovered that one of the main rotor blades had been hit and was badly damaged two-thirds of the way out from the main rotor hub. According to people who watched from the ground, after passing through translational lift, the aerodynamic force of the blades was great enough to straighten out the crimped steel rods that were holding them together.

When the rods straightened out, the five main rotor blades opened up like a Chinese fan under the aircraft and began flying. One of them flew up on the right side and tried to enter the main rotor system, but luckily it deflected downward after contact.

A three-bladed Huey is not very efficient. I tell this tale (yes, that lieutenant was me) only because of the old adage: "Experience is the best teacher and to learn and gain experience from others is golden."

Take heed and beware of unusual sling loads.

Extracted from an article by Major Ralph E. Riddle, Jr. in the U.S. Army Aviation Digest, November 1976.

Recognition Quiz

This Armored Vehicle Recognition Quiz is designed to enable the reader to test his ability to identify the armored vehicles of armored 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 armored fighting vehicles. 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 appearing in the picture should also be provided. Suggestions for improving or expanding this feature are welcome. — ED.

(Answers on page 60)


1

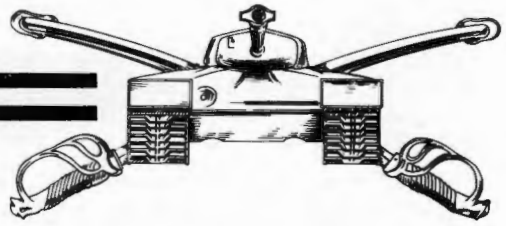

2


3


4


5

OPMD - EPMD ARMOR



ALTERNATE SPECIALTIES

Captains with at least 84 months and not more than 99 months active federal commissioned service as of 30 September 77 will be designated alternate specialties by HQDA by 30 April 77. This group of officers is referred to as YEAR GROUP 70 EXPANDED *for this designation process only.* The term EXPANDED is used to identify those officers in YG 69 that have not been designated their alternate specialties. This situation occurred because of the transition months (July through September) under the new fiscal year calendar. Officers entering active duty these months in 1969 were not included in the recently completed BYG 1969 designation process. These officers will be designated with BYG 1970.

A specialty preference form (DAPC-OPMD Form 854) was mailed to each YG 1970 officer through his military personnel officer (MILPO) on 5 November 1976. Officers who have not received a preference form should contact their MILPO immediately. Factors influencing alternate specialty designation include Army requirements, an officer's preference and specialty experience. Military and civilian education is considered when evaluating an officer's specialty experience.

To obtain additional information pertaining to alternate specialty designations write to the HQDA, Company Grade Combat Arms Division, USA MILPERCEN, ATTN: DAPC-OPE-P, 200 Stovall St, Alexandria, VA 22332, or call Major Herbert E. Koenigsbauer, Jr., Specialty Coordinator, AUTOVON 221-7820/7819.

PROMOTION TO MAJOR, AUS

With a tentative convening date set for 17 May 1977, attention is now being drawn to the 1977 Major, AUS, Selection Board. For those captains in or near the probable primary zone, the next few months will mark a period of increasing anticipation. What can we reasonably expect the zone of consideration to be? What will be the selection rate? How stiff will the competition be? Most of the questions cannot be answered until after the board's results are announced. However, we can gain some insight into what to expect by studying the results of recent selection boards.

The 1974 Major, AUS, Selection Board signaled the beginning of an era of extremely keen competition and relatively low selection rates. In 1974, the Army Promotion List (APL) Selection rate for officers considered in the primary zone for the first time was only 58.8 percent, down from a high of 79.9 percent in 1969 (no board was held between 1969 and 1974). Since 1974, however, there has been a slight but continuing improvement in APL selection rates.

Although in 1976 selection rate was up to 64.1 percent, there is no indication that the competition for promotion is lessening. On the contrary, the general quality of officers entering the primary zone is exceptionally high. Most of these officers were commissioned during the Vietnam buildup and most have been through three RIFs. Unfortunately, continuing manpower constraints will result in many of these quality officers not being selected for promotion. Secondary zone selections are now following the upward trend of the primary zone. In fact, the 1976 APL secondary zone selection rate was 8.9 percent, down from 15 percent in both 1974 and 1975. Indications are that this reflects the recent change to the variable or "floating" zone which allowed the 1976 board to select from between 5 and 15 percent from the secondary zone depending on the quality of the officers in the zone. Under the 1976 board guidance, the secondary zone selectee had to be competitive with the upper one-half of those selected from the primary zone. In short, expect the competition to be even stiffer for the next board.

Guidance to recent selection boards has continued to reflect the Army's committment to OPMS. This is best exemplified by the instructions to the 1976 Major, AUS, Selection Board which stated that "Promotion in the Army is based on the board's determination of the *potential* of an officer to perform in the higher grade," and that "*potential* will be based, for the most part, on the record of performance and aptitude in both his/her *primary and alternate specialties*" (emphasis added). The guidance to the 1977 Major, AUS, Selection Board is expected to continue to focus on specialty development and away from the "generalist" approach of past years.

DA has not yet announced what the zone of consideration will be for the board scheduled to convene on 17 May 1977. However, if the pattern established by the last three boards holds, and there is no reason to believe that it will not, we can expect a primary zone between 7 and 8 months in length. The last board's primary zone cutoff was temporary date of tank (TDOR) through 31 January 1969.

YOUR RESPONSIBILITY TO YOURSELF

Have you done all you can to insure your best chance for selection by the upcoming board?

Your Official Military Personnel File (OMPF) (alias *TAG File*) is *the file* that is examined by all selection boards—whether for promotion (AUS or RA), brigade or battalion level command, C&GSC or SSC level schooling, or Regular Army Appointment, etc. In simple terms, it is your *representative* to the members of all selection boards.

Is your OMPF complete? Is it correct? Are you sure? When did you check it last? Does your picture do you justice? You and you alone are the only person who can insure that these questions are answered in your favor and thereby set your mind at ease.

Assume that you have given all of your jobs "your best shot." Your manner of performance is a matter of record on your OER and you are now about to come under considera-

tion by a selection board. You owe it to yourself to see that your OMPF is complete and fully accurate. A visit to MILPERCEN at a critical time like this would be a good investment in your future. Consider it! Can you afford to gamble?

Another very important document that is not a part of your OMPF but is also furnished every selection board is your Officer Record Brief (ORB). You can update your ORB through your local MILPO. *Do it!* You are required to audit your ORB at least annually, but in case it's been several months since your audit, you owe it to yourself to do it again to insure accuracy for any upcoming selection board. Is your physical profile current? Is your civilian and military schooling accurately reflected? *Go check. You can't afford not to!*

CAREER MANAGERS WILL COORDINATE YOUR MILPERCEN VISIT

Let your career manager assist you when planning your next visit to MILPERCEN. It's as simple as a phone call or post card to your specialty manager. Give him at least 48 hours notice and an idea of what you want to accomplish, and he'll pick the ball up from there. This will help him help you by having the necessary people and material available when you come. Take the time to call or write; it will re. a more meaningful visit to MILPERCEN.

ELIGIBILITY CRITERIA FOR FLIGHT TRAINING

Officers desiring to attend flight school should apply as shown in AR 611-110. Completion for the relatively limited flight school quotas is very keen. Selections are made from the best qualified applications, with demonstrated manner of performance being the primary consideration. An applicant must:

- Have less than 60 months active Federal commissioned service upon enrollment.
- Be able to meet standards of a Class I-A flight physical (graduates of the USMA Flight Program and ROTC Flight Training Programs require a Class II Physcial).
- Have a minimum score of 155 on the composite FAST-OB test. (For officers who completed the AROTC Flight Training Program in college, DA Form 2220, Evaluation of ROTC Trainee as a Potential Army Aviator, is acceptable in lieu of FAST-OB).
- Have served a minimum of one year of duty with troops.
- If USAR, be in Competitive Voluntary Indefinite (CVI) status.

Additional information concerning eligibility and applications may be obtained from Major Gass, the Aviation Management Officer, ATTN: DAPC-OPE-P, or AUTOVON 221-7818/7819.

Note. ROTC instructors should inform cadets graduating from the AROTC Flight Training Program that attendance at Flight school after AOBC *is not automatic.* AROTC graduates must compete for training quotas space with other officers who have completed the above requirements, and may not go to school until they have completed 1 to 2 years service in a troop assignment.

OER REVIEWER PARTICIPATION

The reviewing officer has a key role in the Officer Evaluation System. He must analyze rater and indorser entries for objectivity, accuracy, and fairness to both the rated officer and Department of the Army. In addition, he must challenge rating officials to justify their evaluation. This task is essential when the rater and indorser disagree significantly in their appraisals of the rated officer's performance and potential.

Under the provisions of AR 623-105, the reviewer may submit his own observations or recommendations as an inclosure attached to the basic report and may add any additional comments considered appropriate to protect the interests of the Army or the rated officer.

Officers in the field are reminded that cursory reviews and rubber stamping of Officer Evaluation Reports are contrary to the purpose of including a reviewer in the rating chain. Commanders must insure that reviewers understand the active and important role they play in the OER process. With this understanding, reviewers can materially assist in providing officials at Department of the Army and Department of the Army selection boards with a more effective Officer Evaluation Reporting System. *(Army Personnel Letter, No. 10-76, October 76)*

CLARIFICATION OF TERMS "HOME OF RECORD" AND "LEGAL DOMICILE"

Indications are that there is still a lot of confusion over the difference in the terms *home of record* and *legal domicile.*

The terms are used in the Army (and other Armed Forces) but are not identical. *Home of record* is your actual home just prior to entering the Army according to the DOD Joint Travel Regulation. At separation time it may be used to designate the place to which a service member may be entitled to receive mileage and household goods shipment allowances. Thus, the primary use of home of record is in connection with travel pay and allowances.

Once a home of record has been officially recorded it *may not be changed* unless a bona fide error was made in the original entry. If an individual believes an error was made in the original entry, he should send a request for change, along with copies of documentary proof to:

OFFICER—	ENLISTED—
MILPERCEN ATTN: DAPC-PSR 200 Stovall Street Alexandria, VA 22332	U.S. Army Enlisted Records Center ATTN: PCRC-R Ft Benjamin Harrison, IN 46216

Legal domicile is where one votes, pays state taxes, registers his car, collects Veteran's bonus, etc. *It is not always the same place as home of record.* It may change from time to time to keep pace with military moves and personal desires, provided that legal residency requirements of the states involved are met and a new W-4 form (withholding certificate) is completed. One entry on the W-4 is "Home Address." This is where legal domicile must be indicated. At the end of the calendar year, that entry causes a copy of the W-2 form (Wages and Tax Statement) to be forwarded to the appropriate state. To avoid problems next January, submit a new corrected W-4 form thru your orderly room or finance officer. ▲

NOTES

1976 *ARMOR* AWARD WINNERS

SSG Bunce

MAJ O'Neill

In May 1974, the United States Armor Association's Executive Council voted to award two $50 savings bonds annually for "the most innovative or stimulating" articles published in *ARMOR* Magazine. One award was designated to go to a company grade or warrant officer and the other to an enlisted man or woman.

The winning article written by a company grade officer, selected by a committee of two colonels, one major, two captains, was "Needed Now: An Antitank Doctrine" by Captain Timothy R. O'Neill (now Major). It appeared in the January-February 1976 issue. Major O'Neill was commissioned in Armor upon graduation from the Citadel in 1965. He has served as an OCS tactical officer, commanded armored cavalry and armor units in CONUS and Vietnam, and served on squadron and brigade staffs. Within this last year, he received his Master's Degree in psychology and is currently teaching psychology at the United States Military Academy, West Point, NY.

Staff Sergeant Peter L. Bunce, author of "The Reconnaissance Dilemma," won the award for the best article by enlisted personnel. It appeared in the March-April 1976 issue of *ARMOR*. Sergeant Bunce enlisted in the Army in 1968 and has since served in Vietnam with the 11th Armored Cavalry, in Germany with the 7th Cavalry, and at Fort Knox in the Weapons Department of the Armor School. He is currently serving with Troop G, 2d Squadron, 11th Armored Cavalry Regiment, USAREUR.

ARMY AAH CONTRACTOR PICKED

Hughes Helicopters has been selected as the winner of the U.S. Army Advanced Attack Helicopter (AAH) competition.

The 317.7 million full-scale engineering development contract, which will be incrementally funded, culminates the competitive airframe development phase of the program. During that phase, Hughes Helicopters developed and produced two prototype aircraft and a ground test vehicle. These prototypes underwent government competitive tests from July through September of this year. Test results plus information contained in proposals submitted by the contractor during the last 4 months were used in making the selection.

During the next phase of the program, three additional prototype aircraft will be built. Also, the associated subsystems and weapons will be integrated, tested, and qualified as a complete attack helicopter system.

Integral to the full-scale engineering development phase, the Army also will develop a target acquisition and designation system (TADS) and pilot night vision system (PNVS) for integration into the air vehicle.

The advanced attack helicopter will be vastly superior to current armed helicopters. It will use the *Hellfire* modular missile system as primary armament with a 30-mm cannon and 2.75-inch rockets for area and suppressive fires. The TADS/PNVS will provide laser designation and rangefinding for day and night operations. The advanced attack helicopter will provide more accurate fire, improved first-round hit capability and substantially increased survivability over existing attack helicopters.

NEW LIGHTWEIGHT FIREFIGHTING SYSTEM

A new, lightweight fire fighting system has been developed by The U.S. Army Mobility Equipment Research and Development Command (MERADCOM) at Ft. Belvoir, VA.

Until now, a light truck couldn't be used because the fire fighting agents, primarily water, weighted too much. A bigger truck had to be used to hold the necessary supply. With the advent of lighter firefighting agents, MERADCOM designed and built a firefighting unit to fit in a pickup truck that can arrive at a fire in possibly one-third the time it took the heavier trucks.

Once the truck with two men arrives on the scene the first concern is rescue. One man in protective clothing would rapidly enter the fire area creating a fire-free path to any trapped personnel using an aqueous film-forming foam (AFFF). AFFF is a low expansion synthetic foam ideal for fuel fires because it leaves a thin film preventing re-ignition. The foam is discharged from the system by means of pressurized nitrogen.

If the fire was large, the remaining man would enter the fire with another agent called Halogen 1211. The halogen agent is simply an inert gas that hangs low and suffocates the fire. Using both agents, the firemen would fight as a team till they reach the victims and car-

ry them to safety. With a less critical situation, the halogen 1211 would be used for hard to get at places, such as electronic panels or where a clean agent is desired. Unlike dry chemicals, 1211 leaves no residue.

The skid-mounted unit can be used in emergencies by fire inspection team. Most military posts have firemen who inspect areas for fire hazards. This duty has left several firemen unavailable when a fire broke out. If they make their rounds in a truck with firefighting equipment instead of a car they could react, once they heard the alarm. They could go directly to the scene, sometimes getting there before the station fire engines do.

If added protection is necessary for a high risk area, such as a helicopter refueling area, the unit could be taken off the truck and left there. The unit would be completely operational.

ART PRINT HONORS GENERAL ABRAMS

Prints of a commemorative painting of the American golden eagle honoring General Creighton W. Abrams will be issued by the Cavalry-Armor Foundation in late May 1977.

The painting, titled "The General Creighton W. Abrams Commemorative Golden Eagle," is being executed by the nationally-known nature artist, Ray Harm. The 2,000 full-color prints will be signed, unnumbered, and issued in two series. The first series of 500 will be marked as "First Day of Issue" and will be released on Armed Forces Day, 21 May 1977. Additional information concerning both series of prints may be obtained from the Cavalry-Armor Foundation, Box L, Fort Knox, Kentucky 40121.

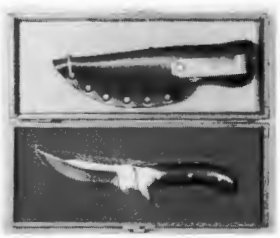
NEW WEAPONS LOCATING SYSTEM

To solve the ago-old problem of locating enemy mortars and artillery, the Army's Electronics Command (ECOM), Fort Mammouth, NJ, has developed a new indirect weapons locating system named FIREFINDER. According to officials from ECOM, the system is high on DA's priority list of materiel requirements.

The FIREFINDER system consists of an operation shelter that can be used with either of two different radar sensor antennas. One sensor antenna will be used for long range artillery detection from behind the forward edge of the battle area, while the other, a smaller antenna, will locate enemy mortars in forward battle areas.

FIREFINDER actually combines two radar subsystems—artillery locating (AN/TPQ-37) and mortar locating (AN/TPQ-36). Both systems use electronic scanning, sophisticated signal processing and computer-aided analysis to detect and track projectiles without being affected by radar returns from birds, airplanes and sky and ground clutter. Officials say the speed of the electronic processing is great enough to allow the system to normally locate a hostile weapon before the fired round has landed.

ECOM officials were expecting Army authorization for limited production of the artillery locator radar subsystem late last year. Development and testing of mortar locating radar will continue this year with production set for late 1977.



A drawing for the five prizes will highlight the dinner at the 1977 Armor Conference in May (see inside back cover). The grand prize is a fireable reproduction of the famous 1855 Hawkins .50-caliber, black-powder, plains rifle. Second prize is a unique .44-caliber, flintlock dueling pistol with a hand-carved grip. Third prize is a walnut finish wood serving tray decorated with the armor insignia on a green background in needlepoint. Fourth prize is a cased Buck hunting knife with sheath. Fifth prize is a 3-year Association membership with subscription to *ARMOR* Magazine. Association members must be present at the dinner to win the prizes.

BOOKS

CLAUSEWITZ AND THE STATE by Peter Paret. Oxford University Press, New York, London & Toronto. 1976. 467 pages. $18.95.

Major General Carl von Clausewitz (1780-1831) was the most influential military theorist of the last two centuries. Even today his epochal work, *On War,* remains the basis for most western studies of strategy and of the nature of armed conflict. He was best known for his conception that warfare is or should be a tool of politics, a means of accomplishing national goals, and that these goals determine the extent and nature of each war.

Until recently, however, Clausewitz's work has been more quoted than read, and more misunderstood than studied. Nineteenth century soldiers frequently criticized Clausewitz's refusal to set out a system of strategy which could be applied to specific conflicts. The 20th century has accused Clausewitz of advocating total war and maximum violence, whereas these were only theoretical concepts which he invented in order to evaluate the limited nature of actual wars.

Professor Peter Paret has devoted many years to a study of Clausewitz and of the military age in which he lived. *Clausewitz and the State* is a major product of this study, an intellectual biography which Paret apparently intends to accompany his recent new translation of *On War.*

This biography includes a wealth of background information designed to trace Clausewitz's mental development. As a young Prussian officer fighting the armies of the French Revolution during the 1790's, he became interested in the contrast between actual war and the outmoded, stylized drill of 18th century garrison armies. In 1801 Clausewitz attended what later became the prestigious Berlin War College. There he met the great military reformer Gerhard von Scharnhorst and learned to analyze military problems with logic and a sense of history. Prussia's catastrophic defeat by Napoleon in 1806 shattered many of the ambitions and ideals which young Clausewitz had invested in his government. As a military reformer who, in 1812, joined the Russian army to fight against France, he became increasingly sophisticated and pessimistic in his professional studies. His greatest works were produced during his long tenure (1819-1829) as Director of the War College, an administrative position which prevented Clausewitz from influencing Prussian military education and doctrine.

These details are important not for themselves but because they restore the military philosopher's ideas to their historical context and thereby explain many apparent paradoxes. For those who seek a rigid doctrine of military operations, Paret explains that Clausewitz was motivated by "the wish to understand events, rather than to prescribe doctrine." The general was too conscious of the influence of psychology and chance in war to believe that there were any absolute principles of strategy, and his sense of history led him to analyze the wars of different eras by their own standards, rather than by comparison to his own experience. War could, however, be conceived of as an abstract concept of maximum violence and emotion. When Clausewitz compared this theoretical absolute to the limited, halting European wars of his own age, he was able to identify the limited political aims of governments as the factor which seeks to control popular emotions and to determine the degree of violence, the military objectives, and the duration of these wars.

For the military historian, *Clausewitz and the State* is a major monograph on an important period in the development of military thought. For the nonhistorian professional soldier, this same book is an extremely readable companion to one of the classics of warfare.

Second Lieutenant Jonathan M. House
USAARMS

BOOTS & SADDLES AT THE LITTLE BIGHORN by James S. Hutchins. The Old Army Press, Ft. Collins, CO. 1976. 81 pages. $4.50 (soft cover).

This little paperback presents in a very readable format a good deal of miscellaneous but interesting information on weapons, dress, equipment, horses and flags of the 7th Cavalry and other cavalry units in 1876. The author, who did his original research some two decades ago, has updated and added to his 1956 essay. The text is profusely illustrated with both the author's sketches and photographs of the actual equipment. The latter for the most part were provided by the Smithsonian Institute.

This book makes a good companion for duMont's *Custer Battle Guns,* reviewed here previously, though it is not done in the depth of duMont's book. Hutchins' essay is essentially a casual introduction to cavalry history of 1876 and would make a fine gift for a youngster starting to show interest in his American heritage.

Colonel (Retired) John R. Byers

THE LAST EUROPEAN WAR: September 1939-December 1941 by John Luckacs. Anchor Press/Doubleday. Garden City, New York. 562 pages. 1976. $15.00.

The book is an excellent review of the period preceding World War II and the last effort of a European country to dominate Europe. After 1941, the war changed to a civil war and a world war. The start of this war in 1939 signalled the final demise of the European State system that had existed for 300 years.

The narrative concludes that Hitler's enormous successes were the result of his conviction of German superiority, which he successfully imparted to the minds of millions, rather than his superior organization of material power. The small countries of Europe were divided in beliefs, politics and sentiments; thus, they fell one by one before the German movements. The later realization of this fact led the first movements toward a European federation. Had Hitler offered Stalin a way out as was given France; that is, to have peace with an Army and some country left, Hitler might have won. But the Russians in 1941, like the British in 1940, simply never realized they were beaten. By December 1940, attitudes were already changing and few people believed Hitler would win in the end. The conflict remained a limited war until the invasion of Russia in 1941 when total war began. The lightning war itself did not hurt people as much as previous wars, but the people suffered more from the depriva-

tions and tyranny of the German occupation.

The story points out that Hitler, contrary to many beliefs, was an able strategist, one of the best economists of the 20th century, and a shrewd judge of people. His decision to "nationalize" the people rather than industry allowed Germany to have guns and butter well into the war. This and many other interesting little known facts are revealed and substantiated in the book.

The story is well written, well documented, and the extensive footnotes provide further details for the historian. The author employs an unusual approach to weave together little known facts into rather interesting conclusions. The book is well worth the money and the time necessary to read it.

The Late Colonel Carl M. Putnam

GIAI PHONG! THE FALL AND LIBERATION OF SAIGON by Tiziano Terzani. St. Martin's Press. 1976. 317 pages. $10.00.

"Ten years of tragedy for nothing." That is the way war correspondent Tiziano Terzani sums up the Vietnam war in this somewhat provocative book. After 4 years of covering the war for *Der Spiegel,* a German weekly news magazine, this Italian-born correspondent slipped back into Saigon to witness the death blow to the South. His fast reading book is full of many details of events during the hectic final days of April 1975 and the subsequent three months of conversion, of the South to communism. However, if you want to gain some insight into why the Thieu government and the American-built military force fell apart so rapidly, you will have to look elsewhere. Author Terzani's emphasis is on the "liberation" of the Vietnamese people and not on the fall of the Republic of Vietnam. Hence, he used the words "giai phong" in his title, which means liberation and was the battle cry of the Viet Cong as they entered Saigon 30 April 1975.

As the opening pages describe the North Vietnamese invasion, it is clear that they were completely determined to overrun the South. Five corps, each with three divisions of at least 10,000 men apiece, were sent down Highway 1 and targeted against Saigon. The commander-in-chief of this "Liberation Army" was Tran Van Tra, the legendary Viet Cong who conceived and conducted the TET offensive of 1968. How much of this force actually reached Saigon is not clear. However, the invasion force was much more than was required since almost no resistance was offered. The Communist forces were ready for a long siege of Saigon and a street by street battle. But none of this was necessary.

Most of what transpired during those final weeks was adequately covered by our news media, but the author's first hand account of the last three days provides some understanding of the tension that gripped Saigon as the city was besieged, the final attempt by Big Minh to negotiate a ceasefire, and the confused evacuation of the last Americans and selected Vietnamese. The hysteria, the black marketing of embarkation passes for several thousand dollars apiece, and the evacuation of the orphans are all included in the opening chapters.

Although Tiziano Terzani may not be a card-carrying Communist, he certainly is a sympathizer and is not hesistant to express anti-American feelings. He could not resist the opportunity to insert his own biased conclusions. This tendency of the author detracts from what would otherwise be a creditable account of those final days of South Vietnam's existance.

The second part of Terzani's book is by far the more interesting. Here he outlines the steps initially taken by the North to convert the South to Communism as he relates events of the 3 months following the fall of Saigon. The orderly, methodical manner by which the Communist infuse their way of life into Saigon (which admittedly had become very Americanized) is indeed very impressive. With the exception of a brief visit to the Mekong Delta and interviews with former prisoners from Con Son island, the author's accounts are centered on Saigon. But the pattern of the Communist strategy of conversion and their basic policies are discussed in sufficient detail to permit the reader to extrapolate what probably transpired elsewhere in the South after the invasion.

The most pervasive emotion in Saigon during its final days of existance was the fear of a bloodbath that everyone talked about. Within days after the invasion forces arrived, the new regime made it known that conducting a bloodbath was not part of their plan. According to Terzani, the concept of a bloodbath was strictly a propaganda device created by Thieu's government and the Americans to motivate anticommunist feelings and a desire to resist. He says it never occurred anywhere. Only a few isolated incidents of public execution are related in the entire book and always with adequate justification provided through some type of people's court for enemies of the people.

After the invasion, Saigon was governed by the Military Management Committee under the chairmanship of General Tra. The first official act of the Committee was to close all bars, brothels, dance halls, opium dens, massage parlors, and other places for "American-type activities." Following this edict came a quick but thorough process of eliminating all traces of the old regime. Saigon obeyed without any apparent protests.

The *Maxime,* a fashionable nightclub next to the *Hotel Majestic* at the end of Tu Do Street, which had been frequented by American correspondents and military personnel, became a police station. Even signs and statues were purged. The wall at the entrance to Tan Son Nhut Airfield, which for years had proudly displayed in large letters a tribute to the Allied effort, "The Noble Sacrifice Of The Allied Soldiers Will Never Be Forgotten," was replaced by a motto of the Revolution—"Nothing Is More Precious Than Independence And Freedom." Within the first week of the occupation, the destruction of "puppet" symbols was concluded by physically demolishing "Thieu's monstrous Monument to the Unknown Soldier," which stood in front of the National Assembly building.

The second official act of the committee was directed against the news media. Nothing could be printed without permission of the new authorities. Every radio and television broadcast was aimed at the conversion of the people to the new way, the way of the Revolution. A new concept of the homeland had to be learned by all. There was to be no recognized difference between the South and the North. Everyone was to become proud of this unity. The glory of it all was given to the people who were told that they succeeded in freeing themselves of the American yoke.

At the grass roots of the entire conversion process were the ubiquitous "bo doi." They moved into every hotel, every neighborhood, and into many homes where space permitted. These regular, uniformed soldiers of the "Liberation Army" were for the most part teenagers. Yet their training and indoctrination prepared them well for their role as catalyst of the conversion. They were everywhere and observed and reported all that took place. They conducted a thorough census of all the people and their possessions, were present during all student group activities such as the burning of "decadent publications," and attended every neighborhood cell meeting or informal discussion group. To most of the people of Saigon, their omnipresence was the only physical evidence of the new regime. Their simple, austere lifestyle was in sharp contrast to that of the

Saigonese, yet they were always modest and compassionate in dealing with the people. The fact that not a single incident of pilferage, rape, or abuse of power was ever noted by the author speaks highly for their discipline and training.

The most significant process of the Communist conversion program was the reeducation called the "hoc tap." This was conducted by the political cadre and was a thorough, long-term process that began with each individual purging themselves of offenses committed against the people by public confession in neighborhood cells throughout the city. Special sessions were conducted for high ranking "puppet" officials and military officers. In these special cases, the "hoc tap" included periods of penance during which roads were repaired, minefields were cleared, or other public work projects were completed. The announced policy of the Military Management Committee was one of the reconciliation and national harmony. No one was supposed to be arrested or punished for what they may have done under the "puppet" regime. They simply had to register officially with the new authorities and complete their "hoc tap." However, there were many groups, such as Thieu's secret police and some soldiers of ranger or paratrooper battalions, who failed to show up during the announced registration period. Some went into hiding, and some fled the city. These were officially branded as "obstinates" who persisted on the "path of error." They were hunted down, and they are probably still being sought to this day. It is interesting to note that a rare news release recently mentioned a North Vietnamese division was conducting operations against "stubborn elements" in the central highlands.

On the whole, the author paints a picture of an orderly conversion with the people of the South being embraced by the people of the North as their long separated brothers. He seems intent on convincing the reader that peace has finally come to all the Vietnamese people. His logic is akin to Orwellian "doublethink," but his book is interesting reading. It does provide some insight into how the party machine can systematically engulf an entire nation. However, be prepared to be upset by some of what you read, especially if you have not completed your "hoc tap."

Lieutenant Colonel (Retired) Bart M. Filaseta

THE ELECTRONIC BATTLEFIELD by Paul Dickerson. Indiana University Press. 1976. 224 pages. $10.00.

Finally a totally revealing book on electronic warfare has found its way into the literary world. Mr. Paul Dickerson has woven a fantastic book into a total up-to-date history of the electronic battlefield.

The Electronic Battlefield reveals the past, present, and future roles of electronics in the ever improving methods of destruction. With the advent of miniaturization of the transistors in the early 1960's and the beginnings of the Vietnam conflict, the electronic battlefield had its beginning. By the mid-1960's, a group of highly acclaimed scientists had a tremendous impact upon the military community. The Jason's were 45 of the nation's top university scientists. These men, in the summer of 1966, were responsible for the famous antipersonnel barrier along the southern edge of the DMZ (McNamara Line). From their idea's came gravel mines, *button* bomblets, *Sadeye/BIU-26B* cluster bombs, acoustic detectors, and *P-2V* aircraft.

Vietnam was the sounding board for varied sensory equipment. New electronic detection gave birth to the new organizations to test such things as people sniffers, starlight scopes, and ground target radars.

By late 1967, *Operation Igloo White* had introduced the total electronic battlefield to combat (sensors, computers, and interdiction bombing). This operation was directed against the Ho Chi Min Trail in Laos with its operation center in Thailand and flying monitor platforms over Vietnam and Laos.

As the author points out, *Igloo White* was directed toward the southeast Asian environment. In May 1972, *Mystic Mission* was displayed to our NATO Allies in Germany. The state of the electronic battlefield was being applied with success to the European environment but not under combat conditions.

Besides an indepth look at Army advancement, Mr. Dickerson has written about the Air Force venture into remotely piloted vehicles (RPV's) and the Navy's use of under ocean submarine sensors.

In the final chapter, Mr. Dickerson asks if the movement toward the electronic battlefield is wrong. Dickerson points out that the technicians who program the computers to perform acts of war are too removed, and therefore, are no longer concerned with the moral issue since they do not meet the enemy face to face.

Future warfare may be totally electronically automated. This book is a brilliant insight into the future as well as a look into the past.

Captain Ronnie W. Nall
Instructor, USAARMS

Information concerning the availability of professional books may be obtained from the U.S. Armor Association, P.O. Box O, Fort Knox, KY 40121.

RECOGNITION QUIZ ANSWERS

1) Japan SU-60
2) Great Britian Chieftain
3) FRG Leopard 30-mm Anti-Aircraft Tank
4) Soviet T-55
5) India Vijayata (37-ton Vickers Battle Tank)

☆ U.S. GOVERNMENT PRINTING OFFICE: 1977—757-041/2

TENTATIVE AGENDA
1977 ARMOR CONFERENCE
Fort Knox, Kentucky
16-19 May

Mark your calendars and plan to attend this important conference and the 87th Annual Meeting of the US Armor Association. Invitations and proxy forms will be mailed to all Association members by 15 March 1977.

MONDAY, 16 MAY 1977

1300-1700	Registration and Visit Patton Museum

TUESDAY, 17 MAY 1977

0800-0810	Opening Remarks, CG, USAARMC
0810-0845	Keynote Address
0845-0945	Threat Briefing
0945-1015	Break
1015-1145	Presentation by USAARENBD and DCD
1145-1315	Lunch - Brick Mess
1315-1630	Presentation by USAARMS (Tank Force Management Group, Division Restructuring, New Tactics)
1830	Social Event

WEDNESDAY, 18 MAY 1977

0800-1130	Presentations by Field Commands
1130-1300	Lunch
1300-1630	New Equipment—M-60A3, XM-1, MCV Scout, ASH, AAH, New Ammunition, Sensors, Mines, Threat Nation Equipment
1830	Social Event

THURSDAY, 19 MAY 1977

0800-1130	Subcaliber Devices and Firing Tables Training Literature, Soldiers' Manuals, SQT's, ARTEP's, GTS's, Training Devices, Engagement Simulation
1130-1140	Closing Remarks by CG
1140-1215	Business Meeting and Election (Armor Association)
1215-1300	Lunch and Departure
1330	Armor Association Executive Council Meeting

Coming in ARMOR

"AN EFFECTIVE MOBILE RESERVE"

In his Professional Thought, Colonel (Retired) George A. Tuttle proposes and discusses the concept of a specialized tank unit, used as the building block for battalions and task groups, to better utilize the ***XM-1*** *in combat.*

"SCORING TANK GUNNERY BY 'INSTANT REPLAY'"

Captain Patrick H. Orell describes the use of television 'instant replay' for scoring tank gunnery more accurately.

"REALISM IN FIELD EXERCISES"

Majors Darrell N. Blalock and Harry E. Mullis present the details of a platoon battlerun course that brings all gunnery training together and demands proficiency of the unit in target acquisition, fire distribution, accuracy, crew drill, and control.

"THIS LAND IS MINED LAND—OR SHOULD BE!"

In an indepth study, Major Douglas H. Starr advocates taking positive action in clarifying, disseminating, and practicing effective mine warfare doctrine.

ARMOR

may-june 1977

NEW TEAMMATE!

US Army Armor School

Commandant
MG JOHN W. McENERY

Assistant Commandant
BG DAVID K. DOYLE

Deputy Assistant Commandant
COL SIDNEY S. HASZARD

Educational Advisor
DR. CHARLES W. JACKSON

Secretary
MAJ WILLIAM A. SCHERR

Command Sergeant Major
CSM WILLIAM R. PRICE

INSTRUCTIONAL DEPARTMENTS

Automotive
COL JAMES L. MARINI

Command and Staff
COL CORWIN A. MITCHELL

Leadership
COL ADDISON D. DAVIS III

Weapons
COL JAMES W. BOOTH

DIRECTORATES

Combat Developments
COL JIMMY L. PIGG

Support
COL WALTER L. WATKINS

Training
COL DAVID R. HAMPTON

Training Developments
COL HERMAN J. VETORT

Evaluation
MAJ (P) PAUL E. FUNK

UNITS

The Lightning Brigade
COL HARRY E. B. SULLIVAN

"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."

Cover

The cover art for this issue depicts the *YAH-64* helicopter which has been selected as the U.S. Army's new advanced attack helicopter. Other pictures and a detailed description of the *YAH-64* appear on pages 8 through 10. The art is taken from an original etching by *Armor's* art director, Karen Randall.

ARMOR

the Magazine of Mobile Warfare

ARMOR Magazine is published bi-monthly by the U.S. Army Armor School at 4401 Vine Grove Road, Fort Knox, Kentucky 40121, to stimulate interest in, provoke thought on, and provide an open forum for decorous discussion of professional matters. Unless otherwise stated, material does not represent official policy, thinking or endorsement by any agency of the U.S. Army. Use of funds for the printing of this publication have been approved by the Department of the Army, 23 December 1975.

SUBSCRIPTION RATES: Individual subscriptions to ARMOR are available through the U.S. Armor Association, Post Office Box O, Fort Knox, Kentucky 40121. **Domestic:** $8.00 one year, $14.00 two years, $20.00 three years. **Foreign:** $10.00 one year, $18.00 two years, $26.00 three years. Single copies: $1.50.

CORRESPONDENCE: Address all correspondence to U.S. Army Armor School, ATTN: ATSB-MAG, Fort Knox, Kentucky 40121. (Telephone: Autovon 464-2249 or Commercial (502) 624-2249).

POSTMASTER: Controlled circulation postage paid at Louisville, Kentucky, Department of the Army, DOD 314.

ARMOR may be forwarded to military personnel whose change of address is caused by official orders (except to APO addresses) without payment of additional postage. The subscriber must notify the postmaster.

LETTERS

A Request For Reconsideration

Dear Sir:

The U.S. Army was recently denied the finest, most flexible, cost-effective improved *TOW* vehicle (ITV) antitank weapon concept, based on an original Ft. Knox invention, simply because the selecting officer was given an inaccurate summary of that weapon's capability, and the real life cycle costs of the awarded system.

The summary of the competitive evaluation data presented to the General depicted the Ft. Knox concept as being analytically low in tank kill probability, which, in turn, was based on a beacon light test tracking score that was low. He was not made aware that a wide discrepancy in results existed between the excellent firings and kill record of that system in actual large quantity missile firings at Ft. Knox, Ft. Irwin, and at Hunter-Liggett, and between the analytically arrived at kill probability. If he, or anyone of normal sensibilities, were made aware of the discrepancy, it would have signalled that something was suspect.

Explanation: To measure tracking, the test beacon light (xenon) must be affixed to a maneuvering tank. The proper location is the center of the turret, a normal target area, but the directional changes of the tank can, of course, cause the beacon to sometimes become hidden. Because of this, the beacon was mounted in the air somewhere above the tank, atop an added pedestal, to make it visible at all times. But still, with all of the competitive systems, there were periods of varying duration when the beacon could not be seen; therefore, the gunners tracked what they guessed to be the suspected location until the beacon again became visible.

With the Ft. Knox concept, using fiber optics, tanks can be seen quite well at all times and at all ranges. However, fiber optics inherently provide lower acuity than do hard optics. Because of this, more "guess" tracking of the beacon is required, and, therefore, lower scores. But if the beacon is properly located on the target center of a known and recognizable mass such as a tank or turret, a gunner would not be guessing, but would, indeed, be tracking a known certain location of the test beacon, even if it were not visible. The result of proper beacon location would mean that all systems would show some score improvement, but the amount of improvement would, of course, be inversely proportional to the relative level of acuity. Therefore, the Ft. Knox concept's tracking score would be much improved—coinciding with, and substantiating the excellent live-firing scores. This is factual and not assumptive.

In short, and very simply stated, the misplacement of the tracking beacon light on the target tank penalized the Ft. Knox concept so very disproportionately that it caused it to be unduly critically judged during the ITV selection.

As to life cycle costing, nothing in depth was done. If it had been, the awarded system would have proven to be far too costly. It alone evidences the "necessity" of major vehicle rework in order to accept the missile system. This would be reflected in an in-depth life cycle costing as a major downstream cost.

General Deane once very wisely said ". . .contractors frequently promise to build a house for a seemingly reasonable sum. Just make sure that the house includes in the quoted price all the necessities to make it useable."

The quoted price of the awarded concept cannot and certainly does not "include the necessities," and the downstream costs will cause an overrun on the program. The price will not stand a detailed audit, or life cycle costing. The price is even exceeded by an independently conducted Army cost study, and by a wide margin. The quoted price bespeaks of questionable financial goal accomplishment methods.

In summation, I believe it would be an honorable and a historic Hallmark in the U.S. Army weapon evaluation, selection, and procurement process if we were, for once, to stop and say, "Let's reassess this great weapon developed by our own, rather than continue on a course predicated on a quirk in a test set-up."

J. D. ALLEN

Elizabethtown, KY 42701

"Listen Up!"

Dear Sir:

The article, "Tanks Against A Beachhead," by General Hinds was an especially good one, and I hope that you will print more from General Hinds in the months yet to come. While I found his descriptions fascinating reading, I think the critical lesson is that responsible seniors did "listen" to important suggestions from their juniors, and plans were changed. Unfortunately, this circumstance is not often the rule. Look at Christie, for one, and Hiram Maxim, for another.

Another case in point is the development of the famous World War II bazooka. Probably only a few of your readers know that this weapon, so critical for the invasion of Sicily, was largely the product of Colonel Leslie Skinner and a prolonged struggle to get his superiors' attention. You would be interested, I'm sure, to read about this intriguing story, published in the December 1973 issue of *ARMY*, written by David Harris, titled, "A Horn In Search Of A Tune."

There is at least one sequel to the above story, and it was published in the March-April 1972 issue of *Ordnance* Magazine (now *National Defense*). Titled "Saving the Bazooka," it was prepared by myself and Lieutenant Colonel Al Garland from tapes of my father, Brigadier General George G. Eddy, who was the World War II Director of the Ordnance Research Center at Aberdeen Proving Grounds, Maryland. Just before the planned invasion of Sicily, General George C. Marshall suspended employment of the bazooka due to several serious injuries and deaths that had occurred to launcher operators in North Africa. General Eisenhower protested vigorously, as he considered the bazooka to be essential for the Sicilian campaign. Suddenly the bazooka became a cause celebre, thrusting the Ordnance Department into a crisis situation. In "Saving The Bazooka," General Eddy recounted how serious technical complications were resolved in just *one week*.

One of the principal scientists at Aberdeen's Ballistics Research Laboratories, Dr. Harvey B. Lemon, who with several other problem solvers were projected abruptly into the one week effort, subsequently penned a special flyleaf dedication in his 1943 book, *Analytical Experimental Physics*, The University of Chicago Press:

"Our greeting to (then) Colonel George Eddy
Whose nerves are remarkably steady.
When all's in a haze
He allots seven days
And Aberdeen's answer is ready.
(or it better had be)."

GEORGE G. EDDY, Ph.D.
Management Consultant

Austin, TX 78746

A Shared View

Dear Sir:

In the January-February 1977 issue, I read with great interest the articles by Brigadier General Henry C. Newton, Ret. entitled: *To Change is to Mature—To Mature is to Learn.* I have known General Newton since 1946 when I attended the Officer's course of the

U.S. Army Constabulary School, in Sonthofen, Germany. He was commandant of the school. His outstanding one hour lecture on the integrity, duty, and professionalism of the Army officer has inspired me until this day.

His article in *ARMOR* is not too dissimilar in principle and objectivity than his lecture in 1946. As President Carter has stated "Change with unchanged principles." General Newton, in my opinion, is certainly one of the foremost authorities today on Army personnel training. I hasten to say that I share his view expressed in *ARMOR:* "as I examine the curriculum in our service school, I am disturbed by a trend toward uniformity—a growing rigidity of structure that reflects less and less the interest of the individual officer."

WILLIAM C. ANDREWS
Lieutenant Colonel, AUS, Retired
Arlington, VA 22204

Tank Main Gun Weapons

Dear Sir:

After reading the article "Standardization" by Captain Magyera I couldn't help but think of all the tank crews we lost in *Shermans* when we could have had *Pershings* with 90-mm guns just because the people in charge didn't think we needed a 90-mm in World War II. The main reasons were a lack of information and a built-in defense against change that all people have to one degree or another. However, I believe it's mainly the second reason. The following table is of the major tank main gun weapons in use and development today.

COUNTRY:	Germany	U.S.	U.S.	British/ U.S.	British
SIZE:	120/48	XM-735E1 105/42	XM-735E2 105/42	L7A1/ M-68 105/52	L/0 110/44
WEIGHT: (lbs.)	16.8	11	11	13.3	13
VELOCITY: (feet per second)	6017	5400	7000	5823	5908
466-mm (65)	2200-m	337-mm	1800-m	292-mm	448-mm
KILL CHANCE:	60%	25%	25%	25%	25%
RPM	8	8	8	8	8

The figures speak for themselves. The German gun is a better all-around weapon although the British have a new 120-mm *APFSDS* round that should be evaluated. The kill chance in the above table is for a turret penetration with ammunition stored for a full vehicle kill. The German 120-mm was made so it can be mounted in all vehicles now mounting the current 105-mm except the *M-47*. The new Threat tank the *T-64 (T-72)* is almost impenetrable to the current 105-mm *APDS* round with a front plate of 349-mm effective armor on a 70° slope and a turret with very similar armor. The German 120-mm is the only current weapon that can deal effectively with the *T-64* of which there are about 2,000 in use. Finally the 120-mm caliber allows more size to work with for future development. Let us not end up as we did in World War II with low velocity 75-mm weapons against high velocity 75- and 88-mm guns and thick armor. If you don't change you don't survive.

CHRISTOPHER F. SCHNEIDER
SP4, U.S. Army
Jolon, CA 93928

Navigational Aid for Tanks

Dear Sir:

In the January-February issue of *ARMOR* I read with interest Major General McEnery's comments regarding the lack of a compass or navigational aid in tanks. This problem was addressed by MASSTER (now TCATA) in April 1972. A vacuum-operated aircraft directional gyro (DG) compass from an 0-1 "Birddog" was installed in an *M-60A1* driver's compartment. Test runs were made with and without the DG to determine if it was an aid to the TC in land navigation. Day and night runs were conducted on tank trails and cross country. Prior to each run, the TC used an *M-2* compass to determine the tank's magnetic heading; the DG was caged, set on the magnetic heading, then uncaged. The driver was then given directional headings by the TC and followed the course by maintaining the compass heading with the DG. Test results showed that the DG "proved to be an aid in land navigation of armored vehicles and appears to provide a relatively inexpensive means of improving mobility under night or low visibility conditions."

These results were reported through test channels to U.S. Army Combat Development Command (USACDC) and U.S. Army Materiel Command (USAMC) in June 1972.

The test was an in-house effort, small in scope, and short in duration; however, results showed that the DG, which is nonmagnetic and therefore not affected by the metal mass of the vehicle, could well provide a solution to the "no compass" problem. Five years later the problem still exists. The DG has been used in aircraft for over 40 years, with millions of flying hours accumulated using the DG as a primary heading indicator. Its reliability is therefore well established.

Current SB700-20 lists the DG at $115.00 each; this we can afford. It is vacuum operated (electric versions are available) and can be powered by the vehicles manifold vacuum, or, if electric, from the vehicle's electrical system.

Why can't our fighting vehicle developers pursue this type of nagivational aid, which we can afford, and which has been in use for 40-plus years?

DON MELTON
GS-12 Training Analyst
HQ TCATA

"Friend or Foe?"

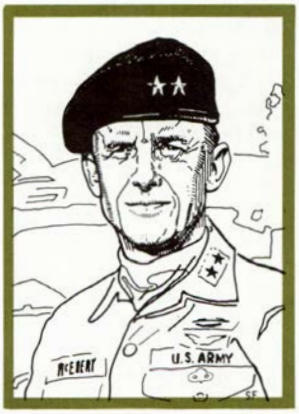
Dear Sir:

After reading Mr. Bauer's article "Friend or Foe?" in your November-December issue, I thought of the enclosed photo which I took in the Golan Heights in January 1974.

As you can see, you are looking at the back of a tank that has been perforated by two 115-mm APFS-DS rounds fired from a Syrian *T-62* tank. (Note: If you look closely you can see the fin marks around the perforations.) What makes the photo interesting is that the turret belongs to a Syrian *T-55* tank.

Identification of Friend or Foe on the battlefield is a real problem.

B. M. DAVALL
Lieutenant Colonel, Armor
Bethesda, MD ▲



THE COMMANDER'S HATCH

MG JOHN W. McENERY
Commandant
U.S. Army Armor School

Where Are We In Armor?

It seems appropriate at this time of the annual Armor Conference to make an assessment of where we are in Armor. This is particularly pertinent because we have not been able to have an Armor Conference for several years. Fortunately, we sorted this matter out and have clear sailing for the future.

In the course of this article, I will mention things that I think are going to happen; however, you should be aware that this article is being written some 2 months before publication and a lot of changes can take place.

Recognizing that tankers comprise only 2 percent of the force on the battlefield yet provide 36 percent of the firepower, TRADOC conducted a study a year ago to determine the status of the tank force. Not surprisingly, it was found that despite this unequal contribution on the battlefield, tanks and tankers are managed equally with lesser systems. That is, there is no special effort given to this very highly critical element of combat power. Following the TRADOC study which illuminated the problem, the Chief of Staff of the Army directed that Lieutenant General James G. Kalergis (Retired) head a Tank Force Management Group to delve into the problem in considerably more detail and to come up with recommended solutions. These solutions are to be briefed and presumably decided on a month after the writing of this article. I will stick my neck out, though, and mention a few that I believe will be proposed.

Today from the training base we are turning out an apprentice crewman and an apprentice platoon leader. This means that units must convert these apprentices into skilled crewmen and platoon leaders. This assures, of course, that many of our crews won't be trained when the war starts. Thus we can significantly improve our tank force simply by providing crewmen and platoon leaders who are fully trained from the day they arrive in the unit. This requires a whole new look at their training. Today, an 11E has a driver's license, but has spent less than 2 hours at the controls of a tank. He can load reasonably well and knows something about gunnery—having fired all of 6 main gun rounds. The platoon leader is a little better off, but not much. He should be—but is not—a qualified driver, loader, gunner, tank commander, and platoon leader. He is simply not qualified from the start to fight his individual tank nor train his people to do so. For the enlisted trooper what is required is a high degree of specialization. We hope to be able to train an individual to do one job only, for example, to be a very good driver on an *M-60A1* tank with considerable time spent at driving and maintenance. We would also turn out a gunner/loader for an *M-60A1* tank who would be similarly qualified in these positions. The *M-551* would have a driver and a gunner/loader similarly trained. These crewmen would be assigned separate MOS's by function (driver or gunner/loader) and type of tank. The basic officer would be trained as a driver, gunner/loader, and tank commander first. Said another way, he would be qualified in skill levels 1, 2, and 3 and then be

trained as a platoon leader. This all sounds simple, but it is far from being so when one considers the resources required to do it. To go full blown, for instance, the annual cost for this at Fort Knox would be $54 million, most of which would be for ammunition. Fortunately, there are lesser programs which take advantage of more subcaliber firing and will give us almost as good a product at far less cost.

Another recommendation of the Tank Force Management Group's efforts will probably be a systems approach to the management of tanks and tankers, thereby providing vertical visibility of tanks and tankers throughout the system. A top-level management system may be established which will monitor the status of tanks and tankers throughout the system. Quite possibly, the Commander of the Armor Center will play a key role in this system as will a management cell in the highest levels of the DA staff.

Major changes have been made in training. We're finally getting a much clearer picture of what we need to do, what really pays off, and how best to do it. This is the responsibility of the training developers, a new breed in our school system. Previously, the academic departments, specifically the instructors, had determined what should be taught, how it should be taught, and where it should be taught. They had written the field manuals. This wasn't completely bad in that these were the subject matter experts in their various fields, but they had a very limited capability of knowing what was really required in the field except as a result of their own personal experiences which varied widely. Obviously, individual instructors were more comfortable developing training in areas in which they had the most experience. Now we have a separate training development element—a large one I might add—in the Armor School which does all of this from an unbiased point of view. The process starts with a detailed "front-end analysis," as we call it. The steps are far too numerous and detailed to list here, but basically this means that there is considerable analysis in the field and at the School of each and every task for each and every MOS. Following this, the training developers decide what to teach, where, and how to teach it. They then produce Soldier's Manuals, ARTEP's, SQT's, TEC materials, Commander's Manuals, How to Fight Manuals, and other training literature. Eventually, they will produce the training material used by instructors. Within a few years, all of the new training literature will have been completed. Much of this material is now in the field in draft or final form, including most of the ARTEP's and Soldier's Manuals for tankers and cavalrymen, FM's 17-D/E Skill Levels 1 thru 4. Projected for distribution this calendar year are:

Soldier's Manual, FM 17-11, Skill Level 5—Sep 77
Commander's Manual, FM 17-11D/CM—May 77
Commander's Manual, FM 17-11E/CM—May 77
Tank Gunnery, FM 17-12—Jun 77
Tank & Mech Infantry Company Team, FM 71-1—Jul 77
Cavalry, FM 17-95—Aug 77
Desert Operations, FM 90-3—Oct 77

That portion of Armor which gets the most visibility, of course, is new materiel. In the 1980's we will have new or vastly improved items of equipment of each type that we have in the Armor inventory. For the tanker, there will be the *XM-1* tank, which will have a several-fold increase in effectiveness over the *M-60A1*. The *M-60*-series tanks, however, will still be the bulk of the fleet and many of them will be upgraded to give them a significantly greater capability than they now have. The *M-60A3*, for instance, will have a greater hit capability than the straight *M-60A1*. Also projected for the *M-60*-series tanks is a new suspension system which will give them greater mobility and allow them to shoot more accurately on the move.

For the armored cavalryman, there will be the improved *TOW* Vehicle (*ITV*) from which a *TOW* missile can be fired while staying protected under armor. The *ITV* can stay in hull defilade while only the launcher is elevated and exposed. The companion vehicle for the *ITV* will be the Armored Cavalry Cannon Vehicle (*ACCV*) in our scout sections. Hopefully, this cannon vehicle will have a 25-mm or 30-mm cannon. Part of our cavalry will have a mix of *ITV's* and *ACCV's*. Another portion of the fleet (most probably those units in Europe) will be completely equipped with the *MICV* Scout. The platoon leader and all four scout crews will have the *MICV* Scout which will have both the *TOW* and the Bushmaster 25-mm cannon on board.

For attack helicoptermen and air cavalrymen, there are new aircraft on the horizon, the principal one of which is the *AAH* which can stand off as much as 5 kilometers and even fire from behind a mask. Not so bright a picture is that of the Armed Scout Helicopter (*ASH*). This program is in trouble and has been delayed so that it can't even start for at least 2 years. In the meantime, we'll have to get by with the unsophisticated *OH-58* which cannot operate at night, acquire targets at extreme ranges, nor laser designate for the *AAH*. At some point, however, we'll prove the need for the *ASH*.

Hopefully, the foregoing assessment has conveyed the message that, overall, the star of Armor is high in the sky and there is every indication that it will remain so. However, this won't happen unless we all work to make it so.

FORGING THE THUNDERBOLT

Instructors have long wished for the ability to "look through the eye of the gunner" and see exactly what he sees, look precisely where he places the aiming cross, determine if he applies the correct lead angle, and finally, whether or not he uses burst-on-target (BOT) techniques correctly. That ability to "look through the eye of the gunner" and record the gunner's actions for later review and critique would clearly enhance instructional techniques and would improve our gunner's proficiency overall. Several conceptual systems have been designed, ranging from the use of overwatch cameras which record the entire tactical scene, to a TV camera mounted externally on a tank to record target hits. Each of these concepts has some merit and use, however

neither can precisely look at what the gunner views through his direct fire-control sights. The U.S. Army Armor and Engineer Board has developed a television sight system capable of displaying the gunner's reticle on a TV monitor and additionally recording the gunner's actions on video tape. The Weapons Department at the Armor School is currently testing the system for incorporation into tank gunnery training.

The television sight system consists of a 24-volt television camera with a 25-mm lens, an *M-31* or *32* daylight sight, video-cassette recorder, and TV monitor. This is the minimum equipment required for use on a subcaliber-scale range. Stationary tank ranges would require additional monitors, recorders, and an overwatch camera with a long lens to score target hits. Moving tank ranges would add a mobile capability with the use of very high frequency (VHF) nondirectional transmitters and receivers.

To install the system in a tank, the TV camera is mated with an *M-32* daylight sight on a bracket and inserted into the head assembly of an *M-32* periscope in place of the infrared elbow. The device is then boresighted to the gunner's daylight primary sight by using the elevation and deflection knobs of the *M-32* periscope while watching the display on a TV monitor.

This system has instructional application to all phases of tank gunnery training. Elementary skills practiced on Tables I, II, and III can be evaluated and corrected before bad habits are formed. Speed and precision of lay, tracking ability, and hitting performance can be closely monitored on the scaled-range exercises of Tables IV and V(P) which are to be implemented by the new FM 17-12. Resolution with this system on the scaled range is excellent, particularly when using .22-caliber tracer.

By using TV tapes of main gun exercises that were made through the television sight system, new gunners can be shown what the blast, recoil, and obscuration will look like prior to firing his first main-gun round.

This technique will permit new gunners to be trained early to look "through" the obscuration to the target in order to sense the projectile impact, and prepare to fire the subsequent round.

More accurate zeros can be obtained by closely monitoring the precision of lay before each round is fired in the zero exercise, thus ammunition savings should result from using the television system.

Instant critiques of the new Table VI for the main gun would be available to the rear of the firing line for the crew to review for both strong and weak areas of their performance.

When the TV sight system is used, Table VII will no longer be just a speed maneuver but will also require the gunner to make a precise and accurate lay on the target. Therefore, higher crew proficiency on Table VIII should be the end result of the constant visual reviewing and critiquing of the crew's actions.

On Table VIII, the system could be used as a supplement to the scoring system, giving a more reliable and accurate evaluation of crew skills. The immediate review and critique capability would be ready and available for debriefing upon the crew's return from down range.

The television sight system is clearly a major addition to a growing list of training devices available to support and augment tank gunnery training. The single disadvantage of this system is that it cannot be used for night training. But, until a system that is capable of both day and night operations is developed, the television sight system adds the dimension of immediate review and critique to tank gunnery training that was heretofore not available. In this era of continued ammunition reductions, the use of the television sight system will make each training round count. ▲

MASTER GUNNER'S CORNER

The development of the thermal sight has given Armor the capability to acquire and service targets in battlefield conditions under which present night vision devices are ineffective. One paramount problem remains. During periods of reduced visibility, our present state-of-the-art does not allow us to range accurately on the selected target. Even with the laser range finder it has been known that heavy rain, fog, snow, battlefield smoke, and even certain types of vehicle paints will result in incorrect data to the fire control system.

In our new FM 17-12, range determination is treated extensively, from immediate methods to be used in battlesight gunnery to the more time consuming and deliberate methods. In using the battlesight method several factors come into play; first, target visibility and, second, recognition. Let's address them one at a time as seen by the tank commander with the naked eye.

Targets seem closer on bright clear days or when they contrast strongly against their backgrounds. However, in fog, rain or when the targets are camouflaged or otherwise blend into their backgrounds they seem further away.

Compounding these difficulties in determining the correct range to the target is the fact that not all crew members have 20/20 vision. We must place an additional requirement on the gunner to aid the tank commander not only in target acquisition, since with eight-power magnified optics he can distinguish tanks, APC's and similar objects, by model, up to 4,000 meters away, but in range determination by using the reticle in relationship with the target.

To determine range using the reticle in relationship with the target, two items must be known. First, the size of the target in meters, e.g. a *T-62* is 2.4 meters high and 3.3 meters wide (front view). Second, the space that it occupies in the reticle must be known. Which brings us to the problem that we will have once the thermal sight is issued to the tank—how do we determine range to the target during periods of reduced or nonexisting visibility?

With the advantage that the thermal sight gives us, it is imperative that we train our crew members so they can determine whether or not a target is within battlesights.

Let's talk facts. Although the WORM formula has been with us a long time, we tankers have treated it with aversion because it seems complicated and, at times, unnecessary due to our range finding instruments. Until an instrument that gives us accurate range under adverse conditions is here, however, we have to make do with what we have.

Now, with the ammunition that we have—faster than a speeding bullet and more powerful (and getting better) than a steaming locomotive—we must have a starting point to deliver accurate and devastating fire on target. The starting point of 1,600 meters with SABOT ammunition is adequate. Let's see how we can determine if the target is within battlesight or if precision gunnery is needed to eliminate the immediate threat.

If the target, a *T-62,* is 2 mils or larger in width, or 1½ mils in height he is within battlesight, so go ahead and shoot it. But if he (*T-62*) is smaller than the aiming cross, he is beyond the capabilities of the battlesight technique, so a more precise method must be employed. For example, if the *T-62* is 1½ mils wide in the reticle, by dividing the width of the tank (3.3 meters) by the mils (1½) that it occupies in the reticle the range comes to 2,200 meters.

At the beginning of this article we discussed that in order to determine using the reticle vs. the relationship of the target, two things were to be known, target size and the space that it occupies in the reticle—which is nothing more than the application of the WORM formula ($\frac{W}{R \times M}$). The way that the formula is written can be confusing, so let's rewrite it and say that to obtain the range to the target all that is need is to *divide* the width of the target by the mils that it occupies in the reticle. Since most of the vehicles found on the battle field (Brand X and ours) are about three meters wide, that first round will be a target hit or so close that you will cure his hiccups.

TANK KILLER

by Major Daniel R. Bauer

The recent selection of Hughes Helicopters *YAH-64* as a prototype for Phase II testing marks the beginning of the second step in the development of an advanced attack helicopter (AAH) for Army use in the 1980's and beyond. During Phase I, the two selected competitors, Bell Helicopter Textron and Hughes Helicopters, each developed and tested a Ground Test Vehicle and two prototype flight vehicles. Phase I culminated with government testing of these prototype AAHs in a competitive fly-off.

As a result of the competition, Hughes Helicopter's *YAH-64* prototype was selected to enter Phase II. Under the Phase II contract the two existing flying prototypes will be modified, and three additional *YAH-64s* will be fabricated to the Phase II configuration for further testing, including integration of the weapons, avionics, and visionics subsystems. These subsystems include the *HELLFIRE* missile, 30-mm cannon, and 69-mm (2.75-in.) folding-fin aerial rocket (FFAR), the target acquisition and designation system (TADS), pilot night vision system (PNVS), associated fire control, and avionics subsystems.

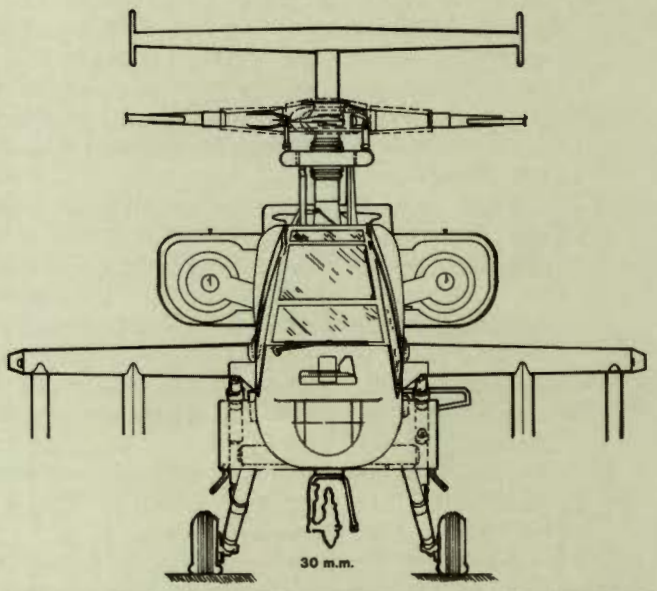
The *YAH-64* is a two-place, tandem-seated, twin-engine, single-rotor, conventional-gear helicopter, which is designed to be able to hover out of ground effect on a US Army "hot day" (4,000 ft and +95°F) (1,220 m. and 35°C) and still climb at 450 feet per minute (f.p.m.) (137 meters per minute) at zero airspeed. The *YAH-64* can do this and more. Capable of operating almost anywhere in the world, the AAH can operate in moderate icing and temperatures ranging from 52°C (+125°F) to −32°C (−26°F) without winterization kits, and down to the −46°C (−50°F) with kits.

A representative AAH mission will have, prior to the engagement, the aerial scouts coordinating with the ground-maneuver units, conducting initial reconnaissance to select routes of advance and withdrawal, holding areas, attack positions, and primary and alternate firing positions for the AAHs. During the operation, the scouts will acquire, identify and hand-off targets, plus assist in the movement of the attack helicopters. The scouts may lead the attack helicopters from a holding area to the attack and firing positions as the situation permits. During the attack, specific engagement techniques from the firing positions will differ depending on which of the two *HELLFIRE* operational modes is being employed.

Operational modes and engagement techniques for *HELLFIRE* follow.

Autonomous mode. In the autonomous, or self-designate mode, the attack helicopter will remain masked in a firing position until directed to engage enemy targets. The attack helicopter will unmask, identify the target and engage it, designating the target with its on-board laser designator until the missile impacts. The attack helicopter may engage several targets from the same firing position before moving to alternate firing positions. The attack, once begun, will continue until the attack helicopter platoon leader or company commander, in coordination with the ground commander, directs otherwise.

Remote designator mode. In the remote designator mode,



		16 HELLFIRE + 30 m.m.		
		76 Rkts 30 m.m.		
		8 HELLFIRE 38 Rkts 30 m.m.		
		4 HELLFIRE 38 Rkts 30 m.m.		
JP-4	JP-4	External fuel tanks	JP-4	JP-4

Statistical Data

Maximum gross weight	**8,080 kg.**	**17,800 lb.**
Height	**3.69 m.**	**12.57 ft.**
Length (overall)	**17.5 m.**	**57.62 ft.**
Length (fuselage)	**15.05 m.**	**49.33 ft.**
Main rotor diameter	**14.63 m.**	**40.8 ft.**
Tail rotor diameter	**2.6 m.**	**8.58 ft.**
Cockpit width	**1.2 m.**	**3.96 ft.**
Wing width	**5.0 m.**	**17.17 ft.**
Range (internal tanks)	**579 km.**	**359 m.**
Range (external tanks)	**1,883 km.**	**1,170 m.**
Fuel (internal tanks)	**1,366 l.**	**361 gal.**
Engines (2) T-700 GE 700	**1,543 s.h.p. ea**	

targets for the attack helicopter are designated by aerial or ground scouts, forward observers, or infantrymen. After missile launch, the attack helicopter is free to remask, while the designator operator continues to designate the target until missile impact. In addition to single shot engagements, multiple missile engagements are possible using the following techniques:

Rapid Fire. Rapid fire occurs when a single attack helicopter fires multiple missiles at targets successively designated by a single designator using a single designator code. When the designator operator is ready, he will designate the first target, while the helicopter unmasks, obtains seeker lock-on, and launches the first missile. Six to eight seconds later, the attack helicopter will launch a second missile on the same code. The designator will continue to designate the first target until missile impact, at which time he can shift to his second target continuing to designate this target until the second missile, already in flight, locks onto the reflected laser energy and impacts.

Ripple fire. Ripple fire occurs when an attack helicopter fires multiple missiles at a series of targets designated by multiple designators on separate codes. It is not presently envisioned that more than two targets and two designators will be involved at one time due to amount of coordination required between the designator and the attack helicopter.

Indirect fire. Indirect fire refers to the launching of a missile on a precomputed trajectory by an attack helicopter that is masked. At a point during missile flight, the target will be designated and the missile seeker will lock onto the reflected laser energy. Both rapid and ripple fire engagement techniques can be employed in the indirect fire mode.

The AAH can carry a large assortment of munitions for either its primary antiarmor mission of providing direct aerial fire against armor or mechanized forces or other missions such as air cavalry operations or airmobile escort and fire support for airmobile operations.

The *HELLFIRE* laser guided missile, the primary armament, while not a true "fire and forget" missile, allows the AAH to "forget" after firing, if the scout or other laser designator does the "remembering." Capable of being fired at ranges of 5 km and beyond, *HELLFIRE* can destroy any known armored vehicle in the world.

A secondary armament subsystem is the 30-mm cannon, known as the XM-230 chain gun. A single-barrel, externally-powered gun, it can fire single-shot or up to 620 shots per minute, with up to 1,200 rounds being carried in the ammunition drum. Besides being a lightweight cannon, 50 kg (110 lbs.), less than 150 parts make it a simple weapon to repair. Tied to the fire control system, the 30-mm can be fired accurately at area targets 3 km away using either the gunner's TADS or a helmet mounted sight. Already a NATO standard round, the 30-mm is available overseas in either a high explosive or amor piercing version. While being able to utilize these rounds, the U.S. Army requirement is for a high-explosive dual-purpose (HEDP) round that can effectively engage both personnel and lightly armored vehicles using a shaped-charge warhead. Because of its performance to date, the 30-mm cannon is also a prime candidate for several ground combat vehicles. If selected, standardization would be a reality, not only within NATO, but within the U.S. Army.

The 69-mm (2.75-in.) rocket completes the AAH's armament subsystems. Equipped with a remotely-settable fuzing capability and stores management, the AAH will be able to deliver short- and long-range rocket fire using submunition, smoke screen, illumination, and chaff warheads, in addition to the current series of warheads.

TADS and PNVS enable the AAH to fight "round the clock" in both fair and marginal weather conditions. These subsystems are mounted in a chin turret under the fuselage nose.

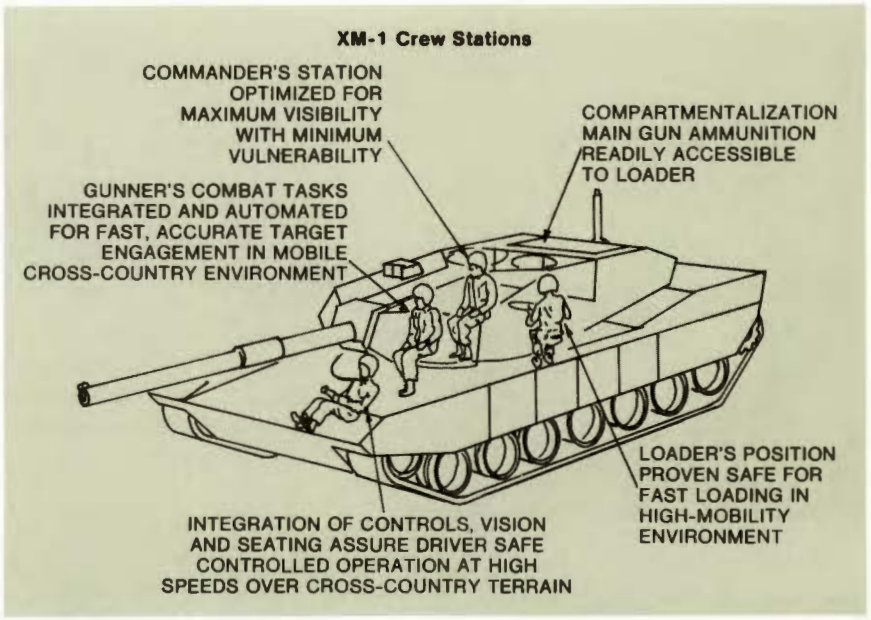
Both the AAH and the *XM-1* have been built to fight outnumbered and win. Besides being an elusive target it can, because of new armor materials, sustain hits from 12.7-mm weapons, with some critical components being protected from 23-mm high-explosive, incendiary (HEI) projectiles. A between-cockpit ballistic shield is provided to protect the pilot or gunner from the blast effects of a 23-mm penetration of the other crew compartment. Other survivability features include a radar warning receiver, low reflectant paint to reduce radar and infrared (IR) reflectivity, black hole IR suppression of the engines and a flat-plate, antiglare canopy to reduce the visual detection clues that give away the present *AH-1* aircraft equipped with a curved canopy.

With all of its survivability features and ability to carry an impressive load and mix of ordnance, the AAH should provide the Army with a versatile and lethal aviation asset well into the future.

MAJ DANIEL R. BAUER received his commission in Armor upon graduation from Norwich University. He has served in various command positions in Korea, Vietnam, Thailand, Germany and CONUS.

He has served in Armor, Cavalry, Engineer, Maintenance and Aviation assignments with the 1st Cavalry Div, 3d Armored Div, 5th Mech Div, 9th Inf Div and the 1st Avn Bde.

Presently Major Bauer is assigned to the US Army Armor School as a project officer with Directorate of Combat Developments.



XM-1 UPDATE

In keeping with *ARMOR's* mission "to disseminate knowledge of the military arts and sciences, with special attention to mobility in ground warfare," here is more information regarding the *XM-1* tank.

POWERTRAIN

The *XM-1's* AVOC-Lycoming AGT-1500 turbine, which delivers 1,500 horsepower, is matched to an Allison X-1100-3 transmission and final drives to provide optimum performance. It has been operated for over 10,000 test hours, with 22,800 vehicle miles having been accumulated. Operations have included over 800 miles in the desert environment at Yuma with no engine problems resulting from the sand and dust encountered (up to 20 times zero visibility on occasion). The turbine starts easily at temperatures down to −25°F without needing winterization kits. Other advantages of the powertrain are:

Lower System Weight and Volume

The powerpack assembly, complete with fuel for the required cruising range, is 2,300 pounds lighter than the comparable diesel installation. The installation size is likewise smaller by approximately 8 cubic feet.

Increased Sprocket Horsepower

The turbine delivers 100 to 150 more horsepower to the sprocket than does a comparable diesel engine because of the relatively low cooling requirements for the turbine and for the transmission, which benefits from the turbine's better torque characteristics. The approach to transmission cooling is unique in that two-stage cooling is used. Only one unit operates for ambient conditions below about 90°F. At higher temperatures, the second cooling unit, which cools the transmission only, is automatically activated.

Improved Durability

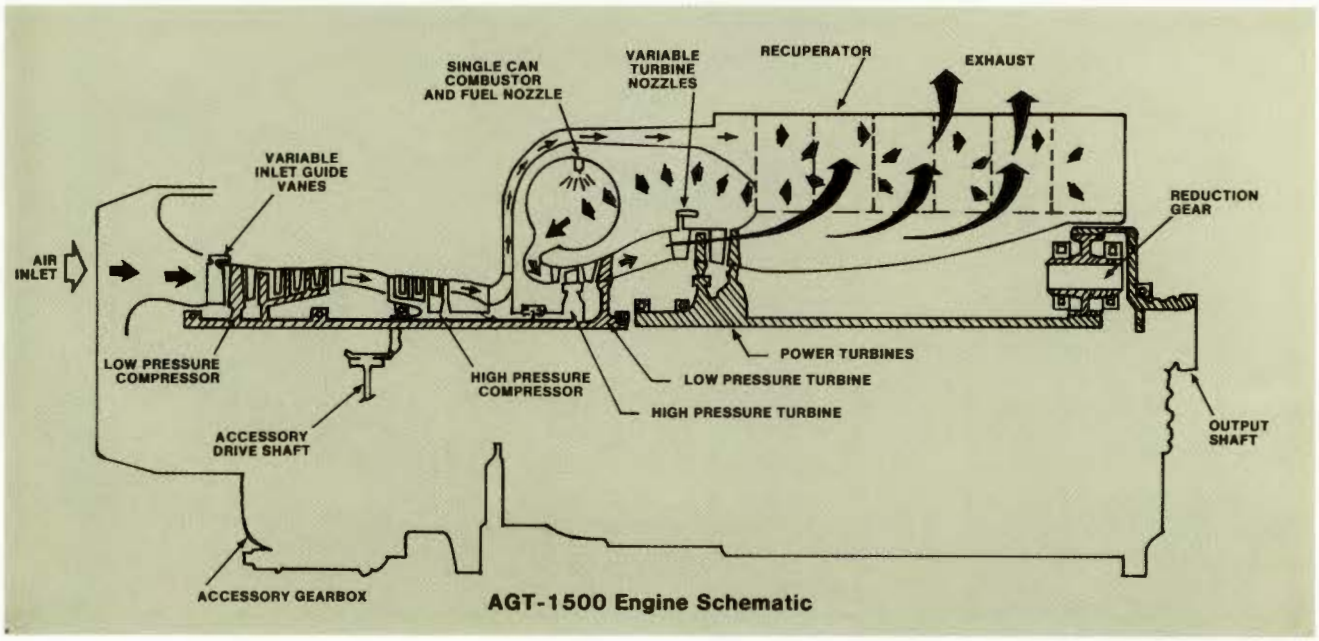
The turbine has a predicted mean-miles-before-overhaul of 12,000 miles compared to 4,300 miles for the *M-60A1PI* tank's diesel engine. This latter engine represents the most advanced state-of-the-art in diesel technology and incorporates many design improvements to reduce historical diesel problem areas.

Growth Potential

A major growth consideration for the *XM-1* powertrain is that it can ultimately be accomodated in *M-60* series tanks.

Fuel Economy

The 127 additional sprocket horsepower, 26 percent faster acceleration, and higher torque of the turbine compared to the AVCR-1360 diesel comes at a low cost in fuel economy (5 to 15 percent depending on operating profile). Additionally, the low volume of the turbine allows fuel for greater range than the AVCR-1360 diesel engine.



AGT-1500 Engine Schematic

SUSPENSION SYSTEM

The *XM-1* suspension system is:

Simple and Effective

The rotary shock absorbers, torsion bar spring system, and improved *T-97*-type track have been combined to provide a simplified suspension of combat-proven design while at the same time achieving the highest levels of performance.

Maintainable

The maintenance burden is reduced due to fewer suspension components being involved in disassembly and assembly operations and a greater than 40-percent reduction in the number of special tools required to perform suspension maintenance, as compared with the *M-60A1PI* tank. A failed torsion bar can be removed from either side of the tank. Additionally, an aluminum tube seals the torsion bar from exposure to foreign matter in the bilges.

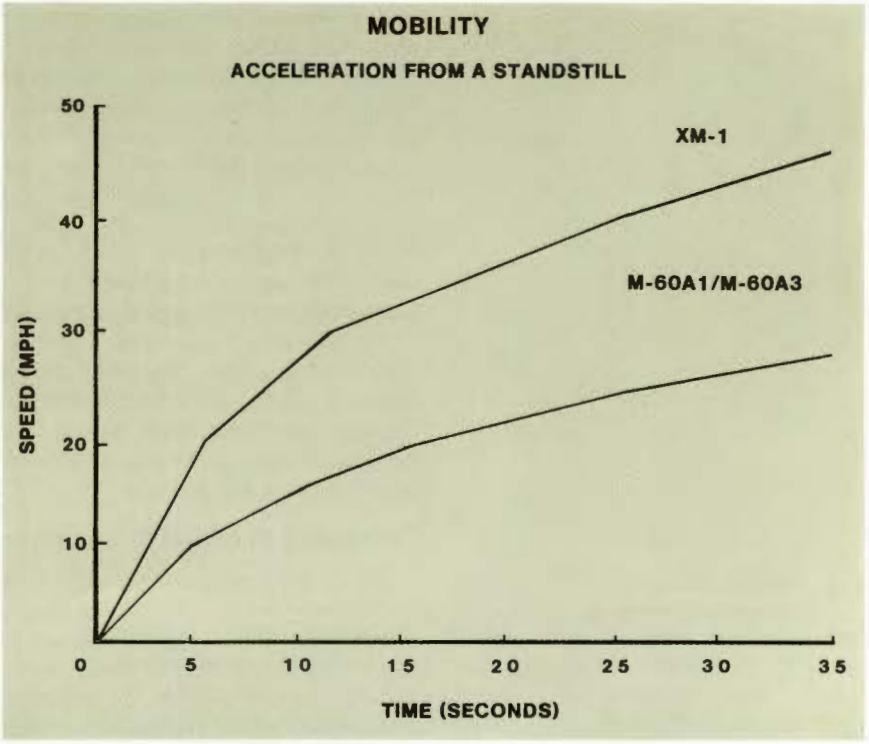
Reliable

The high reliability of the total *XM-1* suspension has been proven in over 12,500 miles of Validation Phase testing in which no failures have been experienced in either springs or roadarms and only minor problems experienced with other components.

The rotary shock absorber functions independent of the vehicle hydraulic system, and failure of its separate hydraulics would not interfere significantly with mission performances.

MAIN ARMAMENT

The main-gun mount has been redesigned and features fewer major parts, extended bearing support, and reduced recoil-oil pressure.



XM-1 TANK CHARACTERISTICS		
Combat Weight		57.9 tons
Width		143.8 in.
Height		93.5 in.
Ground Clearance		19.0 in.
Maximum Speed		44 m.p.h.
Acceleration 0-20 mph		6.2 sec.
Sustained Speed	60% Grade	5.2 m.p.h.
	10% Grade	24 m.p.h.
Obstacle Crossing	Vertical	49 inches
	Trench	9 feet
Power Package		1,500 h.p. turbine
Operating Range		275 miles
Turret		Hybrid 105/120-mm
Primary Weapon		105-mm cannon
Coaxial Weapon		7.62-mm machinegun
Loader's Weapon		7.62-mm machinegun
Commander's Weapon		40-mm HVGL
Range Finder		Neodynium YAG laser
Ballistic Computer		Digital self checking
Night Vision		Thermal far-infrared
Stabilization	Elevation	Line-of-sight reference
	Azimuth	Turret reference
Crew		4 men

Main Armament Ammunition Stowage

The *XM-1* can stow a total of 60 rounds of main-armament ammunition. Of these, 52 are compartmentalized, 44 are located in the turret bustle, and eight in the hull compartment at the right rear of the crew compartment. The remaining rounds are located below the turret ring stowed in spall-protected racks on the floor of the turret basket. Racks are provided for three rounds with space available to accommodate the stowage of five additional rounds.

Reduced Weight and Cost

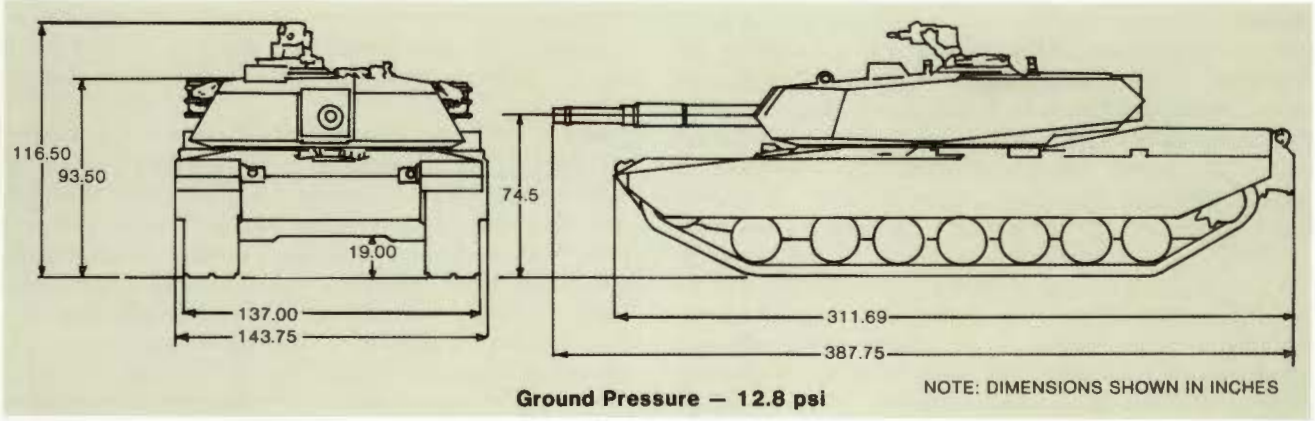
The *XM-1* gun mount weighs 232 pounds less than the standard gun mount on the *M-60*-series tanks. Its cost is reduced by 25 percent.

Improved Accuracy

The bearing span that positions the gun tube in the mount has been doubled in the *XM-1* design.

Test Firings

More than 3,900 rounds were fired on one mount without incident. Other mounts were subjected to firing tests at environmental extremes of −65°F and +125°F at elevation angles up to 35 degrees with satisfactory results. No hang-out-of-battery (HOB) has ever been experienced with the design. ▲



Ground Pressure — 12.8 psi

NOTE: DIMENSIONS SHOWN IN INCHES

FATHER OF THE TANK CORPS

by Jeffrey A. Gunsburg

Mechanization — the introduction of armored, mechanical fighting vehicles—is perhaps the key development of 20th-century land warfare. Despite its industrial prowess, the United States was a latecomer to mechanization, largely because of its relative isolation from the centers of great power conflict early in the century. Following its entry into World War I, the United States Army made its first contact with mechanization and began the slow, faltering progress which would eventually lead to the slashing tank fleets which General George S. Patton, Jr. would make famous in World War II. The subject of this article is the first steps; the beginnings of mechanization in the United States Army and the man who guided those steps, General Samuel D. Rockenbach, "Father of the Tank Corps."

Mechanization was invented (more or less independently) by the British and the French to break the deadlock of trench warfare on the Western Front in World War I. When the United States entered the war in the spring of 1917, tanks had yet to prove themselves in combat; the American Military Mission in Paris did not recommend them. But when General John J. Pershing arrived in France to prepare to field an American army, he decided to look into the matter and appointed various committees to that end. Among these groups was one led by Lieutenant Colonel Hugh A. Parker. Parker, visiting the British Tank Corps, caught fire: he envisioned fleets of tanks cooperating with airplanes to crash through the front, opening the way for cavalry and motorized infantry to exploit the victory. And indeed such prophetic ideas were circulating among Allied tank enthusiasts.

After discussions with the Allied leaders, Pershing, though less sanguine than some of his staff, decided that armored fighting machines could play a useful part in the battle; his Americans must have them. But America, its burgeoning automotive industry notwithstanding, had no tank designs in hand and no prospects of building any for some time to come. On the recommendation of a staff committee, Pershing selected the British heavy *Mark VI* and the French light *Renault FT* designs for the American forces, hoping to arrange production in American factories or perhaps jointly in cooperation with the Allies. He figured that his forces in 1918 would need 1,200 light and 600 heavy vehicles.

That, roughly speaking, was where the matter stood at the beginning of the winter, 1917. American forces were slowly building up in anticipation of the general enemy offensive which everyone expected in the spring of 1918; if the Americans were to have the support of tanks it was time to take concrete action. One of Pershing's aides, the mercurial George S. Patton, Jr., was appointed to study the French light tanks in preparation for setting up a light tank school in France, with the understanding that he would get command of the first battalion. Similarly Major Roger B. Harrison was to begin training American tankers on British heavy tanks in England. Most importantly, however, Pershing formally created the United States Army Tank Corps in France and named as its first Chief, Colonel Samuel D. Rockenbach.

Samuel Dickerson Rockenbach was a stiff, ramrod-straight Regular, a cavalryman and professional soldier on the Pershing model. Nonetheless, his appointment as Chief of the Tank Corps is hard to explain, and he faced severe difficulties in his new job from the start, including the antipathy of his primary subordinate, Patton. Born in Virginia in 1869 with ties (on his mother's side) to colonial times, Rockenbach was raised on stories of Civil War glory (his father was a hero in the defense of the "Crater" at Petersburg near the end of the war). Rockenbach attended the Virginia Military Institute (like Patton) and graduated as Cadet First Captain, ranking third in his class academically and displaying real talent as an engineer. But he wanted a military career and was finally able in 1891, after passing a competitive examination, to get a commission as Second Lieutenant in the 10th Cavalry. Rockenbach served on the closing western frontier where his talents as an engineer were often pressed into service. In 1898, he was an aide to a division commander in the Spanish-American War, but saw little action. Again, however, his engineering talents came into play, and he found himself assigned, against his will, as an engineer officer at Santiago. He managed to break away in 1903, joining the 12th Cavalry in suppressing the insurrection against American rule in the Philippine Islands. Rockenbach spent the next 6½ years outside the United States, commanding American cavalry and Filipino scouts, serving as a District Civil Governor in the Philippines, and visiting the Far and Middle East where he studied native troops — all this while still just a captain in the Regular Army!

Back in the States, Rockenbach attended the new Army War College. With the outbreak of World War I, he served as an observer with the German armies until worsening German-American relations forced his recall in the spring of 1915. With such experience and qualifications under his belt, he no doubt expected a choice command back in the States; instead he was relegated—protests notwithstanding—to a logistics staff position in Pershing's expeditionary force against the Mexican Pancho Villa in 1916 and early 1917. From there it was only natural for Rockenbach to join Persh-

GENERAL JOHN J. PERSHING, COMMANDER-IN-CHIEF, AMERICAN EXPEDITIONARY FORCE DECORATES BRIGADIER GENERAL SAMUEL D. ROCKENBACH, CHIEF OF THE U.S. ARMY TANK CORPS, WITH THE DISTINGUISHED SERVICE MEDAL.

ing as a logistics officer when Pershing left for France. Rockenbach got the dubious honor of improvising a reception for the first American troops as commander of Base Section Number One in France.

These might seem weak credentials for a man to be named Chief of the Tank Corps. But Rockenbach was a professional soldier of the kind Pershing knew and understood. He was also an old regimental comrade of Pershing's Chief of Staff, General James G. Harbord. Rockenbach was a cavalry officer with combat experience as such; he was a trained engineer capable of understanding the technical complexities and requirements of tanks. Above all perhaps, he had demonstrated the ability to improvise—rapidly—an organization under harassing conditions in close cooperation with the Allies.

This ability was certainly the most crucial in practice: on 22 December 1917, Rockenbach formally took command of the Tank Corps, which then consisted of some papers and a few senior officers. He had no men, no training centers, no organization, no doctrine—and no tanks. He had to serve Pershing as tank adviser and, despite his junior rank (colonel), sit as the American representative on the Inter-Allied Tank Committee which dealt with questions of production, organization, and doctrine. During the hectic and near-fatal months of the last German offensive, he had to finagle precious tanks from the Allies, and finally succeeded in getting enough French light tanks to equip one American brigade and enough British heavies for a single battalion (though the latter operated with the British under British control). Finally Rockenbach served from August 1918 to the war's end as commander of the American and French tank brigades (one each) operating with the American First Army in combat.

From this background, it is interesting to note some of the lessons American tankers learned from their World War experience.

During the war, Rockenbach developed his organization (an organization which he later claimed the Allies eventually copied): a central tank headquarters attached to the General Staff dealing with questions of tank design and training and commanding tank formations not attached to the field armies; tank headquarters operating with each army in the field (in fact only one was formed in World War I, under Rockenbach himself); tank centers for training and replacements; and finally 10 brigades (in fact, only two brigades—one of them French—operated under American orders).

In matters of doctrine, Rockenbach was strongly influenced by the British and French. This is hardly surprising: the Allies were old hands at tank warfare, and the American tanks were, after all, Allied designs. From the French, Rockenbach learned the necessity of using tanks *en masse* and by surprise, avoiding the long preparatory bombardments which chewed up the ground and warned the enemy.

But the strongest influence on him was undoubtedly General J.F.C. Fuller, the leading British tank theorist whose "advanced" ideas foresaw a transformation of land war through mechanization. Fuller's influence was no accident: the British liaison officer wrote to Rockenbach on 3 September 1918 that Fuller would like to meet Rockenbach again for a talk on the tank situation and urged Rockenbach to keep in close touch with the progress of British tank theory.

These efforts paid off. On 20 October 1918 Rockenbach spoke to a group of tank officers, forecasting the course of operations to come (at that time he could hardly have guessed that the war would end in three weeks). The Germans would be finished off, he said, by wearing them down and grinding up their reserves in local attacks supported by tanks working closely with the infantry. Then the front would be breached: heavy tanks operating by surprise in concentrations (commanded at the Corps and Army levels) would open the way for succeeding waves of infantry supported by light tanks (the light tanks attached directly to the infantry divisions). Once the front was broken by medium tanks, fast machines equipped with cannons and machineguns for independent action would raid into the enemy rear, causing havoc and confusion like the cavalry of old. The final exploitation to decisive victory would be the work of the cavalry and motorized forces operating with medium and light tanks. The influence of Fuller and his well-known "Plan 1919" was clearly in this plan, although Rockenbach had added some ideas of his own. Pondering on the different types of tanks, he began to wonder whether the fast and powerfully armed medium tank might not be the ideal tank type, an idea which he was to pursue later.

Of course, the war ended before the tankers had a chance to try out their grandiose plans, and the medium tank which Rockenbach described did not then exist. A year later, he summed up the lessons of the war in a talk to the Staff College. The tanks, he said, had resisted "entangling alliances" with the other arms of the service; indeed tanks would be of use to all the other arms and should not be subordinate to any of them. During the war, he said, the tank had appeared as a new tactical instrument capable of defeating the modern defense, but was neither in sufficient numbers nor in an adequate form to fully accomplish its mission. Nonetheless, he claimed that the tanks were the "deciding factor" in the war. Too many on the General Staff were ignorant of the power and also of the mechanical limitations of the tanks: had it not been for the courage and skill of the American tank crews "... an unjust setback to mechanical warfare would have been given to the greatest mechanical nation in the world."

During the uneasy months between the Armistice of 11 November 1918 and the signing of the Treaty of Versailles the following spring, Rockenbach remained in Europe, back at his old job commanding Base Section Number One while retaining a fragment Tank Corps headquarters in case hostilities should reopen. In January 1919, he gave a talk on tanks to a group of ranking officers, including General Charles P. Summerall who had commanded the V Corps in France and would later become Chief of Staff of the Army. As Summerall wrote to Rockenbach, he and the other officers who had worked with tanks and fully appreciated their value, found Rockenbach's presentation, if anything, rather conservative.

"Conservative?" Had Rockenbach gone back on what he told his tankers the previous October? Not at all, but he knew he had to be careful. The next month he wrote to his old friend Harbord, cautiously informing him that he had discussed matters with Pershing and that Pershing approved of the Tank Corps and of Rockenbach's command of it, but Pershing "... of course was not prepared to state definitely what form he thought the organization should take." Summerall had made it clear in his letter that he thought the tanks should have ... an organic relationship to the infantry divisions," something which Rockenbach resisted. The question of authorized strength was important too: Rockenbach (as he wrote to General Hugh A. Drum) wanted two tank centers established (one at the School of the Line, so that line officers could train with tanks, and the other at the biggest available maneuver camp), and one tank brigade for each Corps that the Congress would authorize. Reassured in March 1919 that he might keep one tank center and three brigades in service, and urged on by Patton, Rockenbach received permission to return. Perhaps he felt, as Patton wrote to him in characteristic fashion, that the commander of the Tank Corps back in the States was "dead from the neck up" and that if Rockenbach did not return home soon "someone will steal your job."

The remainder of Rockenbach's association with the tanks was filled with disappointments, but also with hope; hope which a tight-fisted Congress, however, dashed. First came the disappointments: at the end of 1919, the Congress cut back the Tank Corps despite Rockenbach's protests that he needed at least two tank brigades. Worse yet, the following June, Congress, recognizing no threats to security and more than ever conscious of the weight of military expenditure, abolished the Tank Corps and made the tanks subordinate to the Infantry. This decision, taken largely for economic reasons it seems, had a heavy impact on the doctrinal development of the tanks and put Rockenbach in a very awkward position as an armor exponent. In particular, his opposition to attaching tank units organically to infantry divisions could get him into trouble. But he continued to maintain that tanks should remain in reserve in the hands of higher commanders for use in favorable situations only. This was a touchy point: in the fall of 1920, the General Service Schools at Fort Leavenworth recommended assigning one tank company to each infantry division and leaving the rest in general reserve, a recommendation which Rockenbach's Tank Board resisted, despite the fact that in early 1920 the Secretary of War had already assigned one tank company to each infantry division at the request of General Summerall.

But alongside the gloom there was hope; hope for that fast and well-armed medium tank which would make mechanized war practical. Speaking before the Staff College on 3 October 1919, Rockenbach asked for a tank of not more than 18 tons weight, carrying a quick-firing cannon between 2.28 and 3 inches in caliber and two machineguns, with a speed up to 12 m.p.h. and a range of 100 miles. Such tanks, he claimed, could do all the work of previous types and more besides, and do it better. At the end of that month, Patton inspected a promising new design, a motorized gun mount made by J. Walter Christie. Patton concluded that:

> '... much good will be accomplished if Mr. Christie is empowered to design and construct a tank combining the mechanical features and masterly construction of his present mount with the tactical ideas of the Chief of the Tank Corps.'

Rockenbach, of course, endorsed this proposal, despite objections from the Ordnance Department.

In November 1920, Rockenbach received a telegram from General Ernest D. Swinton sending on fraternal greetings from the British tankers meeting on the anniversary of the Armistice. Rockenbach wrote back that he was "driving ahead" on the idea of a fast, powerful and durable tank, with the hope that they would be well-equipped "when we next join you against the common enemy." Perhaps some hint of these developments reached Pershing (by then Chief of Staff of the Army). In any case, he wrote to Rockenbach the following spring, turning down a request to write a preface for a paper on tanks by Rockenbach, but adding that he was glad to see the tank issue kept alive since he thought tank development was one of the Army's most important problems. Unfortunately, money was in short supply and tanks were expensive. Indeed, career-minded officers like Patton and Rockenbach's other brigade commander, Dwight D. Eisenhower, were abandoning the tanks for more productive assignments elsewhere.

But Rockenbach continued to push his plans for the new medium tank—though it continued to exist on paper only. In a study derived from a talk given to a group of Marines in 1922, Rockenbach claimed that by then (1922) there were fast and durable tanks with good cross-country mobility. Tanks had become the battleships or cruisers of land warfare he said, and must be supported by supply, troop, and repair tanks—a mechanized army, though he did not call it that. As

for the role of tanks in future war, he urged his audience to read articles by J.F.C. Fuller. He also restated his preference for concentrating on the fast and powerfully armed medium tank.

Rockenbach's fullest exposition of his views on mechanized war came in 1923, in the manuscript of an article he prepared for publication in the *Military Engineer.* The Armistice of 1918, he wrote, found armies advancing at the rate at which engineers could repair the road. Tanks were not then sufficiently developed to alleviate the situation. What was needed was a new machine (based on the Christie chassis) from 10 to 15 tons in weight, with sloped armor that would protect against .50-caliber armor-piercing rounds and shell fragments, carrying a cannon in a 360-degree traversing turret plus two machineguns. The vehicle should be capable of strategic movements under its own power and have a cross country speed of at least 12 m.p.h. carrying a 4- or 5- man crew. The vehicle should have a range of at least 100 miles across country, with a soft and durable suspension. Some of the tanks should be fitted with radiotelephones for communication with other tank units and stations within the division. Rockenbach added that he had not forgotten that cross-country transport was "the essential thing to restore mobility on the battlefield so that a penetration can be followed by exploiting." Once the new medium tank had proven itself, he wrote, the same chassis should serve as the basis for infantry and gun carriers and supply vehicles.

"At present," Rockenbach wrote, "the tank organization in the United States is reduced to a minimum and is unstable." Tanks were being parcelled out, one company to each National Guard division, as they were organized. Rockenbach stated that, "The tanks would, where the ground was practical, precede the infantry in assaulting prepared positions." "Cooperation with the Infantry," he wrote, "was essential." How these last lines contrast with what he had written just before! To some extent, of course, Rockenbach was walking a verbal tight-rope, balancing his doctrinal innovations on the one hand against the weight of his subordination to the Infantry on the other. And yet what he wrote was not really self-contradictory: "land fleets" for strategic mobility and exploitation across country, tactically traditional combined-arm assaults against an enemy in prepared positions. Once the enemy position had been breached, or from the start in open mobile warfare, tanks would exploit the situation by patrolling well forward and breaking through the last formed bodies of the enemy, spreading confusion in his rear areas and where possible cutting off the enemy retreat by seizing bridges or other defiles.

Tanks were also a valuable weapon against other tanks, he wrote, and speed and power to maneuver would be especially important in such actions. In counterattacks, tanks might thrust forward on their own well ahead of the riflemen. How could he reconcile these ideas with the subordination of the tanks to the Infantry? With a choice bit of equivocation, Rockenbach concluded,

> "The tactics of tanks is that of the modern technical infantry. According to circumstances, tanks may precede the rifleman in attack, accompany him, or follow him. The question is how best to employ the principle embodied in the tank, a modern composite machine weapon."

But it was all in vain. There was no money from the Congress and Christie's ideas never came to fruition in the United States. Mechanization in the United States Army had to wait. In 1924, Rockenbach finally got his long-coveted promotion to permanent Brigadier General (he had temporarily held that rank in 1918). But the promotion meant that he had to leave his beloved tanks. Replying to the congratulations of his erstwhile protege, Patton, he wrote with unusual emotion (he was not a demonstrative man, and even less by virtue of his stiff military bearing):

> "I have gotten my promotion, as some of my stupid friends inform me, in spite of the Tanks, but I believe in Tanks. I believe that the machines that we have in manufacture at the present time are going to win many of our opponents and are going to force you cavalrymen to adopt them."

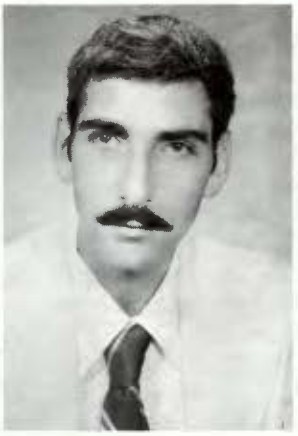
And he admonished Patton—

"Don't let it get into your crazy head that I don't need the approval and sympathy of my juniors . . ."

But Patton was not listening, nor was the Army, nor the nation. At the end of 1933, shortly after retiring, Rockenbach gave a public interview warning that, with Hitler in power in Germany, war would come again. The United States was unprepared, especially its tanks, souvenirs left over from World War I. He added:

> "Casualties of the last war should be a warning. The present generation does not know the real tragedy of the last war. If people could keep fresh in their minds the slaughter and suffering of the last war, there would be no more wars."

During the thirties, even as Rockenbach gave the interview quoted from above, the Army was finally resuming mechanization. Somehow in the process, it managed to lose sight of Rockenbach and the ideas he and others had fought for. But the problem in the twenties had not been lack of advanced ideas nor of men to put them forward. The problem was that the United States, jerked briefly onto the centerstage of military power and international politics in World War I, shied away again in the twenties, eager to recover its lost isolation. Isolated, the United States did not need mechanization. Only later, when a world grown smaller began to heat up, was the money—the lifeblood of military innovation—forthcoming. Only then could the Army resume its march into the 20th Century.



JEFFREY A. GUNSBURG, a veteran of the United States Army who served in Vietnam, was recently awarded a doctorate in history. A former instructor and lecturer at Duke University, he has authored numerous military historical articles in *ARMOR* and an encyclopedia of World War II published in 1976. Doctor Gunsburg is presently Assistant Professor of History at the Virginia Military Institute.

UTTAS

by Captain John K. Butler

The military requirements of the Vietnam War established the helicopter as a vital weapon on the battlefield. The entire series of utility helicopters, *UH-1A-H,* performed admirably in the numerous roles and missions demanded of it, including movement of cargo, troops, aeromedical evacuation, command and control, and even weapons platforms.

During the last stages of the Vietnam War, military planners began looking ahead in an attempt to define the requirements and demands of helicopters in the 1970's and beyond. Realizing the *UH-1* fleet was aging and that helicopter technology had made considerable advances throughout the recent years, the U.S. Army funded two contractors, Sikorsky Aircraft of Statford, Connecticut and Boeing-Vertol of Philadelphia, Pennsylvania in 1972 to competitively develop the utility helicopter of the future.

Following several years of competitive development, the utility tactical transportation aircraft system (UTTAS) candidates, Boeing-Vertol's *YUH-61A* and Sikorsky's *YUH-60A,* flew nearly 3,000 flight test hours during developmental testing. These hours developed the flight envelope and airworthiness of each candidate aircraft.

The 101st Airborne Division was selected to perform the "acid test"—the operational testing in a tactical environment. U.S. Army pilots flew each aircraft approximately 250 hours in a sustained tactical environment to evaluate the compatibility of the aircraft with operational demands.

As a result of these extensive, rigorous tests to evaluate which prototype was best suited to fulfill the Army's mission, Sikorsky's *UH-60A* was selected to enter production. The selection was made in December 1976.

The UTTAS is the most technologically advanced utility helicopter ever produced for the U.S. Army.

The *UH-60A* helicopter has two engines, a fully-articulated main rotor, and conventional landing gear. It is capable of flying at speeds up to 147 knots for over 300 nautical miles and can climb at 470 feet per minute. In addition, it is capable of carrying external loads totaling 8,000 pounds. The *UH-60A* demonstrates these desirable performance characteristics on standard, Army hot-day conditions of 4,000 feet and 95°F.

The UTTAS is powered by newly developed General Electric *T-700* engines. The design goals of these engines were to decrease weight by 40 percent and to reduce fuel consumption by 20 to 30 percent while increasing survivability, reliability, durability and maintenance characteristics over existing *L-13* engines. The *T-700* weighs 417 pounds and at 60 percent of full power (900 shaft horsepower (s.h.p.)) consumes roughly 69 gallons per hour. The engines were designed under a modular concept and disassemble into four major modules consisting of the accessory, cold-section, hot-section and power-turbine modules. Each module may be replaced individually or the entire engine may be removed in less than 1 hour by two men using 10 tools common to the aircraft mechanic's toolbox. The Army specification is for each engine to develop 1,543 s. h.p. This margin of power and the increased efficiency of the main rotor system permit sustained flight if either engine malfunctions while airborne. The *T-700* will have a 1500-hour, mean-time-between-failure (MTBF) compared to the current engine average of 500-hours MTBF. This engine will also be used on the advanced attack helicopter (*AAH*) and is completely interchangeable between airframes. The contribution of the *T-700* engine is summed up in one word—*performance*!

The current *UH-1* fleet, while performing admirably in the Vietnam War, was unsuited for the more rigorous demands of the mid-intensity battlefield. The *UH-1 "Huey"* is limited in power and is unable to carry the basic tactical team—the squad—and its associated equipment.

The UTTAS fulfills this deficiency and is the first true squad carrier capable of carrying a full squad and its associated equipment into battle. It permits the employment of the basic tactical team while maintaining team integrity on one helicopter. Furthermore, this capability is demonstrated at nap of the earth (NOE) altitudes which is essential to survivability on the modern battlefield.

Alternate missions include carrying up to 8,000 pounds of cargo during resupply missions or carrying from 4 to 6 crash-survivable litters along with necessary medical personnel and equipment during aeromedical-evacuation missions.

The fully-articulated, main-rotor system has been designed with maximum attention given to survivability, maintainability, reliability, and vulnerability reduction. The main rotor hub is of titanium which provides excellent ballistic tolerance for hits from weapons of up to 23-mm. Elastomeric bearings require no lubrication and the damper assembly has been demonstrated jam proof during ballistic testing. Sikorsky's bifilar vibration absorber is designed to absorb main rotor vibrations, a primary factor in causing

crew fatigue and damage to electrical and flight components.

The main rotor blades consist of a titanium main spar, fiberglass skin, and nomex honeycomb. This construction inhibits corrosion, reduces maintenance requirements and provides a blade that has demonstrated a "get home" capability after sustaining multiple hits from 23-mm weapons. The swept-tip caps offer more speed, agility, maneuver, and hover performance while providing increased noise reduction by eliminating the characteristic "popping" noise. The blade inspection method (BIM) provides an immediate visual cue of blade integrity before each flight. The blades are easily removed with quick-release attachment pins and are pretracked and balanced for rapid field interchangeability.

The four-bladed, cross-beam tail rotor consists of two main spars running the entire length of the two blades opposite each other and require no tracking or balancing. It is located on the right side of the vertical pylon and tilted 20 degrees to provide up to 400 pounds of additional vertical lift and increased hover performance. The tail rotor contains no bearings or seals and requires no lubrication. The tail-rotor drive shaft and rotor head are also ballistically tolerant to 23-mm hits and provide added insurance of survivability. The large vertical pylon provides the required stability for forward flight even though the tail rotor is shot off. The tail-rotor centering spring returns all blades to a preselected pitch to provide maximum control if the primary tail-rotor controls or primary hydraulics system fail. This increases survivability by allowing the pilot to fly home.

The main transmission is designed with a modular concept to ease maintenance requirements. Each module may be removed without contaminating or removal of other modules. The transmission is ballistically tolerant to 23-mm and is designed to operate a minimum of 30 minutes in flight with no lubrication!

Crew survivability is enhanced by the use of curved boron-carbide-armored seat buckets which offer 80 percent ballistic efficiency compared to 46 percent with current panel buckets. In addition, the windshield and instrument panel have been fabricated from materials designed to reduce the casualty-producing effects of spalling after being hit.

Maximum survivability has been achieved through the use of redundant systems whenever possible. This redundancy is evident in the two engines, main-rotor controls, tail-rotor controls, and electrical and hydraulic systems. The incorporation of two small, interchangeable fuel cells permit running both engines from either cell in the event one is damaged or running one engine from both cells.

The UTTAS is one of the most combat survivable helicopters ever built; but, despite these efforts, some UTTAS will have a malfunction in flight resulting in a crash. What has been done in the area of crash survivability? What can the crew expect in the event of a crash?

Crash survivability measures have not been overlooked but instead have been considered from the earliest design planning stages. The results of this foresight are that survivability measures have been maximized in the aircraft design, and the *UH-60A* is one of the most crash-survivable aircraft ever built. It is designed to survive a 42 feet per second vertical crash which equates to a 2,500 feet per minute rate of descent in autorotation-*without a pitch pull at the bottom!*

Maximum crew and troop protection is obtained through the energy-attenuation capability of the landing gear and structure under crash loads and crash-worthy seats for all occupants. The landing gear has been located to eliminate the possibility of the gear penetrating the cabin area or fuel cells. The cabin superstructure is designed to retain the engines and transmission under high load factors.

The fuel cells are crash resistant and self-sealing when hit by projectiles from weapons of up to 12.7-mm. The fuel lines are self-sealing and contain self-sealing breakaway valves. The fuel cell vent lines have poppet valves to prevent fuel spillage in the event of postcrash rollover. An inertial crash switch activates the onboard fire extinguisher system upon impact thereby further minimizing the chances of postcrash fire.

Main support beams in the cabin structure tend to maintain the cabin configuration during the crash seqùence and aids in reducing the tendency of the cabin to parallelogram, thus preventing doors and windows from jamming.

Reduced maintenance man-hours per flight-hour was a design goal of the UTTAS. This is accomplished by on-condition component maintenance. The component condition is monitored and only replaced when necessary, eliminating unnecessary replacement of expensive components. There are no time between overhauls (TBO) in the UTTAS, and component life is increased by 200 percent. There are fewer scheduled inspections, and PE intervals have been extended to 500 hours. These developments mean increased availability and maximum reliability with a minimum of maintenance.

Current production plans for the *UH-60A* call for 1,107 aircraft. The first of these aircraft will be delivered to operational units early in 1979 and production will be carried out over several years.

Air cavalry units will receive the *UH-60A* on a one for one exchange basis for the current *UH-1H*. The priority for unit issue is established by the Deputy Chief of Staff for Operations (DCSOPS) but eventually all will receive this remarkable aircraft.

The UTTAS will be the backbone of the U.S. Army utility helicopter fleet through the year 2000. Tough demands will be put on it to perform, but the *UH-60A* will meet those demands and provide one more exciting chapter in the history of Army aviation.

CPT JOHN K. BUTLER attended the Armor Officer Basic course (AOB) in 1968 followed by flight school. He served with D Troop, 1st Cavalry Regiment in Vietnam from 1969-1970. Captain Butler commanded Combat Support Command, 3-63 Armor in Germany. In 1973 he attended AOAC. Upon completion of AOAC he was assigned to A Troop, 2d Squadron, 1st Cavalry. He is currently a project officer with Directorate of Combat Developments, USAARMC.

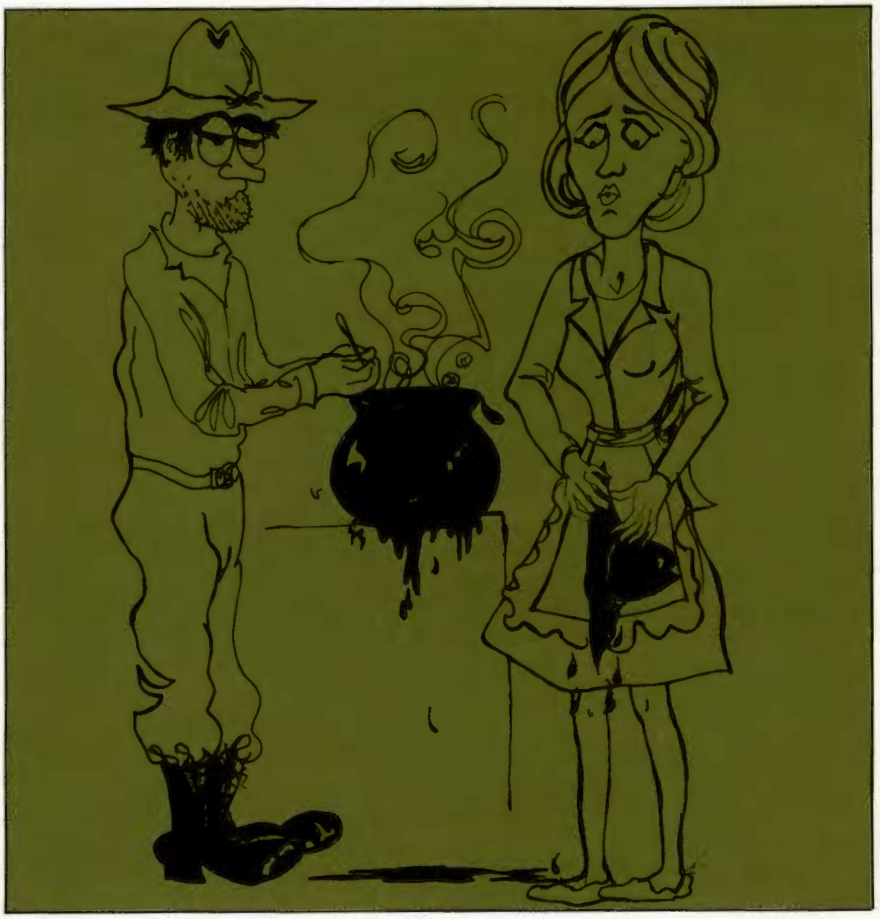
From the Wateree to the Pee Dee

by Lieutenant Colonel William P. Gillette III

The title of this article was taken from the operations of the 3-17th Air Cavalry Squadron during *Air Assault II* conducted by the 11th Air Assault Division in South and North Carolina in the fall of 1964. This was the final peacetime test of the air assault and air cavalry concepts. The next test was at An Khe. During this momentous exercise the Air Cavalry Squadron validated its operational techniques and expertly trained its troops. Aside from the operational magnitude of the squadron's *Air Assault II* experience, there occurred another significant event in the annals of the U.S. Cavalry. The cavalry hat was reborn.

In the ensueing years I have heard with amusement several tales concerning the genesis of the current Black Hat. Through the use of this article I hope to set the record straight. Some of the principle players in the reincarnation were Lieutenant Colonel John B. Stockton (Squadron Commander), Major General Harry Kinnard (Division Commander), General Harold K. Johnson (Chief of Staff of the Army), and Captains Walter Harman and myself (Cavalrymen). The stage was a goat pasture on the shores of Wateree Pond and the time was November 1964.

After a period of intensive simulated combat, members of the squadron were authorized several days rest and recreation (R and R) on a staggered schedule. Since both Walt and I had wives at Fort Benning (our home station), we decided to return to the banks of the Chattahoochie for R and R. Walt went home a couple of days before me and must have rested quickly, for when I arrived, he was roaming around. Being a licensed cavalryman, Walt dutifully conducted a reconnaissance as he roamed about. His travels took him to the Fort Benning salvage store, where he found some olive drab, Montana peak drill sergeant hats for sale. Having purchased some of these hats he posted over to my quarters where we convened a planning session. It didn't take long for two dashing captains of Cavalry to decide that the motley specimens we held could be turned into the campaign hats of yesteryear. Initially there were three problems, the color and shape of the hats, and the necessary hat cords to designate general officers, officers, warrant officers and troopers by branch. The color soon resolved itself when we convinced our wives that if we got some black dye that they could easily dye our hats black. This was not as simple a task as it first appeared. It took several dyings before our first hats attained the proper color, and of course the dye pot had to boil over in the kitchen once or twice. About this time Walt and I thought it would be discreet if we conducted a deploying action as we were about to be decisively engaged on the home front. We withdrew smartly in an effort to solve our remaining two problems.



In Phoenix City across the Chattahoochie, we found a cleaning establishment which consented to block our hats into the prescribed shape. Not having any knowledge of how to solve the problem of the hat cords we conducted an area reconnaissance of Columbus. Somewhere in the back alleys of the city I located an owner of a second-hand shop who had a desk drawer full of hat cords and didn't know what to do with them. A bargain was soon struck and we were able to produce several specimens of what was to become the black cavalry hat.

Having reached the end of our R and R, Walt and I reported back to the squadron assembly area on the banks of Wateree Pond. Back in our troop area, we sought the council of our troop commander, Major Robert I. Storerink. We decided that the best way to propagate the black cavalry hats within the squadron was to give our squadron commander one for his birthday which would come to pass in the next couple of days. Colonel Stockton's birthday turned out to be a momentous occasion that year. In addition to the cavalry hat from B Troop, he received an old white mule from C Troop. He was delighted with both the hat and the mule. Walt and I were commissioned to produce hats for all of the squadron officers and the mule, (Maggie) was proclaimed the squadron mascot. This announcement presented C Troop with a problem. The C Troop officers had rented the mule from a local farmer and presented him to Colonel Stockton as a joke, knowing well that they could return it after the Colonel told them to get that mule out of his CP. However, since they didn't get the mule back, they had to return to the farmer and purchase Maggie.

The cavalry hat procurement went well until early spring of 1965 when we exhausted the supply of salvage hats at Fort Benning. Although I'll admit that it was a welcome relief for our wives who had to dye all of the hats. But it was good training for them because it wasn't long before they had to dye all of our underwear green prior to our deployment to Vietnam. Notwithstanding the procurement problems, the demand for cavalry hats increased drastically. The deteriorating situation necessitated that Walt and I hold another planning conference. We surmized that since the John B. Stetson Company had produced some of the salvage hats which we used, that they might be able to produce the cavalry hat. I took a picture of my hat and sent it to the Stetson Company with our request. The response was outstanding. The sales manager of the Stetson Company agreed to supply the prescribed hat with cord at a reasonable price. Thus, the machinery was set for the resurrection of the cavalry hat.

The story of the reinstitution of the black cavalry hat would be incomplete if some of the earlier wearing difficulties were not included.

As the 3-17 Air Cavalry Squadron's hats became increasingly visible at Fort Benning, our Division Commander, General Kinnard, became more forceful in his objections to the wearing of cavalry hats. Not desiring to irritate our commander, we became very careful where we wore the hats. They were essentially relegated to wear in the field and the squadron area at Harmony Church (that was almost in the field). All went well until the squadron conducted a counterinsurgency exercise at Camp Shelby, Mississippi. Being in the field, we wore our cavalry hats. Evidently, while there, a new photographer took a picture of members of the squadron wearing black cavalry hats. The aftermath of the Camp Shelby publicity took place at Fort Benning one Sunday morning several weeks later. That was the day Colonel Stockton picked up the telephone and heard the following. "Colonel, this is General Johnson. Don't you believe in the uniform which I have prescribed for the Army?"

LTC WILLIAM P. GILLETTE III was commissioned in Armor upon graduation from the United States Military Academy in 1958. He has commanded cavalry platoons and troops, both ground and air. Formerly an instructor at the Armed Forces Staff College, he currently commands the 1st Sqd, 10th Cavalry, 4th Infantry Division (Mechanized) at Fort Carson, CO.

Scoring Tank Gunnery by 'Instant Replay'

by Major Patrick H. Orell

As most TV football fans know, what you don't see the first time on a play can be seen again and again by "instant replay." These instant replays are only used for the fans however; and the referees controlling the game don't get to use it to help make decisions when their vision is partially obscured by passing players or weather. This same television "instant replay" technique can be used by the graders scoring tank gunnery, and will aid them in scoring more accurately when their vision might be obscured.

Obscuration caused by smoke, dust, rain, fog and haze is a normal condition in both range firing and actual combat. On-board, fire-control optics, as well as binoculars used by the tank commander, cannot penetrate these obscurants. In combat, a hit on a tank (hard target) may produce a catastrophic hit indication (fire, flying parts, crew abandonment, etc.) and is an aid in determining if there is a hit. During practice and qualification firing, such as on Tank Table (TT) VIII, both inert (target practice) and service ammunition are fired; but the only hit indication produced by inert ammunition is the visual sensing of the tracer passing through the target. The poor quality and size of the hard targets used on tank ranges (tank hulls, scrap piles, etc.) make it difficult to sense hits even when using service ammunition. The other types of targets presently being used on tank practice and qualification ranges are made of either plywood or target cloth. These targets are also difficult to sense hits on unless the round leaves a clean hole in the target or knocks part of the target down.

Scoring hits on TT VIII is currently being accomplished at Fort Hood, Texas, by an assistant instructor (AI) riding on top of the tank using either binoculars or the unaided eye. Using the same methods for vision, the safety officer also scores hits while following the tank in a 1/4-ton truck. Obscuration caused by dust, smoke, rain, muzzle blast, and mud make it difficult for the AI and the safety officer to sense and accurately score each round. To determine the accuracy of the scoring system, an evaluation was made by TRADOC Combined Arms Testing Activity (TCATA). In this evaluation, it was found there is a significant error rate (17-26 percent) in the current method of scoring tank main gun engagements on TT VIIIA (day).

The evaluation team used a television camera with video tape to check the accuracy of the scoring system used on TT VIIIA (day). The television system, called a television trainer (TVT), is presently issued to each tank battalion by the Training Aids Support Office (TASO). The evaluation officer mounted a 500-mm f 4.5 telephoto lens on the camera of the TVT. This configuration allows the evaluator to not only view targets clearly at any of the TT VIII ranges but also affords him the capability of "instant replay." Thus, a viewer may run the video tape made by the system any number of times to check his sensings, before debriefing the crew.

The TVT system can be mounted on a 1/4-ton truck or on an *M-113* Armored Personnel Carrier. The vehicle can follow the firing tank through the table, or it can be in a fixed position that affords the camera a view of all the main gun engagement targets. Both these methods are being used at Fort Hood and have produced excellent results.

The 1/4-ton truck method is accomplished by mounting the full

Quarter-ton truck configuration

camera tripod on the machinegun mounting post of the vehicle. The tripod can be stabilized by tieing the legs to the mounting post and the seat backs. The shoulder strap, provided with the system, is used to tie the video tape recorder into the passenger seat. There is ample cable on the camera to reach the video tape recorder and to allow for free movement of the camera on the tripod. Power to run the TVT is obtained by connecting a car battery cord to the 12-volt DC side of the 24-volt battery system on the jeep. If not issued with the particular TVT, the cord is available at TASO.

The *M-113* armored personnel carrier method requires that a camera mount be made in a metal working shop. The mount made for the Fort Hood evaluation is a piece of aluminum tube machined to fit into the .50 caliber machinegun mount on the *M-113*. The camera tripod head is removed from the TVT tripod and connected to the end of the aluminum tube. The commander's hatch cover is closed to provide a seat for the camera operator. The video tape recorder is strapped with the seat belts into the commander's seat of the *M-113*. The camera cable is threaded through the hole left by removing the front vision block. By having the hatch cover closed, the video tape recorder is shielded from direct sunlight and weather. Power to run the TVT is obtained by connecting a car battery cord to the 12-volt DC side of the 24-volt battery system on the *M-113*. This cord is also available at TASO. The large crew hatch on top of the track can be left open to allow for easy access to the video tape recorder for tape changes and to turn the system on or off.

The stationary configuration is the easiest if there is a location from which all targets can be seen. The system can be run either on vehicle or generator power, and the television monitor can be used during taping to view the action. This configuration is the most favorable, thus far, for using units because the unit operations officer (S3) can verify each round with the AI team chief. If time permits, the crew can be debriefed by using the TV video tape on a second system set up for playback only.

The TVT system has an audio microphone on its camera, which can be used by the cameraman to identify the tank firing. With a little training, cameramen can learn to operate the system with a minimum of "dead time" between firings by using the camera activation switch on the front of the camera. Hand signals are used between the AI and the cameraman to alert the cameraman to turn on the camera. The signal is given when the AI hears "on the way," and a signal is again given at the end of the engagement. By knowing the arrangement of the targets on the table, the cameraman can easily sight the camera on target in time to get a video taped copy without interfering with the operation of the range.

The TVT may also be used for gunnery training on TT VIIA (day). While self-scoring targets could solve the scoring accuracy problem, the TVT would provide a useful critique capability. It allows the crew the opportunity to discuss misses and identify problems before firing TT VIII (day).

Scoring tank main gun engagements accurately at night remains a challenge. Attempts during the Fort Hood evaluation with Low Light Level Television and Thermal Imaging devices were unsuccessful.

The cost of the 500-mm f 4.5 telephoto lens, with mounting brace and case is $1,409. A suggested basis of issue would be three per division; one for table VIII, one for table VII, and one as a backup.

***M-113* mount without camera**

The cost of the lens is cheap when compared with the cost of tank ammunition. The increase in motivation resulting from the more accurate scoring and the instant replays should result in better trained crews and is well worth the expense.

MAJ PATRICK H. ORELL was commissioned in the Signal Corps upon graduation from the Junior College Division of New Mexico Military Institute in 1965, and received his BS degree in radio/television production in 1971. He has served as platoon leader, company XO assistant S-1, Corps Radio Officer in Vietnam, battalion communications officer, company commander and assistant S-3 in various Signal units. Major Orell is presently assigned to the Training Directorate, TCATA, Fort Hood, TX.

ARMOR ADVANCES IN BRAZIL

by Richard M. Ogorkiewicz

Four years ago I described on these pages the beginning of the development of armored vehicles in Brazil and the prototypes which had emerged out of it (*ARMOR,* March-April 1973). Since then, considerable further progress has taken place in Brazil. In particular, the development of armored vehicles has advanced beyond the construction of prototypes to quantity production and field use. Therefore, it is time to give further attention to Brazilian armor.

Development and Production

The development of armored vehicles in Brazil has been largely concentrated on relatively light, wheeled models. This has been a very sound policy in view of the content of the Brazilian territory, which is about as large as that of the United States, and the need of the Brazilian Army for armored units capable of moving long distances over land. The policy of concentrating at this stage on the development of wheeled armored vehicles is also sound in view of the current political and strategic situation in Latin America, which calls for such vehicles rather than battle tanks.

The actual development and production of the Brazilian wheeled armored vehicles has been the responsibility of the Engesa Company of Sao Paulo. After it started producing them for the Brazilian forces, Engesa also received orders from armies outside Brazil. As a result, its production of armored vehicles has expanded very rapidly during the past 2 or 3 years. In fact, Engesa has become one of the most rapidly growing manufacturers of military vehicles in the Free World.

The basis of Engesa's success has been its pair of closely related 6-wheelers, the *EE-9 Cascavel* 6x6 turreted armored car and the *EE-11 Urutu* 6x6 amphibious armored personnel carrier. As I previously described in the March-April 1973 issue of *ARMOR,* prototypes of the *Cascavel* and *Urutu* were built in 1970 and the first orders for both were placed in 1972. Thus, the Brazilian Army ordered in 1972 a batch of *Cascavels* and the Brazilian Navy ordered special versions of the *Urutu* for its Marines—the *fuzileiros navais.* The delivery of these preproduction vehicles was completed in 1973. A year later, quantity production commenced in a new, purpose-built assembly plant in Sao Jose dos Campos, an industrial city about 60 miles from Sao Paulo. Since then, several hundred *Cascavels* and *Urutus* have been built at Sao Jose for both the Brazilian forces and export.

Cascavel Armored Car

The current, production version of the *Cascavel* incorporates several important improvements on the original design. In particular, it has been developed to mount a 2-man turret armed with a smoothbore 90-mm gun and a coaxial 7.62-mm machinegun.

On the *Cascavels* built for export, the turret has been of French origin. However, a new turret has now been developed by Engesa and is about to go into production. It is also intended that future models will be armed with Brazilian-made 90-mm guns. In the meantime, pending the delivery of Brazilian-made turrets and guns, *Cascavels* delivered to the Brazilian Army have been fitted with 2-man tur-

rets mounting 37-mm guns, which have been removed from World War II U.S.-built *M-3A1* light tanks still in Brazilian Army inventory.

The arming of the *Cascavel* with the 90-mm gun, which fires fin-stabilized, shaped-charge projectiles, has given it considerable antitank capability. At the same time, the 90-mm has also given it the ability to engage unarmored targets with effective high explosive shells.

Another important difference between the production models and the preproduction vehicles is that they are built of special dual-hardness armor developed by Engesa. This consists of two different steels which give the armor a hard outer layer and a tough inner layer for optimum ballistic protection. The pioneering use by Engesa of this type of armor for the construction of hulls and turrets has helped to keep the weight of the *Cascavel* down to 23,750 pounds, combat loaded, without compromising its protection.

The automotive characteristics of the production version are basically the same as those of the prototype. Thus, its power plant is a Brazilian-made Mercedes-Benz diesel of 172 horsepower, which gives the *Cascavel* a maximum road speed of 60 m.p.h. As before, the front wheels are independently suspended, while the rear wheels are mounted in pairs on walking beams which form part of the Engesa's "Boomerang" rear suspension. The walking beams provide exceptionally large 35-inch vertical travel to each rear wheel, which ensures traction even over very rough ground and leads to excellent obstacle crossing performance. The *Cascavel* also performs well over soft ground due to its relatively large, 12.00x20 low-pressure radial tires. To make them "bullet-proof," the tires are fitted with cellular inner tubes, which enable a vehicle to operate even after its tires have been punctured.

The *EE-9 Cascavel* armored car is armed with a 90-mm gun which fires fin-stabilized shaped charge projectiles, giving it considerable antitank capability.

Urutu APC

The *Urutu* armored personnel carrier uses the same automotive components, as well as the same type of armor as the *Cascavel*. In consequence, it performs equally well on and off the road. The use of the same automotive components in the two vehicles also offers important advantages for maintenance and logistics when the two vehicles are used together, as they are in the Brazilian Army and elsewhere.

The Brazilian Army has so far assigned all the *Cascavels* and *Urutus* it has procured to its Armored Cavalry, which employs them in mixed platoons consisting of two *Cascavels* and one *Urutu*. Used in this way, the two vehicles are most effective because they can complement each other, and their combined employment is obviously made much easier by their nearly-identical automotive characteristics.

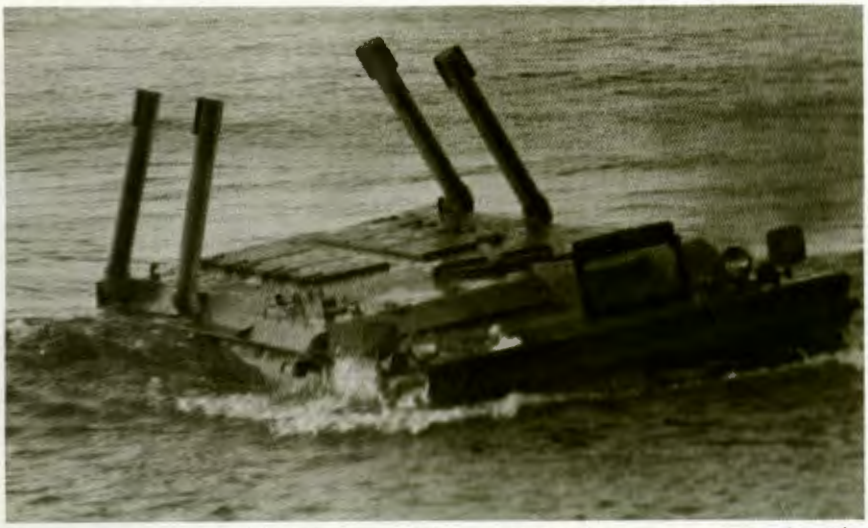
Because the *Urutu* is an armored personnel carrier, its configuration is different from that of the *Cascavel*. In particular, its engine is at the front, on the right of the driver, instead of being at the rear as in the *Cascavel*. This leaves the rear of the hull free for a large compartment capable of accomodating up to 14 men or carrying 4,000 pounds of cargo.

Access is provided by a rear door, a door in each side of the hull, and four rectangular hatches in the roof of the crew compartment. There are also five firing ports in each side of the hull, one in the rear door and a rotating, open-top mounting for a .50-caliber machinegun. As an alternative, the *Urutu* has been fitted with a 2-man turret mounting a 20-mm cannon. Another version has been fitted with a 2-man turret of the British *Scorpion* light tank. This mounts a medium-velocity 76-mm gun as well as a 7.62-mm machinegun and transforms the *Urutu* from an armored carrier into a general purpose armored fighting vehicle. Yet another version mounts the same 90-mm gun turret as the *Cascavel*.

The *EE-11 Urutu* 6x6 armored personnel carrier accomodates 14 men.

Marines' Version of *Urutu*

Unlike the *Cascavel,* the *Urutu* is inherently amphibious. Thus, its basic army version can swim across inland waters with a minimum of preparation, propelling itself by means of its wheels. However, a special version of the *Urutu,* which has been acquired by the Brazilian Marines, has greatly superior amphibious capabilities. In fact, it can swim not only in inland waters but also negotiate in open seas and surf. This is something which only special-purpose armored amphibians, such as the U.S. Marine Corps' *LVTs* can do.



The Marines' version of the *Urutu* amphibious armored carrier can not only swim in inland waters, but negotiate open seas and surf.

To give it such amphibious capabilities, the special Marines' version of the *Urutu* has been fitted with additional equipment, which is not carried-on the basic army version. In particular, it is fitted with a trim vane and two shrouded propellers which give it a water speed of up to 6 m.p.h. It is also fitted with twin rudders, to increase its maneuverability in water. Another feature of the vehicle is Engesa's unique swivelling, air-intake tubes. There are four of these tubes at the sides of the hull top, which when turned to a vertical position, enable the vehicle to operate safely, even when rough waters wash over the hull roof.

These and other excellent features are a credit to the designers of the *Urutu* and the *Cascavel.* The acquisition of these two vehicles by the Brazilian Army has greatly increased the capabilities of its Armored Cavalry. The *Urutu* has also increased the amphibious capabilities of the Brazilian Marines. Moreover, the successful development and production of the *Cascavel* and *Urutu* also provides a sound basis for further progress by Brazil in the field of armored vehicles.

The prototype of the new *EE-17 Sucuri* tank destroyer with a 105-mm rifled gun is equipped with a 2-man, trunnion-mounted turret.

Sucuri Tank Destroyer

Engesa has already developed another, completely new, wheeled, armored vehicle. Named the *EE-17 Sucuri,* I had the privilege of seeing this prototype with the other Engesa vehicles during a recent visit to Brazil.

Like the *Cascavel,* the *Sucuri* has 6-driven wheels and a walking-beam rear suspension. Weighing about 40,000 pounds, it is significantly heavier and more powerful.

To be specific, the *Sucuri* is fitted with a 2-man trunnion-mounted turret originally developed in France for the *AMX-13* tracked tank destroyer. The turret mounts a 105-mm rifled gun which fires the same types of projectiles as the French *AMX-30* battle tank, although with a somewhat lower muzzle velocity. In any case, its 105-mm gun makes the *Sucuri* as heavily armed as any wheeled armored vehicle built anywhere in the world and makes it a highly effective tank destroyer.

In summary, the *Sucuri,* along with *Urutu* and the *Cascavel,* provide the Brazilians with an effective armored force that is well-suited for the terrain and road nets over which it is likely to operate.

RICHARD M. OGORKIEWICZ, widely recognized as a leading authority on armored fighting vehicles, is a consulting engineer and author of two books and more than 200 articles, including 64 in *ARMOR,* on various aspects of armor. He has also lectured extensively on the subject not only in the United States and England, but also in Sweden, Israel, Brazil, and South America.

Pages from the Past

CAVALRY

Concerning the status of the horse in regard to a motorized Army, Chief of Staff, General Malin Craig, makes the following observations:

"I believe there is no probability of all horses being taken away from the Regular Army and National Guard this winter nor for many years to come.

"While mechanization and motorization have and can replace the animal for many military purposes, I do not believe that a properly balanced army, able to operate in any theatre of operations, can ever dispense with a proper proportion of mounted cavalry and horse-drawn artillery.

"Since the United States does not ever contemplate organizing for aggression, it cannot choose a theatre in advance.

"Consequently its peacetime organization must keep alive troops that are universally highly mobile in all theatres of operations."

The Cavalry Journal
September-October 1937

COMMAND

The constitution of command is one of the first elements of the strength of armies. It reposes upon a fundamental principle—the unity of the command—or, according to a happy expression of the great NAPOLEON, "the unity of the military thought."

This principle constitutes a rule without exception. It is absolute. In peace, as well as in war, it is the basis of all good army organizations. But it is especially in a campaign that its neglect can cause irreparable disaster. It has been many times proven that in multiplying the number of chiefs called to make a decision, a means is only offered to each one to elude the responsibility in difficult moments.

The Cavalry Journal
November 1888

MOMENTUM

We should take action now to make our forces more mobile. To get an edge on your enemy in mobility is a constant challenge facing the military man. To keep this edge is an Army-wide problem. Maintaining momentum once gained keeps the enemy off balance and throws him on the defensive. Wars aren't won on the defensive. The force that knows the enemy's disposition and has the mobility to attack, disperse quickly, and regroup again to strike the enemy's rearward salient weak points, will make the penetration and become the decisive factor on the battlefield.

From time immemorial, battles have been won by decisive mobile action. Many times the conquering heroes have been the "Davids" in that they were smaller in numbers, lacked equipment, but were superior in knowledge. They obtained the momentum, maintained it, and shifted it as the situation dictated; hence they won.

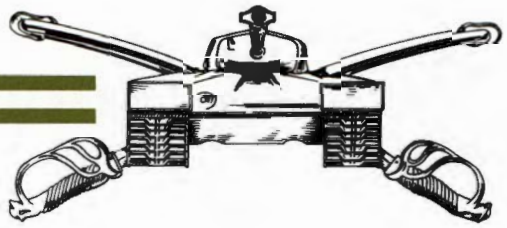
ARMOR
May-June 1954

LEARNING

We must stop being what psychologists call "ethnocentric" about our military equipment. We often tend to rejoice about the superiority of our own equipment, and to judge non-U.S. equipment as necessarily less effective. We can learn much from our allies, as well as from our potential enemies.

ARMOR
March-April, 1967

OPMD - EPMD ARMOR



OPMD

Officer Personnel Management System-U.S. Army Reserves

The Officer Personnel Management System—United States Army Reserve (OPMS-USAR) will provide an experienced, well-trained corps of Reserve officers capable of performing as well-trained mobilization assets. The "One-Army" concept is now a reality with 44 percent of the Army being Reserve component personnel. Department of Defense requirements for the Reserve components—especially for its Reserve leadership potential—have reached an unprecedented importance, and a reliable, responsive management system is considered mandatory.

The OPMS-USAR Program is designed to insure Congress and Department of Defense that Army Reserve officers will be trained for mobilization when required. OPMS-USAR is being designed to achieve several key objectives and will produce the best trained officers possible with skills needed for possible battlefields of the 1980s. Computer technology will assist in identifying and classifying what the Army has currently available for immediate recall from Reserve officer assets. All career Reserve officers will have a readily available Personnel Management Officer to provide training and development guidelines and to audit the Reserve officer's duty performance.

Critical Objectives

Key OPMS-USAR objectives closely parallel the critical mission of the Army's Reserve components and will:

- Develop and train officers in the right numbers, with the right skills, to meet the "One-Army" mobilization requirements.
- Provide officers a personalized, professional development plan that includes rotation within the Ready Reserve.
- Improve the training, motivation, professional satisfaction, and retention of quality officers in the USAR.

Individual Management

OPMS-USAR will manage each officer as an individual, and consideration will be given to the realities of "citizen-soldier" status. The needs of the Army and the professional development needs of the officer will be the key assignment considerations. In addition, command responsibilities and prerogatives and readiness of Troop Program Units must be evaluated. Geographic constraints, job and family commitments, community responsibilities, and the amount of time the individual officer can give to military activities will also be carefully considered when managing the career Reserve officer.

OPMS-USAR will give career Reserve officers, not on extended Active Duty, a centralized, professional development and management program similar to the Active Army OPMS. Training funds will be used to reach the skill officers will need if mobilized. A highly successful program, Counterpart Training, has been developed to train Reserve officers with Active Army units to improve and update required military skills. The Reserve officer will also complete military education requirements to keep pace with technological advances in the military arena.

Advantages

OPMS-USAR will provide several advantages to the career Reserve officer since it will:

- **Install**, for the first time, centralized officer management for all officers in the USAR not on extended Active Duty.
- **Recognize** the importance of the individual non-unit officer as a mobilization asset on equal basis with the unit officer.
- **Provide** non-unit Ready Reserve officers the opportunity for 35 days of structured, professional training annually.
- **Assure** the optimum use of USAR training funds to directly influence the planned development and maintenance of officer skills.
- **Provide** a management structure that can adjust resources to changing mobilization requirements.
- **Significantly** reduce the officer attrition rate.

As a result, OPMS-USAR will become an integral, established part of the Army Reserve approach to personnel management and an important contribution to the "One-Army" concept.

Phased Implementation

OPMS-USAR will be implemented over a 3-year period, FY 77 through FY 79, approximately 10 percent of the USAR officer force (10,000) will come under the umbrella of centralized management, and in FY 78, another 26,000 officers will be brought into the system. During FY 79, the remaining 38,000 officers will be included.

Both unit and non-unit officers will be managed and will be rotated between unit and non-unit status as required by the professional development plan prepared by the officer's Personnel Management Officer. The approach to professional development will be based primarily on development of a single specialty with limited training and assignments for alternate or acquired specialties when appropriate. Additional specialties will be validated based on military related civilian skills and specialties acquired through unit assignments. Officers will be phased into the system on a geographic basis by Readiness Regions to insure proper coordination and control. **(continued on page 32)**

Your Personnel Manager Directory

OPMD action officer contacts with Armor officers in the field indicate that many of you don't know "who does what to whom" at MILPERCEN. Without going into an organizational "wiring diagram" exercise, we Armor (Specialty 12) Managers provide you this directory. You'll find the names and phone numbers of all specialty managers and personnel action/professional development points of contacts for your convenience.

You can contact any of us using this address:

U.S. Army Military Personnel Center
ATTN: (Appropriate Office)
200 Stovall Street
Alexandria, VA 22332

Commercial phone: (202) 325 - (Appropriate Extension)
AUTOVON 221 - (Appropriate Extension)

LIEUTENANT COLONELS DIVISION (DAPC-OPL)

	EXT
COL Robert L. Ray—Chief	7890
LTC Robert E. Walker, Jr.—Coordinator	7892
Mrs. Loretta Vermillion—Secretary	7891

Assignment Branch (DAPC-OPL-A)

LTC(P) Herman R. Betke—Chief	7337
LTC Milton H. Mathis (Specialty 11 CONUS)	9529/49/9614
LTC Thomas N. Griffin, Jr. (Specialty 11 Overseas)	9529/49/9614
MAJ(P) Dennis A. Leach (Specialty 54 CONUS)	9529/49/9614
LTC Donald D. Chelberg (Specialty 13 Overseas, 54)	9789/93/9529
LTC Donald W. Jones (Specialty 13 CONUS)	9789/93/9529
MAJ(P) H.E. Koenigsbauer, Jr. (Specialties 12, 51)	9529/49/9614
LTC Travis N. Dyer (Specialties 14, 51)	9529/49/9614
LTC Henry Covington (Specialties 21, 49, 52)	0423
LTC William Kromer (Specialties 25, 28, 53, 72)	0423
LTC Robert D. Orton (Specialties 43, 46, 47, 74)	0423
LTC David K. Williams (Specialties 41, 42)	0424
LTC William Creighton, Jr. (Specialties 44, 45)	0424
LTC William Waldrop (Specialties 31, 48)	9799
LTC Donald Steiger (Specialties 35, 36, 37)	9799
LTC Paul C. Bayruns (Specialties 73, 77, 91)	0422/7898/9657
LTC John S. Whedbee (Specialties 81, 83, 92, 93, 97)	0422/7898/9657
LTC Warren Dunnington (Specialties 71, 86, 88, 95)	0422/7898/9657
LTC Charles A. Jolley (Aviation—Specialty 15)	8305

Personnel Actions and Development (PA&D) Br. (DAPC-OPL-P)

LTC Robert W. Harris—Chief	0752
LTC Willard E. Golding—PD Monitor & CCSS Manager	0753
LTC Anne H. Hudnall—PD Monitor, PMDP, OPMS	0753
LTC David C. Whitworth—PD Monitor, Spec Changes	0753
MAJ(P) W.G. Robertson—PD Monitor, Cmbt Arms, (Homebasing Off)	0753
Mrs. Norma Brandt—PA Actions	7894
Mrs. Sharon Dennery—CCSS Admin.	0752
Mr. Frank Knight—PA Actions	7893
Mrs. Frances Lee—Trng Quotas, Sch Rpts	0752
Mrs. Gertrude Younger—Civ & Mil Schools	0752

MAJ(P) Herbert F. Koenigsbauer, Jr.
Lieutenant Colonel Assignments
Ext 9529/49/9614

MAJORS DIVISION (DAPC-OPM)

	EXT
COL Jack L. Zorn—Chief	8116
MAJ(P) John J. Walker—Coordinator	8117

Professional Development/Personnel Actions Branch (DAPC-OPM-P)

LTC Joseph Ostrowidzki—Chief	8104
Mrs. Agnes G. Burns—Civil Ed	8119
MAJ John Heldstab—Cbt Arms Team	8105
MAJ Garrett C. Marcinkowski—Cbt Arms Team	8106
Mr. James F. Harrison	8105
MAJ George D. Cromartie, Jr.—Cbt Spt Arms Team	8110
MAJ Jerry Domask—Cbt Svc Spt Team	8112
MAJ Otto S. Guenther—Pers Act Team	8119
MAJ Winnie Pittillo—Pers Act Team	8120

Combat Arms Division

Assignment Branch (DAPC-OPM-A)

LTC Edward A. Colburn—Chief	8104
MAJ Julius F. Johnson (Specialty 11 CONUS)	8105
MAJ John P. Otjen (Specialty 11 O/S)	8105
MAJ Timothy J. Grogan (Specialty 12)	0686
MAJ Thomas P. Easum, Jr. (Specialty 13 CONUS)	0686
MAJ Joseph A. Siraco (Specialty 13 O/S)	0686

LTC John E. Toye
Colonels Assignments
Ext 7873

LTC Warren J. Walton
Branch Chief
Ext 9696/9658

MAJ Thomas M. Montgomery
Captain Assignments
Ext 9696/9658

MAJ(P) Timothy J. Grogan
Majors Assignments
Ext 0686

CPT Peter J. Schoomaker
Lieutenant Assignments
Ext 9696/7849

MAJ G. Wayne Tingle
Aviator Assignments
Ext 9696/9658

MAJ Carlton H. Smith (Specialties 14, 51)	0687
MAJ William E. Bailey (Specialty 15)	0686
MAJ Gary E. Woodham (Specialties 21, 49, 52)	8108
MAJ Bernard J. Greenwell (Specialties 25, 26, 27, 28, 72)	8109
MAJ Walter N. Ferguson, III (Specialties 31, 46, 53)	8108
MAJ Harry E. Cryblskey (Specialties 35, 36, 37)	8107
MAJ Henry B. Quekemeyer, Jr. (Specialties 41, 42, 43)	8122
MAJ James E. Chambers (Specialties 44, 45, 47)	8122
MAJ Robert A. Vogel (Specialty 48)	8607
MAJ Walter M. Smith (Specialty 54)	8113
MAJ James M. Erickson (Specialties 73, 74, 75, 76, 77, 91)	8122
MAJ Jerald G. Knudsen (Specialties 81, 82, 83, 92, 93, 97)	7123
MAJ William J. Blair (Specialties 86, 87, 88, 95, 71)	8121
MAJ Ned W. Bacheldor (H/S)	0686

Mr. Leo L. Leal—Accessions	**9696/7849**
Mrs. Barbara Vereen—Secretary	**9696/9444**
Mrs. Paula D. Leak—Secretary	**9696/9444**

PROFESSIONAL DEVELOPMENT/PERSONNEL ACTIONS BRANCH (DAPC-OPE-P)

NAME	POSITION	EXT
LTC Jack T. Clark	Chief	0701
MAJ Richard F. Timmons	Specialty Coordinator	7820
MAJ Haspard R. Murphy	Military Schools	7820
MAJ Edward R. Bryan	Civil Schools	7818
MAJ James M. Glass	Aviation Mgmt	7818
CPT Everett L. Roper	CPT File Eval A-H	0701
MAJ Joseph W. Fitzpatrick	CPT File Eval I-P	0701
MAJ Kenneth W. Simpson	CPT File Eval Q-Z	0701
CPT Peter Krafinski	LT File Eval A-K	0701
CPT Maurice Alexander	LT File Eval L-Z	0701
Mrs. Hilda Gross	Branch Transfer, Resignation, REFRAD	0701

(continued from page 29)

COMPLETE THE RECORD OERs

The intent of this optional OER is to provide rating officials an opportunity under restrictive circumstances to submit a report on officers who are under consideration for board selection; however, based on the quantity of erroneous submissions, the restrictions are not understood fully.

- Complete the record OERs may be submitted only on officers under consideration for promotion in the *primary zone.* Reports on officers in the secondary zone will not be accepted.
- The period of the report must *equal or exceed 120-rated duty days.*
- The *thru date* of the OER is established by HQDA and is specified in the *DA message* which announces the promotion board. The 120-rated-duty-day minimum mentioned above must have been achieved or exceeded as of the *thru date* specified in the message announcement.
- The report must be the *first OER* received *in the duty position* for which the report is being rendered. This requirement may be waived only if an officer's performance *displays a marked change*—either improvement or decline—since the previous report in that position. In this case, the reviewer (or general officer when no reviewer is required) will attest to the marked change in performance in an accompanying inclosure to the OER. *(FOCUS, number 27-76, 22 Oct 76)*

ARE YOU IN THE NET?

If your career manager doesn't have your current home and duty addresses and phone numbers, drop a quick *note* or *postcard* in the mail or include them on your *next preference statement.* Career opportunities sometimes arrive with short reaction times, and it really helps your career manager to better serve you by staying "in the net." It's just another way you can help us help you!

NEW MILITARY EDUCATION CODES FOR OFFICER RECORD BRIEFS

New military education level (MEL) codes are now being used in section VI of the officer record brief (ORB), according to MILPERCEN officials.

The codes identify officers selected for or deferred from attendance at either senior service (SSC) or command and staff college (C&GSC). Nonresident graduates, constructive credit recipients and graduates of approved foreign equivalent C&GSC courses now receive the same MEL codes that resident staff college graduates receive. Codes that previously reflected course completion in a nonresident status have been dropped. These codes now conform with the sequential coding used for civilian education levels (CEL), with the lower numbers designating higher education levels. MILPERCEN officials point out that the granting of an equivalent MEL code does not preclude later attendance, if selected, at residence courses.

Section VI of the ORB further indicates the school or college which the officer attended to obtain the MEL. Subcodes posted on the officer master file (OMF) trigger identification on the ORB of the school or college.

The OMF will be updated using the new codes when officers are selected for resident staff or senior service college-level schooling. Those selected to attend the resident course the following academic year will be coded as graduates (code 1 or 4).

Attendance of some officers at the Army War College (AWC) and C&GSC will be deferred because of current stabilization requirements. Officers must complete at least 24 months of a CONUS tour or five-sixths of an overseas tour before the course starting date, or be in the last year of eligibility for the school before they can PCS for schooling. For SSC, the criteria are completion of 24 months of a CONUS/overseas long tour or five-sixths of a short tour. Those officers deferred will be coded as selectee deferred (either code 2 or 5).

Automated procedures will be used to enter selection and completion codes for officers in the AWS corresponding studies (AWCCS) program. Award of MEL 1 for this program will be made only after graduation is certified by the college. MEL 4 will be awarded upon certification that nonresident C&GSC has been completed.

The modified MEL codes and meanings are:

MEL CODE	MEANING
1	**Senior service college graduate, including foreign SSC, Army War College Corresponding Studies (AWCCS) graduates and constructive credit awards.**
2	**Deferred SSC selectee, foreign and U.S.**
3	**AWCCS selectee.**
4	**Staff college-level graduate, including resident, nonresident, constructive credit and foreign school.**
5	**Deferred staff college selectee.**
6	**Branch advanced course graduate, resident or nonresident.**
7	**Branch basic course graduate, resident and nonresident.**
8	**Specialist course graduate, resident and nonresident.**

EPMD

VOLUNTEERS SOUGHT FOR ATTACHE DUTY

Two and three-year Defense Attache assignments are available in 40 countries for interested middle-grade NCO volunteers in the administrative field (CMF 71) or those who have had administrative experience.

MILPERCEN's Enlisted Personnel Management Directorate (EPMD) currently is accepting applications from soldiers in grades E5 through E7 for these vacancies. Selected volunteers will receive approximately 6 months on-the-job training (OJT) for the award of MOS 71S, Attache Specialist, and will receive Defense Intelligence Agency and language training when required. Upon completion of attache duty, MOS 71S may be withdrawn or awarded as a secondary MOS, and the soldier's former PMOS will be restored.

The critical prerequisites for attache volunteers are:

General Technical (GT) score of 100 or higher,

Clerical score of 110 or higher,

Defense Language Aptitude Test score of 20 or higher,

Enlisted Evaluation Report Weighted Average (EERWA) above average for grade,

PMOS test score of 100 or higher,

Typing ability of at least 45 words per minute,

Possess or be eligible for a TOP SECRET clearance and Special Intelligence access, and

Applicant and spouse must be U.S. citizens (by birth or naturalized).

Also, due to extensive participation in military activities and social obligations, most attache vacancies require married applicants. Although the above criteria are waiverable, keen competition for attache positions usually results in waiver applications being denied.

Additional qualification criteria for both the soldier and any authorized accompanying dependents are contained in AR 611-60, Assignment to Army Attache Duty. This regulation also contains application procedures and a list of countries available for assignment.

After thoroughly reviewing AR 611-60, interested volunteers may forward their applications through command channels to the Commander; U.S. Army Military Personnel Center; ATTN: DAPC-EPM-A; 2461 Eisenhower Ave; Alexandria, VA 22331.

COMMON EER/SEER ERRORS

The Enlisted or Senior Enlisted Evaluation Report (EER or SEER) probably is the most important document in an enlisted soldier's official and branch files. In addition to being used in the assignment process and during promotion and schooling selection proceedings, the reports also are primary source documents in considering overall performance to determine whether or not the soldier warrants retention under the Qualitative Management Program.

Nevertheless, nearly half of the reports received by the Enlisted Records and Evaluation Center (EREC) contain errors; more than one-third must be returned to the MILPO for correction.

Identifying and returning erroneous ERRs/SEERs is a time-consuming process that not only delays incorporation of the report into a soldier's file, but also delays computation of the soldier's Evaluation Score.

In the interests of obtaining support from the field on reducing the number of erroneous reports received, EREC has outlined the following recurring problem areas:

• *Erroneous "Thru" Dates* in the Period of the Report section (Part I, section H) are the most common errors on the report. If a gap exists between the old and new reports, EREC's computer will reject the report and wait for the missing report. In this case, and in the case of overlapping report dates, the reports will be returned for correction. Soldiers and MILPOs may verify the dates of the last EERs/SEERs by checking section V, Item 62 of their last DA Forms 2.

• *Missing information* includes omission of personal data in Part I, the lack of the rater's or indorser's authentication in Parts III and IV, and missing or incomplete MILPO certification in Part VII. These elements must be complete and accurate or the report will be returned for additional action.

• *Incorrect scores* in Part II, section E, F, G and H usually are the result of simple addition or division mistakes. Rating officials also should insure that individual numerical scores coincide with the appropriate mark sense scores.

All persons involved in the rating process—from the rated soldier to the reviewer—should check the report for accuracy and completeness before forwarding it to the servicing MILPO for final review and authentication. This combination of soldier, rating official and MILPO reviewing procedures will greatly reduce the number of reports being returned for correction and will insure rapid incorporation of the report scores into the soldier's file and Evaluation Score.

NCO NONRESIDENT COURSE

Outstanding Senior Active Army, Army Reserve and Army National Guard non-commissioned officers can take a giant leap forward in the NCO Education System by taking the challenging non-resident course of the Sergeants Major Academy, Ft. Bliss, TX.

Successful completion of the two-year non-resident course counts equally in competition with senior NCO's who complete the 22-week resident course.

Recent changes in selection requirements allow promotable Sergeants First Class (E-7) to apply for the nonresident course.

All selections for the nonresident course will be determined by a special panel at Department of the Army.

Another significant change in the program is that applications will be returned to those not selected with instructions to reapply next year if still interested. This will insure the selection board has the benefit of the most current information for each applicant and reaffirms the applicant's interest.

Students are required to attend a 2-week resident session prior to graduation.

The course emphasizes leadership and human relations, resource management, military organization and world studies. A significant segment of the nonresident course is the requirement for assignments answered on audio tape.

The U.S. Army Sergeants Major Academy is accredited by the Southern Association of Colleges. Many colleges recognize up to 18 semester hours of undergraduate credit for completion of the course.

Active Army personnel may apply by letter through channels to: Commander, MILPERCEN, ATTN: DAPC-EPZ-HA, 2461 Eisenhower Avenue, Alexandria VA 22331.

Army Reserve personnel should apply on DA Form 145 through channels to HQDA, ATTN: DAAR-OT, Washington, D.C. 20310.

Army National Guard personnel should apply on NGB Form 64 through channels to: Army National Guard Schools Branch, ARNG Operating Activity Center, Building E4430, Edgewood Area, Aberdeen Proving Ground, MD 21010. ▲

The Individual Soldier

by Major E. V. Sumner

In the present, we have the daily actions of men immediately surrounding us, and we are called upon to determine what our fellow soldier is by what he says or does. We are sometimes led to doubt the loyalty of our most intimate friends and are distrustful of all. This should not be the case with soldiers, for in all our undertakings, we are so entirely dependent upon each other that, to insure success, we should know and trust. Wilkison, in his "Life of a Private Soldier," says, "No matter how brave a veteran soldier may be, he relies on the men on either side of him to stand there until they fall. He relies on them to accompany him in the advances and to be by his side when slowly falling back before a superior force. It is essential that a soldier hears the voices of his comrades when he is charging. He must know that his comrades are as staunch fighters as he."

The past is "as a tale that is told," and its burdens now rest upon the men of our time. A proportionate share of responsibility is thrown upon every officer and enlisted man in the service today; but the portion allotted each of us is so slight that we are apt to think little of it, and, entertaining only a vague idea of our individual obligations, we scarcely realize their importance until we are aroused by some extraordinary occurrence. It is then that those who are unprepared prove to be failures and better men come to the front.

It is hard to make a young officer, who is living an easy life, following beaten paths, believe in responsibility until it actually comes upon him. It is difficult to impress upon the young enlisted man the fact that some of the characteristics of a good soldier must come from beneath his own blouse and must be contained in his own actions.

There are few men whose capabilities extend in all directions, and those who have had a certain amount of experience in life are apt to doubt any man's doing all he advises others to do. In other words, it is quite an easy matter to indicate what a soldier ought to be, but quite another to be one. We will, therefore, leave for abler pens the subject of what the soldier should be, and will look at him as he is, as we find him and see him every day. There can be no reason why the personnel of the Army should not be discussed with quite as much interest to the service as discussions held upon arms, ammunition and other material. I approach the subject, however, with the knowledge that many officers think there can be no improvement made in this respect; that their men are all good men, and not to be improved upon; hence, they are disposed to let well enough alone. On this principle, flintlocks and paper cartridges were good enough. Why change to breech-loaders and metallic shells? While it is true that a majority of our enlisted men are of the metallic sort and have the proper ring about them, still some are of the paper kind, good when not drunk; good if everything is all right, but not to be depended upon in bad weather.

It is in support of the reliable men we now have in the service that reform is required; that those men who are not worthy to wear the uniform, and who lower the standard of the enlisted soldier in the eyes of the community, should be rooted out and kept out. No man should be accepted as a recruit who cannot bring credentials or show good character by testimony of reliable persons. When this rule is once adopted and known throughout the country, a better class of men would undoubtedly present themselves for enlistment.

Few good men enter the service, I imagine, without giving the matter some thoughtful consideration; if, then, the character of the occupation can be raised to a point where all thought of degradation is out of the question, it would

doubtless have the double effect of inducement to good as well as hindrance to bad men.

But with all due care and taking every precaution, we are bound to get bad characters occasionally; men who develop evil tendencies after enlistment. Such men should be discharged at once, instead of being kept in service and ordered to be disciplined. I do not believe that any amount of Army discipline will correct a morally bad man; nor do I look upon the Army as a training school for morals, the discipline of men for our purposes having altogether a different bearing. We enforce discipline in order that men shall be brought to render effectual service in time of need. Each soldier, therefore, should be treated as an individual in whom the government has taken a special interest and intends to improve and develop for its own benefit.

Bancroft says: "The object of all earthly experience is to develop the value of the individual man; and the object of society, of institutions and of government is to protect the rights and to favor the development of each man of the race." If this is true in regard to society and the institutions of men in civil life, why should not the selection and improvement of the individual soldier add strength to the mass?

The training, government, subsistence and most effective use of men at arms has been the study of the greatest soldiers of all ages.

If there is ever a time in the life of a soldier when he needs care and kindness as an individual, it is on his first entering the service. I presume almost every officer has experienced the feeling of having wasted sympathy on undeserving men. This is one of the experiences of life among men. The unfortunate part of it is that it falls so heavily sometimes upon men who really are deserving. It too frequently happens that officers will not take the pains to discriminate in their treatment of enlisted men, between an intentional or an unintentional mistake. Sufficient allowance is not made for the ignorance of men, nor is sufficient patience exercised in the way of overcoming this ignorance.

Every recruit who joins the Army is more or less unjustly treated, and each has to receive many hard knocks before he reaches a point where he can look for kindness.

The character of the man goes far toward establishing his status and the man who does not possess the necessary firmness to await the time when he can declare himself, deserts. This may account for the large number of desertions from our Army in the first year of enlistment, and as the greater number of desertions take place within that time, the cause may easily be discovered. The men are new to the service and unfamiliar with restraint. They are mixed in with all kind of characters: good, bad, and indifferent. All these trials have to be endured for 3 months or more, and at the end, men who enlisted for certain regiments in the south are assigned to regiments in the north and vice versa.

It would be far better for the new men and for the service, and would decrease desertion one-half if recruits could be enlisted for regiments they select and be sent to their stations, their future homes, with as little delay as possible.

The company is the true and only home of the soldier. In the company, the new man ceases to be a recruit and learns to be a soldier in the shortest possible time. There he has the care and protection of his own officers; the affiliation of comrades wholly in sympathy with his own views; every comfort in garrison that a soldier should have—his own bed and bedding, his private box, his uniform and equipment complete. Whatever he has is under the protection of all and what he lacks is made up to him by comrades, who are closer than brothers. Here there is no deception; the captain is intimately acquainted with every man, and each man has his true value.

The better a true man is known, the more advantageous it is to the man, and the more quickly comes his preferment; the sooner a rascal is discovered, the better it is for the honest men. The finer points of the moral law are not particularly observed by soldiers, but the lines are drawn so exceedingly close on some offenses that the offender has soon to choose between reformation or desertion. It is seldom that a man of any standing in his company deserts. When an occurrence of this kind does take place, his comrades can always give a reason, and it will be found to be not "incident to the service."

The present management of recruits seems to be in contradiction to the requirements of men, making so radical a change in life, from the freedom of a citizen to the restraints of a soldier; I mean the better class of men, the kind of men we want.

It is not to be supposed that a sensible man entering the service as a private soldier will have extravagant expectations, but it would be better for the man and the service if even ordinary expectations were fulfilled, and still better if good and fair treatment exceeded expectations.

As affairs are now conducted, the future for these men, if they behave themselves, has in it a life of comparative ease

and comfort, our soldiers are never overworked, on the other hand idleness is the bane of our Army.

The idleness of our soldiers in barracks is the cause of many disagreeable criticisms and it frequently reaches a point where the soldiers themselves complain of the monotony of their lives, and no doubt not a few desert on that account. We pay so much regard to the matter of having everything outdoors just right for comfort, that we drag along from November to April or May in a state of hibernation, waking up in the spring to find that last year's work has to be done over, and that the enforced idleness of many months render it a labor, all of which might have been saved by a continuance of instruction indoors, when it could not be done outside. The day should be an exceptionally severe one when able-bodied men cannot stand a certain amount of exposure.

When we come to consider the expense of maintaining a troop of cavalry for 6 months, we find that the organization is less efficient on the first day of May than in the November preceding, it looks serious, and when that is multiplied by 120, the cavalry arm, when not efficient, may well be called an expensive luxury. Some troops are in better condition and are far superior to others, but we have yet to see any troop where every man in the ranks is able to perform all the duties of a cavalry soldier. Until all men are so instructed, there is something left for the officer to do.

The cavalry soldier must be trained as an individual, not merely as a unit of a large mass. His individual knowledge and ability must be continually improved and strengthened, while at the same time his power of acting as a fraction in large masses should be kept steadily in view. Thus, as previously said, the cavalry soldier requires to be all he has ever been, together with a great deal more he has hitherto not been.

This theory is deduced from the experience of service in late wars, and it will be seen that the proper instruction of the individual soldier is considered an absolute necessity. To any thoughtful man who is now or may become a troop commander, and who may be called upon at any time to put this theory into practice, or may have the responsibility thrown upon him of gaining important information through the individual troopers under his command, this subject must be of sufficient importance to cause a desire on his part to be prepared.

Some captains are best when left to exercise their own judgment in controlling their men, while others in the same command have to be followed up closely. Some, if the responsibility is thrown upon them, visit their troops and quarters frequently and have a thorough knowledge of everything pertaining to their commands, while others sign their morning reports in bed at the hands of a servant, perhaps, and seldom see their troops. Such an officer not only makes a convenience of his troop but also compels the government to expend money in his pay for which it gets a small return. It is not the intention in this article to touch upon the duties or discipline of officers generally, but where any military system admits of such neglect as has been mentioned, it may be seen that some advantage might accrue to the enlisted man as an individual, and to the government as well, if it were different.

The instruction of the younger officers now going on is one step in the right direction and will doubtless cause all officers to study more than they have been doing, and to inform themselves in order that they may not be left entirely in the rear. But what are the uses of advanced theories if no practical application is made? Wherein is our service to be advanced or benefited if, after we read and study the campaigns of other armies in the field, we close the book and permit the irksome details of our own duties to go on without improvement? In other words, if we expect to make any real advancement, the officers whose duty it is to look after the instruction and improvement of the individual soldier must be at their posts constantly for practical work; otherwise the magnificent theories set forth for our instruction will prove as useless as an idle dream and our superiors, although they may find us well up in the history of the past, may meet with disaster in our not being able to grasp and perform the simple duty required to meet a present emergency. It is useful, as well as ornamental for us to be as well informed as possible, but as subordinate officers, officers directly in command of enlisted men, there can be no doubt where our first duty lies, or what is most important for us to know. Let us then in our search after knowledge, in fields of information more properly belonging to our superiors, not forget to impart some practical lessons to inferiors in whose hands, after all is said and done, lie our success or failure. In peace and in garrision the officer has every advantage, has no anxiety and no fear, the daily routine of his duty goes hand and hand with his comforts and amusements, but imagine the feeling of a captain, who, brought with his troop, suddenly in the presence of an enemy, with a desperate duty to perform, having neglected his duty to his men, now feels a want of confidence in them and they in him. Under like circumstances, the officer who has been true to his subordinates now commands their respect and affection as well as full obedience, and has in that sufficient strength to enable him to engage the enemy with every confidence of success.

The best and strongest of us require encouragement occasionally, and when it comes from a superior it seems to have double weight. The soldier who never gets a pleasant word or receives the benefit of a kind act from his captain will not be likely to do more than he is compelled to do and will escape that if possible.

Strict justice to all, kindness to those who are trying to do well, firmness with those who try to do wrong, should be the rule.

There is no intention in this article to underrate the rank and file of the Army. The heart of every true soldier, whether he is officer or private, goes out to his brother in arms, in the ranks or out of them, provided only he be true, so that the individual soldier, when he can respect himself, and, when he performs his duty faithfully, need have no fear of the criticisms of any man.

The foregoing article appeared in the second issue of the ***Cavalry Journal*** *in July 1888. It is reprinted in* ***ARMOR*** *with the thought that today's Army, like the society from which it springs, has become so enmeshed in and infatuated with technology and gadgetry that its leaders, commissioned and noncommissioned, sometimes overlook the Army's most valuable asset—the individual soldier.—ED.*

AN EFFECTIVE MOBILE RESERVE

Although 1985 seems like the far distant future, it is rapidly approaching insofar as the introduction of any new equipment, logistics concepts, or tactical doctrine is concerned. If any of these are to be available in that time frame, the ground work must be initiated as soon as possible.

In reviewing the high-low mix concept proposed for the *XM-1, M-60* Tank Fleet, even after all of the programmed *XM-1s* have entered the inventory in about 1990, it is evident that the *XM-1* will have to be used to counter the most severe threats. There will simply not be enough of these new tanks to spread them effectively over the entire combat area.

In the history of combat, the first attack is many times just a feint to get the initial forces of the enemy committed, and the true main effort may not be evident for several days. It thus is essential that our doctrine for utilizaton of the *XM-1* constituting only about 1/3 to 1/4 of our tank force, be carefully examined.

True, we can position our "Sunday Punch" based upon the best intelligence available and our estimates of the situation, but the enemy does not always agree with these estimates. Many times we are forced to move units through great distances to reinforce in the area of his main effort.

The proposal for a truly *Mobile Reserve* that I would like to put forth is not a new one, however the state of the art in both tanks and wheeled vehicles puts a new light on its feasibility. In essence, I would propose to establish a specialized tank unit to be known as a *Tank Company, Mobile Reserve.* This could be the building block unit for battalions or task groups. It is not the purpose of this article to discuss whether this would be a three or four platoon company, nor to propose the number of tanks in each section, but merely to put forth some very basic ideas as to the overall organization and function of a tank unit which could accomplish the mission of a mobile reserve, effectively, over hundreds of miles of frontage.

The basic difference between this company and the normal tank organizations is that it would have organic one tank transporter for each tank in the company. There would also be a five-man crew responsible for each tank-tank transporter combination. Thus the company would have the capability to move over long distances at high rates of speed and have the tanks and crews combat ready on arrival at their point of commitment.

Several countries, including many Warsaw Pact nations

SUGGESTED MILITARY CHARACTERISTICS FOR TANK TRANSPORTER DESIGNED SPECIFICALLY FOR MOBILE RESERVE UNITS FOR XM-1 TANK (NOT IN ORDER OF PRIORITY)

- SPEED OF 40 TO 45 M.P.H. ON LEVEL ROADS
- SPEEDS OF AT LEAST 35 M.P.H. UP TO 5-percent SLOPE
- CAPABILITY OF NEGOTIATING 15-percent SLOPE AT 15 M.P.H.
- BASIC DESIGN PRIMARILY TO CARRY LIVE TANKS
- POWERPLANT AND OTHER COMPONENTS LOGISTICALLY COMPATIBLE WITH XM-1 TANK INSOFAR AS PRACTICABLE
- MINIMAL OFF-ROAD CAPABILITY
- SPACE IN CAB FOR FIVE CREWMEN
- MAXIMUM USE OF ALL TRACTION AIDS FOR OPERATION ON ICE AND SNOW
- OPTIMIZED TO CARRY XM-1 TANK, NO COMPROMISE TO TRANSPORT OTHER VEHICLES
- AS SMALL AND LIGHT AS POSSIBLE CONSISTENT WITH RAM-D REQUIREMENTS
- COMPATIBLE WITH STANDARD ROAD WIDTH AND BRIDGING EQUIPMENT
- MAXIMUM USE OF COMMERCIALLY AVAILABLE AUTOMOTIVE COMPONENTS SUCH AS DRIVE TRAINS AND AXLES TO LOWER COST

Table 1.

have used this concept in a somewhat less formal manner. They generally have about three times the number of tank transporters per 100 tanks than we do.

This tank transporter would be somewhat different in concept and employment from our present heavy equipment transporters (HET). The present HET is primarily a vehicle to transport disabled combat vehicles and other types of heavy equipment. As can be seen from Table 1, the proposed transporter will be extremely mobile, and in many areas, a much more special purpose vehicle than the existing items.

The horsepower requirements to meet some of the characteristics, based upon very rough calculations could be as high as 1,200 for short periods of time. This is feasible with today's state of the art engines and transmissions. Ideally, the transporter would be powered with a de-rated engine of the same type utilized in the *XM-1* and make maximum use of other components of that vehicle. The elimination of requirements for extensive winching systems, off road capability, and requirement to carry other loads would decrease the cost of the tank transporter. Another point is the lower fuel consumption required to move the unit over long distances. The transporter uses much less fuel per mile than a tank at the same speeds.

What then would this type of organization give the field commander for the trade-off of the added number of tank transporters, and the additional personnel to drive and maintain them? It would give him a truly mobile unit of his first line fighting vehicles which would be in a constant state of readiness, and that could be deployed at a speed of about 40 miles per hour to any part of the combat zone. It would also give him the knowledge that his tank crews were fresh, and that their vehicles would be ready to be offloaded and enter into combat immediately. They would be completely fueled, have full stowage, including ammunition, water and rations to initiate a full battlefield day. He would also know that his tank-tank transporter crews were trained as a team and would not have to depend on any other unit to get to their area of committment.

This concept would not be inexpensive, but could be very combat and cost effective. It would allow one reserve unit to substitute for several as now constituted. It would allow the commander to make his decision to commit his reserves later in the battle, when the situation is more stable.

True, this unit would be road bound to a certain extent, but with the excellent highway and secondary road networks in the areas of probable employment, as well as the increased capability in our forces to bridge obstacles and keep lines of communication open, this could be a smaller problem than it first appears. Also with our improved night vision equipment, many of these high-speed moves could be made during the hours of darkness.

In summary, I would not propose that every *XM-1* company be organized as I have described above, I would not even hazard a guess as to how many of them should be in the force structure. However, I feel that the introduction of the effective, sophisticated and expensive *XM-1* into the inventory forces us to run system analysis studies for the best means of properly utilizing this weapon in combat, and would propose this *tank company, mobile reserve* as an extremely promising alternative to be included in these studies.

GEORGE A. TUTTLE
Colonel, USA (Retired)

DO SOMETHING ABOUT THE OER!

Having commanded a personnel service company and being branch detailed to AG, I have perhaps a better perspective on the supposed inadequacies of the OER system than most Armor officers. As the article by Colonel Bahnsen and Major Highlander makes clear, the ratings are now so inflated that your future career rests heavily on the literary ability of your rater. Face it: the average score for any officer you don't want to destroy is virtually 200. Aside,

possibly, from second lieutenants, any adverse comment you make in block IV will have a career-stopping effect and no amount of exceptional skill in one area can be rated highly enough to offset any minor deficiency in another. The officer who is a uniform gray is completely safe, while the inspiring but tactless, diligent but untidy, or brilliant but overweight officer either sees his flaws glossed over or gets the axe.

Furthermore, the OER is a field day for the spiteful or prejudiced rater, who can easily damn-with-faint-praise any subordinate who has put duty ahead of currying his favor or who has the wrong race, religion, or politics. Underinflation can arise from honest raters who do not know how bad things are, or from blind supporters of the system that attempt to turn back the tide—at their supporter's expense. And how many times have we heard of the officer passed over for lieutenant colonel because of bad reports received as a second lieutenant? But I have said nothing you have not heard before.

It is clear from the pages of *ARMOR* and other publications that not one officer in 20 has faith in the OER system and yet, in spite of this overwhelming concensus, nothing is done about it. Perhaps this is because no one has suggested an alternative solution. If that is the case, I would like to launch the following trial balloon: SCRAP IT!

Instead of redesigning DA Form 67 yet again to include more questions or more narrative, round boxes to shade in, lists of adjectives to check off, or issuing more detailed instructions or more emphatic warnings not to inflate: SCRAP IT!

Abandon entirely the concept of centralized promotion which demands the OER and which has become little better than random selection. Replace it with decentralized promotion at the battalion and division level for company and field-grade officers. Establish the rating of lieutenants as a major responsibility of the battalion S-1 and empower the battalion commander to promote to fill vacancies within his command, subject to time-in-grade/educational requirements. Likewise, divisional commanders would be authorized to promote to fill vacancies at the field-grade level.

In both cases, the responsible commanders would have a powerful motivation to look closely at their subordinates nearing promotion and would be in a much better position to do so than some disinterested officer at DA.

General officer promotions would remain at DA but would not require OERs in addition to all the other information available on the career of a prospective general.

Some may object that this system would be more subject to abuses of power than the present system. This was, indeed, true of the regimental promotion system which the OERs replaced. But the conditions of the 19th century no longer hold true; an officer will not be permanently assigned to one battalion or division and remain there, eternally blighted by its commander's displeasure. Rotation assures that every officer gets only an equal chance at bad raters. Under the proposed system, a good officer's career could be held back by the whims of his commander for the duration of that tour; but, under the present system, a good officer's career can be effectively terminated by every rater he encounters.

I expect that a barrage of comment will shortly descend upon me. Hopefully, when the smoke clears, some alternative to the OER will remain.

DAVID A. WESELY
Captain, AG

Fort Snelling, MN

TANK MACHINEGUNS

There have been many attempts to find the ideal secondary armament for a tank. Throughout the history of armor, two things become apparent. First, a tank without machineguns is dead; second, a tank with unreliable machineguns has no machineguns.

Commanders are proud when their units qualify high in gunnery, but if we consider how many of those tanks made it on "borrowed" machineguns, we are forced to admit that many of those scores do not reflect the true picture of the unit's ability to perform.

The best news in the past year has been that *M-73*-series/*M-219* machineguns will be retired after their long and markedly dismal careers as coaxes. A refreshing change in weapons procurement has finally agreed to adapt the *MAG-58* as the new coax. My only hope is that the powers that be who will decide on its final design will opt for the 1-millimeter-thicker receiver that the Swedes use on their version of the gun.

In retrospect, however, there is some valuable experience that must be used to prevent similar catastrophic failures, such as the *M-73/219,* from recurring.

While lightweight is an admirable quality for a machinegun designed for infantry use, it is of negligible value for the tanker, the reason being that current manufacturing techniques achieve lightweight through the use of stampings or investment castings. Neither of these methods provide a receiver that is exceptionally strong nor do they provide for long wear. They provide materially an ease of large-scale production, cheap manufacture, and light weight. Their biggest shortcoming is that they are not durable.

Examples that may be cited as "successful" stamped receiver guns are the *MG-34, MG-42, FG-42, RPK,* and

M-60. All of these weapons are primarily squad-level infantry weapons where they provide maximum firepower for minimum weight. It must be noted, however, that the amount of machinegun ammunition that can be supplied by the squad is relatively small in comparison to the amount that can be even reasonably carried by the tank. The useful life of those weapons is reached when the replacement of all component parts, except the receiver, fails to correct chronic malfunctioning. Even pegging an estimated life of 40,000 rounds to reach this point (although experience with ACAV and helicopter-mounted *M-60's* indicates 10,000 to 15,000 to be more realistic), it can readily be seen that while that may be a lot of ammunition for a grunt, it is not much to a tanker. The *M-73*-series weapons cannot be compared on the same terms because the receivers of the aforementioned weapons are only there to "hold parts," while the *M-73/M-219* receiver contains opening and closing cams and a rate control mechanism which are critical to functioning but are actually carried by a component that is easily the weakest in the gun, most susceptible to distortion by heat or mechanical damage. Thus, the first conclusion we must come to is that a stamped receiver is inappropriate to a tank-mounted or other "heavy-use" machinegun.

The investment casting is a relatively new technique and currently is only used on the *M-16.* The *M-16's* (AR-15's) 7.62-mm predecessor, the *AR-10,* had a LMG version, as did the Colt *CAR-15* weapon's system, but in neither of these machineguns did the process prove itself. Also investment casting is a relatively sophisticated technique, suitable only to weapons used by a country with sufficient industrial base to permit manufacture on a mobilization basis.

Another design characteristic of successful machineguns, something the *M-219* lacked, was simplicity. Although simplicity of itself neither assures the reliability of a gun or its popularity with the troops, it helps. The *MAG, M-60, MG-42,* and *RPK* are all simple weapons that are popular with the troops that have used them. The *Maxim, Vickers* (a modified *Maxim*) and *Madsen* were popular with the troops also, despite their complexity, because of their utter reliability. The last weapon to receive the same notoriety among American troops as that of the *M-219,* was the French *CSRG* (*Chauchaut*) that was issued to the American Expeditionary Force (A.E.F.) in World War I, despite the fact the Browning Automatic Rifle (*B.A.R.*) had been issued to the U.S. forces.

The complexity of the internal mechanism is still a grave design consideration. Early in World War I, the Colt manufactured version of the *Vickers* machinegun was phased out of the U.S. inventory in favor of the *M-1917* series Browning because the *Vickers* action was difficult to manufacture. The simpler Browning was easier to make in quantity and simpler to maintain. The basic Browning design remained as our rifle-caliber machinegun for 40 years. Other weapons, due their simplicity in design, which have remained popular through the years are the *MG-42* (currently in use in FRG as the *MG-3*), *M-2* .50 caliber, and *MAG-58.*

Before somebody claims that the *MAG-58* is a "new" weapon, it should be pointed out that it is a belt-fed variant of the type D automatic rifle, which was a quick-change barrel, Belgian copy of the *M-1918A2,* commonly known as the Browning automatic rifle (BAR).

The basic premise of this piece is to show that among the design criteria for a tank-mounted machinegun, certain factors must be included. They are, in order of importance:

- Utter and complete reliability
- Ruggedness of design and manufacture
- Simplicity in operation and maintenance, and ease of manufacturing.

The overall rating is *not* necessarily a sum of the parts. A gun may be so reliable that other factors are relegated to minor importance.

EMIL M. DULAR
Sergeant First Class
Master Gunner

Fort Knox, KY 40121

RETENTION OF NON-WATER WALKERS

Several years ago (it seems like a lifetime), in Vietnam, my deputy and I were chatting over a beer at the end of the day in a lazy Mekong Delta District Compound. He made a comment I've never forgotten. He said that he had no other aspirations in the Army but to be a Captain and to command an infantry company. Tom was a perfect Captain: bright, witty, exquisite physical condition, hard working—a born leader. Unfortunately, he had some of the other attributes which could have nipped his career in the bud: he was a bachelor, a hell-raiser, lacked a college degree, and had absolutely no interest in those facets of Army life which he considered unnecessary. Unfortunately, a Viet Cong bullet ended Tom's career a few months after our discussion. I have often wondered as I have prayed for Tom and thought about him: what would have happened to him if he had been allowed to continue his career? Always my thoughts return

to the hard fact that Tom would have probably gotten caught in a reduction in force (RIF) or been passed over twice for selection of Major, and his career would have been abruptly terminated after years of faithful service, many of them in combat.

There are literally thousands of officers like Tom who have been brave in combat, devoted to duty, loyal, and all around good soldiers, yet whose careers were terminated by the stroke of a pen instead of a Viet Cong bullet. The men I am referring to are the thousands of casualties of the peacetime Army who have experienced the anguish and rejection of a Reduction in Force (RIF) or a second passover for AUS or RA promotion which has resulted in involuntary termination of their military careers. Virtually no officer ever leaves the Army feeling complete satisfaction. The Colonel who didn't make Brigadier, the Brigadier who wasn't selected for Major General, all face lingering doubts at retirement that they could have done better if it weren't for some SOB they ran into somewhere along the line. Far worse is the case of the officer who is involuntarily separated—he leaves behind him a sensation of having failed in his chosen profession and the unhappiness and dissatisfaction that comes from being fired.

Now obviously the Army has no reason, nor need, to continue the services of those officers who have been proven to be noneffective. There are, however, countless officers who have served well but who, for one of many reasons, have fell afoul of someone who "did them in" on an efficiency report and have had to leave the service. It matters not whether they have served under a number of different leaders on various battlefields who have been very satisfied with their work, however, the fact that one man or in some cases, two, have for some reason marked them down and has resulted in termination of their service.

Before proceeding, a comment on efficiency report writing might be in order—raters, make a choice! If you want a man to stay on active duty, whatever you do, take care of him. Rate him high—as high as he deserves. Remember 'superior' on an OER means 'marginal.' If you don't believe he should remain on active duty, *say so.* Stand up and be counted. Let the guy know it's time to write resumes and check the want ads. Help the selection boards make the choice which you believe is in the best interest of the service.

Having said that, what can the Army do to segregate the non-water walker, the guy who occupies the big "bell" portion of the bell curve, from the marginal performer? I believe a great deal. When the crunch appears to occur, most officers are terminated while in the grade of captain and, to a lesser degree, major. Ironically, in most units these are the two grades which are in the shortest supply, and are most necessary. These officers are the classic mid-level managers of the Army. A number of them, when faced with the option of having to involuntarily terminate their service or stay on in their present grade would opt, very willingly, to remain on in their present grade and would serve well. Why should every officer be expected to have promotion potential in order to serve in his present grade? This philosophy overlooks the fact that many people do excellently in their jobs and have no aspirations to go any higher. Now bear in mind, I am not trying to state that we need a bunch of mediocre performers in the officer ranks. There are a number of people who do well and don't have the inclination, drive, or ambition to serve in higher ranks whom the Army needs to do the ordinary jobs that make the Army run. With all our sophisticated selection techniques, I am sure there are methods to separate those who should serve in their present grade and those whose services should be terminated. I offer the following proposal to see if we might get back on track and retain these captains and majors who can do well as captains and majors and who need not be considered for advancement with contemporaries:

- Allow the selection boards for AUS promotions to come up with three categories: those selected for promotion, those not selected for promotion, and those selected for retention in grade. Not a new idea, you must admit, for we did this during Vietnam and before. The new approach is this: an officer selected for retention in grade should be offered a contract with the Army to serve in his present grade for a period of 2, 3, 4, or even 5 years. The contract will state he will remain in his present grade, not be selected for future schooling, and not be considered for promotion or reassignment, but will be allowed to serve for the period of the contract, provided his service continues in a satisfactory manner.
- Upon reaching the end of the contract period, consider the individual again for promotion. Once again, three options would remain open: promotion, passover (and, consequently, release from active duty), or selection for retention in grade for another period. The advantages of this are obvious. The individual continues to strive in his present job, the Army does not waste a lot of money on severance pay and retraining a replacement and the individual realizes that his work in his grade will be recognized and he may continue on and be afforded the job security, which is of course, just about everyone's basic desire.
- An officer who has received a second passover to a Regular Army grade who qualified can similarly be offered a reserve active duty commission in his current AUS grade. At the conclusion of this period, he would, like all other officers, be considered for AUS promotion, elimination, or retention for another specified period.

This system of personnel management should go a great way toward improving the standards of professionalism within the officer corps. We will have more experienced captains and majors because some will be individuals who are serving under specific, passover, active-duty contract. The officer will realize his own potential and, if he can work successfully as a professional captain and major, as do professional soldiers in many armies throughout the world, will be happy in his own work and a credit to the service.

I do not proclaim to be a personnel manager—my chosen field is logistics. However, I have seen the heartbreak of too many fine young officers who have run afoul of someone early in their careers and have paid the price by being involuntarily separated from active duty. What we must do is recognize the fact that not every officer is capable of advancement, *wants advancement,* or would serve the Army best in the next higher position. If we realize this, the Army will be better, the Officer's Corps will be happier, and the level of experience of our junior officers will increase.

CYRIL W. APPEL
Lieutenant Colonel, Armor
Fort Knox, KY 40121 ▲

IMPROVED *CHIEFTAIN* FOR IRAN

Last year, British Secretary of State for Defense, Roy Mason, announced the development in the United Kingdom of a completely new type of armor which he said "represents the most significant achievement in tank design and protection since the Second World War." At the same time, he made an announcement concerning development of an improved *Chieftain* for Iran, as a follow-on to that country's order for more than 780 *Mk5P* models of the British main battle tank, placed over 4 years ago.

The order will include spares and logistic support, as well as over 1,200 of the tanks being fitted with the new armor. The tanks will also have the latest fire control equipment, a new 1,200 h.p. Rolls-Royce engine and a new David Brown transmission, providing a much improved power/weight ratio. The tanks will be called *Shir Iran,* meaning Lion of Iran in Farsi.

The *Shir Iran* will have a somewhat different external appearance from existing *Chieftains* due to use of the new armor, and to a hull which is lengthened and slightly raised at the rear to accommodate the larger capacity cooling group necessary for the more powerful engine. The turret front is considerably more sloped and the sectioned skirt plates are hinged to the chassis, so that there are some outward similarities to the Chrysler *XM-1.*

Armament

While the standard armament will still consist of the 120-mm rifled main gun, .50 caliber ranging machinegun, 7.62-mm coaxial machinegun and a commander's cupola-mounted 7.62-mm machinegun, the *Shir Iran's* main weapon will be capable of firing the latest range of ammunition developed by the Royal Armament Research and Development Establishment (RARDE). The new ammunition consists of:

- Armor-piercing, fin-stabilized, discarding sabot (APFSDS).
- Product-improved, armor-piercing, discarding sabot (APDS).
- High-explosive antitank (HEAT).
- Product-improved, high-explosive squash head (HESH).
- Illuminating.
- Canister.
- Product-improved smoke.

The APFSDS, HEAT and canister rounds are totally new. The former is said to defeat all known and expected new battle tanks at ranges conservatively described as being "in excess of 2,000 meters." The key factors are improved accuracy combined with the greatly enhanced armor penetration of the APFSDS. New core materials and a high energy propellant are also utilized. It is thought that depleted uranium (DU) was seriously considered as core material for the APFSDS.

Work is being carried out at RARDE to significantly improve the performance of the 120-mm rifled gun. Electro-Slag Refined (ESR) steel is being used to increase barrel fatigue life to such an extent that—even with wear-reducing propellant additives—the barrel still wears out before it fails from fatigue. With ESR steel, the equivalent-full-charge (EFC) life of the barrel can be raised by the use of propellant additives (a figure of 400 EFCs has been mentioned in some quarters), and the gun can be fired at higher pressures giving potential for even further improvements in performance. RARDE officials indicated that the muzzle energy of the new APFSDS round fired from the old 120-mm gun is higher than that of the 115-mm fin-stabilized round fired by the smooth-bore weapon of the Soviet *T-62.* Of the ESR steel barrelled 120-mm, officials said that all future tank guns are likely to have a muzzle velocity of over 5,000 feet per second (1,500 meters per second) for kinetic energy rounds. About 50 guns of ESR steel are currently in existence and it is possible that at least part of the *Shir Iran* fleet will be fitted with main ordnance of this material.

The *Shir Iran* will be equipped with the improved fire control system (IFCS) produced by Marconi Space & Defense Systems. A reworked commander's cupola is being produced for the new Iranian MBT's, and it is understood that it is scheduled to incorporate a new combined day/night periscopic sight by Pilkington P.E.

Armor

Armor for *Shir Iran* is the so-called *chobham* armor. Weight for weight, it gives significantly better protection than all existing armors against attack by all forms of antitank weapons. No details on the composition of the armor have been released, but it seems that it could be a variable sandwich of several materials such as steel, ceramics, and aluminum.

Selection of chobham armor has added only 1-2 percent to the overall cost of each tank without appreciably adding to the weight. Thousands of rounds have been fired at representative test rigs of chobham armor proving that it provides adequate protection against all types of round that can be foreseen (including APFSDS). Rounds used in trials apparently also included 120-mm APDS and HESH, HEAT (*Swingfire* and *Sagger*), and 100-mm APHE. Test photographs shown to the press indicated that chobham armor could withstand multiple attacks by all of these rounds, against which the equivalent weight of single plate armor offered no protection at comparable ranges.

Automotive Components

Rolls-Royce Motors is responsible not only for the 1,200-h.p. engine, but for the whole powerpack (engine, transmission, cooling group, etc.), which will be assembled as a complete drop-in unit.

The turbo-supercharged CV12 TCA diesel engine uses no essentially new technology, thus reducing technical risk to a minimum. Though altered to round metric dimensions, components such as cylinders, piston heads, etc. are common to those already operating in thousands of commercial and military vehicles. Maximum military rating of the CV12 TCA has been held to within about 10 percent of current commercial maximum pressures and speed constraints to ensure high reliability. Development of a new cooling group has enabled very low exhaust temperatures to be achieved, even though each cylinder produces 100 h.p.

The requirements for the cooling group were to:

- Remove at an ambient temperature of 52°C the heat dissipated from the new CV12 TCA engine and TN37 transmission;
- Provide charge air cooling.
- Provide an additional 10 percent of the total air volume for cooling auxillaries;
- Provide auxiliary power unit (APU) cooling.

This was achieved by designing a system consisting essentially of two air-to-water radiators, two air-cooled, charge-air coolers and three 15-inch, mixed-flow fans, mounted on top of the drive transmission. A separate fan was required for cooling the APU when used during vehicle silent-watch operation with the main engine off. The mechanical fan drive absorbs a maximum of 98 h.p., at a fan speed of 5,520 r.p.m. or 8 percent of engine output power.

Few details have yet been released on the new Dunlop hydropneumatic suspension system for the *Shir Iran,* apart from the fact that it is a bolt-on system with individual units for each road wheel, having a facility for interconnection if required. It is understood that the units are not of the conventional "in-arm" type.

Condensed from an article in the August 1976 issue of International Defense Review.

THE ATTACK HELICOPTER IN THE ELECTRONIC WARFARE ENVIRONMENT

The capability of the attack helicopter to survive in an electronic warfare environment was tested and proven in a joint exercise by Army and Air Force elements near Nellis Air Force Base, Nevada, recently. It was the first time an attack helicopter element had ever joined forces with the Air Force against an electronic warfare threat.

The exercise pitted the elements of B Troop, 7th Sqdn, 17th Cav, 6th Cavalry Brigade (Air Combat), Ft. Hood, Texas, with Air Force fighters from Moody AFB, Georgia, and Marine fighters from El Toro, California, against Aggressor *F-5* fighters from Nellis AFB. The major consideration of the exercise was how well the joint elements would perform in a mid-intensity environment using today's tactics and equipment.

The 6th Cavalry Bde. fired 14 *TOW* missiles with 14 direct hits. The important factor in this firing is that it was the first time the pilots had ever fired the *TOW* weapon, although they had received extensive training during simulated missions.

The tri-level operation tested how well the attack helicopter element could work as a combined-arms team with ground forces and the Air Force in engaging the same target. The third level consisted of Marine fighters operating with the other two forces as the "watchdogs" of the operation, guarding against enemy aircraft.

The 'hide-and-seek' operation of the *AH-1 TOW Cobra* and *OH-58 Scout* matched sophisticated electronic warfare and communications jamming devices against radar detection, alerting the attack helicopter pilots of radar signals coming their way by sight and sound indicators.

One problem the B Troop pilots encountered was the desert environment. A dark helicopter against a white desert floor is definitely noticeable. However, the pilots soon discovered that by flying NOE in the shadows of the mountains or in tight ravines, the enemy pilots couldn't find them. These NOE tactics also reduced radar detection considerably, due to increased ground clutter on the enemy's radar screens.

The employment of NOE tactics proved to be successful against electronic warfare. Not one *Cobra* attack helicopter was detected on aggressor radar during the 2-week exercise.

The seven attack helicopters were kept at a 100 percent mission-ready status throughout the exercise, while five *OH-58s* dropped to 80 percent for only 2 days. The *UH-1H Huey* was also kept at 100 percent mission-ready status throughout the 2-week exercise; making the aircraft, overall, 97.1 percent operational in the more than 290 mission hours flown.

Lieutenant Colonel Garry Dolin, 7/17th Cav's commander, summed up the joint exercise by saying that it takes all forces working together to get the job done. He also emphasized that Army aviation is not in the close air-support role, but is operating as part of the ground force. This basic concept was tested and proven during the tri-service maneuver.

Widespread use of electronic warfare in military tactics makes it essential that today's Army aviator is as familiar with electronic warfare as he is with his aircraft checklist.

Extracted from an article by SP4 Richard Lamance in The Fort Hood Sentinel.

THIS LAND IS MINED LAND - OR SHOULD BE!

by Major Douglas H. Starr

As the American Army faces the latter part of the 1970's, it does so with what might best be described as a sort of "tactical schizophrenia." It must, of course, stay prepared, and increase preparedness, for the possible large conventional face-off in Europe, Korea, or the Sinai. But it must also apply lessons learned from the agonizing experience in Vietnam toward preparation for the increasing likelihood of future "limited wars." This doctrinal and tactical quandary, coupled with the enormously increasing sophistication of weaponry, demands that we, in the Army, constantly reevaluate our weapons and our doctrine for their use. The new "How To Fight Manuals" are examples, and good ones, of this updating process, but like most changes significant enough to be considered major improvements, they are not perfect. The pages of the Vietnam war are indelibly etched with the grim and painful lessons of the impact of mine warfare on our mobile and most often numerically superior forces.[1] Yet, faced ourselves with a highly mobile and numerically superior force in our conventional scenario, we have failed to apply in our "How To Fight" manuals the devastating simplicity and effectiveness of such a doctrine. *A new mine warfare doctrine—one which is simple, efficient, and viable—is a vitally needed addition to our new Armor and Mechanized Infantry "How To Fight" Manuals.*

Very few would really disagree with the fact that there is a need for a mine warfare doctrine, but a glance at the possibilities of such a doctrine, rigorously applied, should convert tacit acceptance to vigorous support.

America, because of its unique and historically consistent approach to war preparation, has always needed time after the outbreak of hostilities to react. Mine warfare, carefully coordinated with other delaying tactics, can help provide that time. By denying to the enemy the vital high-speed avenues of approach, we cause him to slow his advance in order to seek alternate routes. This change in the speed, tempo, and direction of his offensive can have serious repercussions on his overall scheme of maneuver. We need look no further than to the length of time it took for road clearing operations in Vietnam against a comparatively unsophisticated—if clever—mine warfare effort to appreciate the devastating effects on timetables that such an effort can have.

[1] *Landmine and Countermine Warfare* (Washington, D.C.: Engineer Agency for Resources Inventories, June 1972), Vols. 9, 10, 14, 15.

By denying the enemy the high-speed avenues of approach, by causing him to choose alternate routes, or to expend valuable time in breaching minefields in the face of direct covering fire or observed indirect fire, we have succeeded in denying to him the tactical maneuverability so essential on today's battlefield. This is not a new concept by any means. Faced for the first time with the terrifying reality of an armored tracked vehicle known as a "tank" in 1917, the Germans, in a direct reaction to this potentially decisive new weapon of mobility, used artillery and mortar projectiles "on the ground with the activated fuzes exposed in a manner to contact the tracks."[2]

In its 1965 *Land Mine Warfare Handbook,* the Infantry School called the proper use of mines "one of the most effective means available to the commander for reducing the tactical mobility of the enemy."[3] The brand new FM 20-32 (30 September 1976) updates this concept by observing that mines "can slow down enemy movement, or stop his advance or retreat, to make him a better target."[4]

Some of the direct offshoots of denying tactical maneuverability to the enemy are perhaps more emphatic. With the increased need for high-kill-probability and economy-of-force methods of employing antitank weapons in an environment where we face a large numerical superiority, the canalization of the enemy by use of effectively employed minefields takes on great importance. In TC 7-24, we are told that "mines should be thought of more as a target acquisition tool than as a tank killer,"[5] citing the fact that tests show "the employment of mines increased the effectiveness of one tank defending against five by 20 percent to 60 percent, due not to mine tank kills, but to the mines causing "the attacker to be hit by antitank weapons while he was concentrating on avoiding or bypassing the mines."[7] Thus, by causing the enemy to canalize or to choose heavily defended routes of *our* choice, we not only cost him time but increased casualties resulting from his inability to choose or use covered and concealed routes of advance. This also has far-reaching impact on helicopter and tacair target acquisition factors. The significant reduction in enemy tactical mobility and corresponding increase in the effectiveness of our antitank weapons, capable of being brought about by a well-coordinated mine warfare doctrine, cannot be overemphasized. FM 5-15, *Field Fortifications,* sums up this potential in observing that "the installation of minefields changes favorable terrain to unfavorable terrain and materially enhances the strength of the defense system."[8]

With the phenomenal increase in costs accompanying our continued plunge into sophisticated weaponry, *cost effectiveness* has become an often-heard battle cry; rivaling and, unfortunately at times, preventing such traditional cries as *Follow Me* or *Move Out.* A quick review of the factors leading to cost effectiveness from the standpoint of mine warfare establishes mines as one of our most valuable weapons. A relatively low initial cost, coupled with the capability of being reused time and again if not expended, establishes the mine as unique. Wouldn't it be nice to be able to safely retreive *Shillelagh* rounds or 105-mm rounds that missed and use them again?

While we cited TC 7-24 as emphasizing the target acquisition aspects of mines, the damage potential of mines should not be overlooked, particularly in view of the ease of installation of minefields (especially with the modern automatic delivery systems) and the fact that no friendly casualties need be accepted in the laying of minefields. Cost effectiveness needs to be examined in more ways than how many mines are actually struck by the enemy. How many of our weapons systems can boast of an effective life terminated only by success? Even if the minefield is of the new self-destruct variety, the measurement of mine cost effectiveness that takes into consideration all of the benefits of mine warfare cannot help but conclude that if all of our weapons systems were as cost effective, the term itself would not be as much in vogue as it is today.

An appreciation of one of the unquantifiable, but perhaps most significant, benefits of mine warfare requires some historical perspective. The condemnation, early in the American Civil War, of a general by his own commanders following his unprecedented use of "mines" underscored his departure of what up to that time had been considered gentlemanly and chivalrous warfare.[9] It was only toward the end of the Civil War, when the bitterness, ferocity, and hatred of the campaign reached their height, that mine warfare was endorsed by the commanders of both sides. Mine warfare represented a departure from the American concept of gentlemanly warfare into what might be described as "mind" warfare.

In old FM 20-32 it was noted that "the knowledge that a mine or boobytrap can be emplaced almost anywhere slows down operations and results in considerable time and effort lost in mine sweeping and clearing operations,"[10] but the real impact of this statement is only implied. The time-worn joke about being most worried about the round addressed "To Whom It May Concern" applies in somewhat macabre fashion here. The slowness of the operation and expenditure of time and effort in sweeping for mines stem from the psychologically devastating effects of mine warfare. Sudden, unexpected, and essentially "unrevengable" casualties have an effect on unit morale that can only be fully appreciated by those who have experienced them or who have been able to empathize with the deep age lines of tension and apprehension in the eyes of the otherwise young combat soldiers in Southeast Asia. Mines accounted for "70 percent of all U.S. vehicles and about 33 percent of U.S. personnel casualties through 1970."[11] It is noteworthy that these figures have been increasing steadily from conflict to con-

---

[2]Russel H. Stolfi, *Mine and Countermine Warfare In Recent History,* 1914-1970 (Aberdeen Proving Ground, Maryland: Ballistic Research Laboratories, April 1972), p. 12.

[3]*Land Mine Warfare Handbook* (Fort Benning, Georgia: United States Army Infantry School, November 1965), p. 1.

[4]FM 20-32, *Mine/Countermine Operational at the Company Level* (Fort Belvoir, Virginia: U.S. Army Engineer School, 30 September 1976), p. iii.

[5]TC 7-24, *Anti-Armor Tactics and Techniques For Mechanized Infantry* (Fort Benning, Georgia: United States Army Infantry School, 30 September 1975), p. E-4.

[6]Ibid.

[7]Ibid.

[8]FM 5-15, *Field Fortifications* (Washington, D.C.: HQ, Department of the Army, June 1972), p. 5-5.

[9]FM 20-32, (September 1976).

[10]FM 20-32, *Landmine Warfare* (Washington, D.C.: HQ, Department of the Army, January 1971), p. 6-3.

[11]FM 20-32 (September 1976), p. 135.

flict. World War II statistics indicate 20.7 percent of Allied tank casualties and 3 percent of European personnel casualties were due to mines; Korean statistics indicate 70 percent of tank casualties and 10 percent of personnel casualties were mine induced.[12] Mine warfare is a psychological weapon of immense proportions.

But to establish the need for mine warfare or to emphasize its effectiveness is not the problem. All of the currently emerging new manuals wholeheartedly accept these positive features of mine warfare. The problem lies in the fact that current *mine warfare doctrine* for Armored and Mechanized units is vaguely defined and unrealistically designed to employ these features.

In an April 1972 report on mine and countermine warfare, Dr. Russel H. Stolfi concluded that "acceptable quantitative measures of mine and countermine combat effectiveness, which reflect the reality of war, have yet to be established."[13] Ironically, this is just as today true today, 5 years later, despite our development of mine warfare materiel in that time that far surpasses anything then in our inventory.

To begin with, references to the use of mines in our new manuals are very sketchy indeed and are, for the most part, confined to such comments as that found in FM 71-2 where the soldier is told that "normally the most effective and least time consuming type of artifical obstacle to emplace is a minefield,"[14] followed by a very brief description of a hasty protective minefield, only one of a number of different types of minefields possible. FM 71-1 and FM 71-2 very generally discuss the use of mines in the defense; FM 100-5 discusses *trends* in mine warfare. The Tank Battalion ARTEP and Mechanized Infantry Battalion ARTEP require what is described as "minimum mine emplacement." TC 7-24, perhaps the best of the new literature on the subject of mines, identifies *types* of mines and minefields, but does not suggest *employment doctrine* in any but the very most general of terms. FM 5-100 (Combat Engineer Operations) and FM 90-7 (Denial Operations and Barriers) will contain more detailed information, but from the Engineer standpoint.[15]

A clearly defined mine warfare doctrine for mechanized infantry and armor units is required. It is fine to pay lip service to the importance of mines, but what is needed is a practical program for insuring that importance.

Mine warfare techniques are simply not being effectively practiced at unit level. Maneuver unit mine training is, for the most part, oriented on the individual. Units are seldom required to lay standard minefields or to support Engineers in barrier construction. In fact, over half of the Infantry platoon leaders and company commanders surveyed in September 1976, indicate that mines are never used on field training exercises.[16] Current ARTEPS simply do not require feedback on the proficiency of units in any phase of mine warfare.[17]

While the training that is done is oriented on the individual, that is certainly not to imply individual proficiency. A MILPERCEN Military Occupational Data Bank Survey suggests that an astonishingly few 11E and 11B MOS's are required in their job to lay, mark, record, or detect minefields. Responding to the question, "Which of the following tasks do you perform as part of your job?", a mere 22 percent of 11B's indicated they were required to lay mines, which seems a very low figure indeed until compared with the 3 percent of 11E's responding the same way![18]

Some major contributing factors to this lack of training are the lack of training devices to simulate mines, the lack of anything approaching an adequate number of training mines themselves, and the lack of an effective engagement simulation device that would stress the importance and impact of mines in mobile warfare. Current combat exercises totally ignore realistic mine and countermine warfare practice. Even the costly development of unit and individual skills in mine detection gained in Vietnam is being or has been lost. The individual soldier is not even receiving the rudimentary training in mine warfare that is indicated as necessary in the vague references we *do* have in our manuals. A significant aspect of our defense on the highly mobile battlefield is thus being misunderstood or ignored in training.

The logistical factor of mine warfare training is also being overlooked. Even when practice minefields are actually laid, they are generally small segments or fields not longer than 100 meters. Thus, the all-important logistics system necessary for sustained mining operations has not been exercised.[19] The breakthrough advent of scatterable mines with self-destruct (SD) mechanisms greatly reduces the logistical and counterattack considerations, respectively, which have so long existed with conventional mines. Thus, "properly employed, scatterable landmines provide the commander with a rapid, flexible, and effective" weapons system.[20] The problem, of course lies in the term "properly employed." The current system of employment, which can be only sketchily accumulated by examination of all of the incomplete references to mines in our inventory of manuals, is based on what must be described as dangerously optimistic assumptions.

---

[12] Ibid.

[13] Stolfi, p. 2.

[14] FM 71-2, *The Tank and Mechanized Infantry Battalion Task Force* (Fort Knox, Kentucky and Fort Benning, Georgia: U.S. Army Armor School and U.S. Army Infantry School, 6 July 1976), p. 5-46.

[15] Col. John C. Bahnsen, *Mine Warfare Doctrine for the Maneuver Forces*, to General DePuy, 30 August 1976.

[16] Survey taken by TRADOC as part of statistics accumulation for countermobility study (LTC Quinn).

[17] Ibid.

[18] MILPERCEN Military Occupational Data Bank Survey. Results obtained from TRADOC Countermobility study data.

[19] TRADOC Survey, Countermobility Study.

[20] FM 20-32A, *Landmine Warfare* (U) *(Scatterable Mines)* (U) (Washington, D.C.: HQ, Department of the Army, May 1969), p. 2.

The new air-delivered, scatterable minefield, *M-56* system, is a wonderfully flexible, rapid, and effective system, but one which is disturbingly apathy-producing. A brief glance at some of the cautions contained in the manual itself should make the point.

First, we are cautioned that "to preclude unwarranted exposure of the *UH-1H* helicopter to enemy fire, local air superiority over the area to be mined should be obtained, and enemy fires suppressed."[21] This is certainly logical and reasonable, but isn't it also sound to suspect that the very time when a hasty minefield is needed to counter enemy advances would be exactly that time when the tactical situation is such that local air superiority would be the most difficult to achieve and counterbattery fires most severely challenged?

We are also reminded that "weather conditions also place restrictions on when the mine can be employed by aircraft."[22] Again logical and reasonable, but, historically, our enemies have not been so obliging as to wait for good weather before advancing. What of the days on end of IFR conditions on the European front in winter or during the rainy season in Southeast Asia?

Finally, we are reminded that "the availability of mine dispensers containing the desired types of mines and of the appropriate dispensing aircraft must be reconciled with other priority tactical demands for aerially dispensed munitions."[23] Certainly! But we must again be concerned about the fact that just at the moment when the need for aircraft is greatest, the need for a hasty minefield would also be greatest. The *M-56* system does not have its own dedicated aircraft—it must compete with all of the other critical and legitimate needs for aircraft over the battlefield. In fact, even in the happy event that unlimited aircraft were available to us, "Ammunition Supply Point (ASP) capability limits loading and reloading the *SUU-13* (dispenser) to a sustained rate of 7 helicopter sorties per day for 30 days[24]—enough to lay in one day only *one* 700 meter minefield of a density of .04 mines per square meter! Let me emphasize the fact that I *am not* denigrating one of our most important new weapons systems. I *am* asserting that it does not solve the necessity for a concrete mine warfare doctrine for Armor and Mechanized Infantry units.

Even the new artillery-and rocket-delivered scatterable mine systems have the same inherent drawback as the helicopter system—that of relying on a "vehicle" having a different primary mission which will be especially critical at the very times that it would most likely be asked to deliver mines. The *M-57* ground vehicle dispensers, on the other hand, have the unique mission of dispensing mines and could represent a significant mine warfare system until the advent of the full range of advanced delivery systems in the mid-1980's. At present, however, this vehicle is in comparatively short supply and is not adequately reflected in those sketchy references to mine warfare that do exist.

Two additional problems are suggested by difficulties associated with the above systems. They are not new problems by any means, but ones which are certainly made more acute by our facing an extraordinarily mobile[25] and numerically superior adversary in some of the world's finest mobile-warfare terrain—transportation and logistics present significant problems in our current preparedness to conduct mine warfare.

Mines in our current inventory are stored in crates in our ASP's according to existing regulations. Those few mines that have been put in the hands of frontline troops are likewise stored, crated, and banded according to unit SOPs and the need to pass inspections. In FM 71-1, we are told that "the company team most often lays hasty protective minefields on short notice, using mines from the team's basic load or from local stocks."[26] *What* local stocks? *What* basic load? Current frontline basic loads and local stocks are virtually ludicrous when considered in terms of the requirements to stop an enemy of the nature we expect to face. Where do the mines come from then? They are shipped to the frontlines when they are needed. How? Again we find that we are counting on support for our mine warfare effort at a time when higher priority missions are already straining available resources. Refugees, civilian vehicles, ambulances, and supply vehicles will virtually glut road networks. Air resources will be taxed to the limit. TC 7-24 does remind us that "emplacement of obstacles is contingent on materials, manpower, and time available, and on future plans of the friendly forces."[27] This reminder, coupled with the current state of readiness of frontline units to employ mine warfare, effectively rules out any meaningful use of mines to counter an enemy offensive.

If transportation, or the lack thereof, alone does not signal the demise of mine warfare, then certainly the logistical

---

[21]TC 20-32-2, *Employment of the M-56 Helicopter Delivered Mine System* (Fort Belvoir, Virginia: U.S. Army Engineer School, 30 September 1976), p. 4.

[22]Ibid., p. 8.

[23]Ibid., p. 12.

[24]Ibid., p. 17.

[25]Fred S. Hoffman, "Russia Arms with Better Artillery," *Ledger-Star*, 14 October 1976, p. A-14.

[26]FM 71-1, *The Tank and Mechanized Infantry Company Team* (Fort Knox, Kentucky and Fort Benning, Georgia: U.S. Army Armor School and U.S. Army Infantry School, March 1976), p. 5-43.

[27]TC 7-24, p. E-2.

[28]Ibid.

limitations of securing mines from rear ASP's on the critical first days of a conflict will do so. Depending on which of the various estimates of lead times one chooses, the feasibility of effective movement of these mines to the FEBA in sufficient time to be employed prior to D-Day ranges from impossible to unlikely. Again, TC 7-24 observes that "logistics will govern minefield size rather than manpower."[28] Absolutely! In fact, logistics in our current configuration would probably prohibit minefield use rather than "govern minefield size."[29]

The present mine warfare scheme, sketchy as it is, presumes that antitank fire in its various modes will alone allow time to support a landmine effort, despite smoke, the "dirt of battle," enemy speed and maneuverability, and what will certainly be the heaviest enemy fire and communications suppression effort that the world has ever seen.

In 1944-1945, Russian "difficulties in transporting *Teller* mines, due to the lack of transport space, were solved in a very primitive manner. When marching to the front as relief, every man had to carry two antitank mines. At the front, these mines were laid by engineers according to a diagrammed mine plan."[30] While I certainly do not advocate old Russian solutions to mine warfare, particularly in view of the fact that their pragmatism also caused them, in the winter of 1941, to clear "a German minefield south of Leningrad by chasing over it tightly closed columns of Russian soldiers shoulder to shoulder,"[31] I do feel that the Russians' solution to the *Teller* mine supply problem does point out the need for mines to be forward in the battle area, readily accessible to the frontline troops that will need to employ them immediately.

A great number of mines should be added to the basic load of tracked combat vehicles. Current loading plans will allow transport of 15 to 20 mines per vehicle and, while special care in handling the more delicate fuzes, primers, detonators, and boosters for conventional mines would need to be taken, current estimates and tests indicate that the exterior loading of mines on combat vehicles can indeed be done safely.[32] If separated by 6 inches in loading to avoid sympathetic detonation and if placed away from the more vulnerable parts of the vehicle (hatches, engine grill, fenders, optics), *M-21* mines would not normally damage a tank or its inhabitants even in the theoretically unlikely event of its detonation by enemy fire.[33] The advantages of a vastly increased mine inventory forward for rapid and effective use certainly warrants more indepth studies on exterior loading of mines on combat vehicles. The current basic load of two *M-21* antitank mines per five soldiers in Armor and Mechanized Infantry and one mine per 10 soldiers in Infantry units can only be described as wholly inadequate.

While TC 7-24 stresses the fact that "scatterable mines do not invalidate conventional mine-laying techniques,"[34] but rather "supplement and reinforce" them, scatterable minefields certainly represent a dramatic advance in the capabilities and flexibility of mine warfare. The variable-setting, self-destruct feature of the scatterable mine removes what has long been a major drawback of minefield emplacement, the fact that "until neutralized, installed mines are a hazard to both enemy and friendly forces."[35] Mines should be, to the maximum extent possible, the scatterable variety in frontline units to facilitate maneuver in the face of rapidly changing battlefield conditions. Simplification of reporting procedures,[36] reduced weight, reduced size, and ease of emplacement argue very strongly for the maximum use of scatterable mines by frontline troops emplacing them by hand. The great number of crucial tasks that must be accomplished by a Mechanized Infantry or Armor unit, between the receipt of a warning order and commitment, lobbies very strongly for an increased share of the burden for conventional mining to be put on supporting Engineer units.

Training procedures for dramatically improving unit, as well as individual, readiness in the area of mine warfare need to be developed and instituted. In addition, training devices for both mine warfare gaming and mine emplacement and detection training need to be developed and fielded as soon as possible. The important logistical procedures of mine warfare must be clearly stated and practiced, perhaps using a "lay it and leave it" type of practice mine. The British currently have a biodegradeable practice mine for this purpose.

Finally, a thorough study of our present doctrine for employing mine and countermine warfare needs to be conducted and the results incorporated into "How To Fight" literature for Armored and Mechanized Infantry units. The arrival in the field of the most sophisticated and effective mine warfare hardware ever dreamed possible is paradoxically accompanied by the very weakest of doctrine. FM 100-5 states that recent improvements in mines "have made them a more dynamic part of modern battle, and have significantly enhanced our antiarmor capability."[37]

However, until we have established a coherent doctrine for first emplacing the right mines in the right hands at the right times, we will be wasting that valuable, dynamic potential.

---

[29] Ibid.

[30] *Land Mine Warfare Handbook*, p. 131. (From DA Pamphlet 20-201, pp. 68-69).

[31] Ibid.

[32] Captain Ely, *Basic Load of Mines for Maneuver Forces*, to Col. John C. Bahnsen, 10 September 1976.

[33] Ibid.

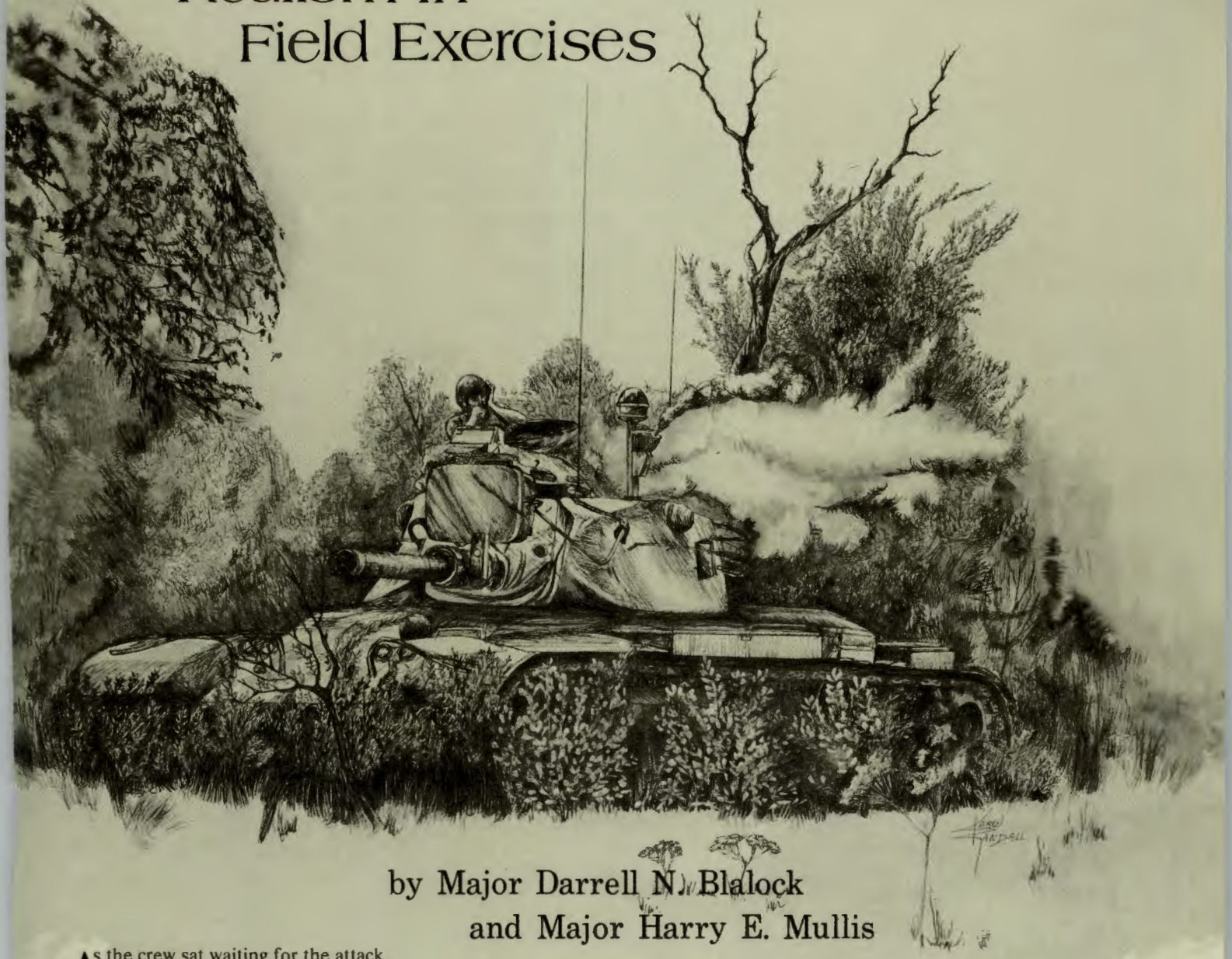
[34] TC 7-24, p. E-11.

[35] TC 7-24, p. E-4.

[36] FM 20-32A, p. 16.

[37] FM 100-5, *Operations* (Washington, D.C.: HQ., Department of the Army, 1 July 1976), p. 2-25.

Realism in Field Exercises



by Major Darrell N. Blalock
and Major Harry E. Mullis

As the crew sat waiting for the attack, which they knew was coming, the radio was silent. Occasionally, the gun tube would move indicating that the gunner was searching the target area for enemy tanks. In the distance, the rumble and clanking of the enemy tanks could be heard and a telltale cloud of dust could be seen. They knew it wouldn't be long. The tank commander began to search intently with his binoculars. The driver cranked the engine to make sure that they were ready to move. Then questions began to cross the minds of the crew. "Did we camouflage well enough?" "Do we have a good zero?" "Does our route to the next position provide enough cover and concealment?"

Suddenly, there they were. Outnumbering them 4 to 1, a horde of enemy tanks rumbled across the battlefield toward the friendly platoon. The tank commander shouted, "There they are!" and the battle was joined. The initial engagement lasted less than a minute, but it seemed like an eternity. Tank 25 fired and missed. A bright yellow glow emanated from tank 24 as it became engulfed in a cloud of smoke. The crew on 25 began to feel the panic of the situation but fired again and saw the same bright yellow flash as smoke poured from the enemy tank. There was no time to celebrate. In an attempt to survive, the tank moved rapidly backward. A round just missed them, and the crew knew that they too were under fire.

Over the radio came the welcome command, "Move out to position number two." Tank 23 was just ahead of 25 when suddenly it stopped in a cloud of smoke. Tank 25 veered to the right into a draw to insure that it too was not exposed to enemy fire.

As they pulled into the second battle position, only three tanks remained in the platoon. The tank commander on 25 carefully pulled his tank into firing position. Five smoking enemy hulks were visible when the platoon began to fire. Tank 22 got off one round before it was killed. Two more enemy tanks were killed before the platoon leader's radio transmissions stopped. The crew on 25 could not see the platoon leader's tank, but the smoke billowing above the trees nearby told them that they were now alone. After a few attempts to contact the platoon leader by radio, the tank commander changed frequen-

cy to the company net and was told to move to battle position number 3 and to join the rest of the company in the fight.

Carefully, the crew picked their way through the vegetation and terrain trying to find a safe route to the third battle position. They came upon a gully which could not be crossed. Thirty meters away, across open ground, was a possible crossing site. Should they chance it? Yes! The driver accelerated to shoot the gap. The smell of cordite and the blinding smoke told them that they had failed. Tank 25 was dead. The battle was over, and *so was a very realistic field exercise.*

When the platoon reassembled to discuss what had happened, each tank commander and most of the crewmen knew why they had been "killed." They realized their mistakes and made plans to improve on them during the next exercise. The platoon leader described a new technique that he would try during the next problem play.

Realistic Capability to "Kill" or Be "Killed"

That's the way it was during the 3X5 tank platoon test conducted by the TRADOC Combined Arms Test Activity (TCATA) in September 1976. The 3X5 tank platoon test was conducted at Fort Hood, Texas, in support of the Division Restructure Study (DRS). Two platoons were selected for testing and were employed in three different tactical missions—day defense, attack by fire, and night defense. Each platoon conducted each mission four times in each configuration, three tanks per platoon and five tanks per platoon. During each exercise, the platoons faced a live Aggressor that outnumbered them, 4 to 1 for the defensive exercises and 2 to 1 during the attack by fire.

If the action described earlier sounded real, it was due in large part to the Weapons Engagement Scoring System (WESS) which was used in testing. WESS uses an eye-safe laser to simulate main gun round effect, a high intensive strobe light, and a carbon dioxide fire extinguisher to simulate firing signature. A detector on each tank provides the capability for the tank to be "killed" and alerts the crew to an engagement by an under-fire light. When a tank is killed, a bright yellow, rotating beacon and a smoke grenade are activated, simulating a "kill." The WESS components are inactivated on "dead" tanks. The realism generated by the laser system of hit/kill simulation involved all members of the tank crew in a game that was played to *win.* As in most units, these tank crews varied in their individual skill levels and performance. The unique occurrence in this test, however, was that there were marked improvement in skill levels as well as platoon and tank crew proficiency as the exercise progressed. This was attributed to the *realistic hit/kill simulation.*

Individual tank crews boasted of the number of Aggressor tanks "killed" by them and attempted to avoid the stigma of being "killed." Throughout the test, the members of the platoons remained enthusiastic about using the WESS. One platoon completed a night exercise at 0530 hours. At 0900 hours, the same platoon was preparing for the next event. At 1600 hours, the platoon was engaging an Aggressor force with all the crews excited and trying to win. Exhilaration was expressed by the crews with shouts of: *"There comes one! Shoot him! You got him! There're two more! Over there! Kill him! Shoot! Yes, you killed him!"*

The Learning Experience

Although the WESS is not a gunnery trainer like the laser simulated firing system, SIMFIRE, used extensively by the British Army, it enhanced the learning of many skills and crew duties. Tank commanders learned the importance of making the initial lay for the gunner, and gunners were required to make the final lay and track moving targets. All tankers learned the importance of selecting and preparing good positions, as well as good tanking when moving on the battlefield.

For example, in its first exercise, tank 15 pulled into an exposed firing position without camouflaging and began firing at the Aggressor. The tank never moved and was "killed" without achieving a single Aggressor "kill." In the next exercise, 15 chose a firing position that provided better concealment but poor fields of fire. The tank was "killed" while moving to a subsequent platoon position without achieving a single Aggressor "kill." In the third exercise, 15 was in a better concealed position with good fields of fire and achieved one Aggressor "kill" prior to being "killed." Again it was "killed" while moving over an exposed route to the next position.

Tank 15 was a searchlight tank in the fourth exercise. The crew attempted to camouflage for the first time. When the battle was joined, 15 illuminated with searchlight and engaged the Aggressor, achieving one "kill." The tank *did not move* from the fighting position and was "killed" soon after the battle was joined. The tank commander voiced the crew's determination to "kill" more tanks in the next exercise as the crew meticulously placed the tank in a firing position and camouflaged extensively. They moved forward on foot and surveyed the tank to adjust the camouflage. They rubbed the gun tube with dirt to reduce its shine. However, the tank was ordered to move before it had fired on the Aggressor and was "killed" enroute to the next platoon position. The tank commander stated that he had made a mistake, that he should have used the covered route behind the trees instead of moving exposed in front of the trees. In the final exercise for tank 15, the crew selected a good firing position, fired at the Aggressor and backed out of position to gain cover and concealment.

The tank pulled back into the same position and fired, then immediately backed out again. Tank 15 continued this technique and achieved two Aggressor "kills" prior to being "killed." The tank crew was elated with their success, but the tank commander commented that if he had another chance, he *would not* continue to reoccupy the same firing position. The ability to engage live stationary and moving targets with real time feedback, coupled with the requirement to use evasive tactics to avoid being "killed," taught the crew, in 36 hours, the importance of cover and concealment, fields of fire, and camouflage, as well as the need to shoot, move, and use alternate firing positions.

Early in testing, a tank commander was observed moving his tank into a subsequent firing position and yelling to his gunner, *"There he is! Shoot him!"* The gun tube was pointed 45 degrees away from the enemy and weaved around in geometrical patterns as the gunner searched for a target. Consequently, the tank remained exposed in the firing position too long and was "killed" before the gunner could identify a target. Later in testing, tank commanders were observed laying the gun for the gunner, thus reducing exposure time.

All crewmen learned the advantages of using folds in the ground, defiles, and vegetation to enhance their chances of "killing" and staying "alive." In one example, the light section was in an excellent firing position to overwatch the rearward movement of the heavy section. However, when the platoon sergeant was asked about his route of egress, a glance over his shoulder left a puzzled and embarrassed look on his face. His section would have had to move approximately 300 meters over open terrain which afforded the Aggressor excellent targets.

The platoon leaders gained an appreciation for command and control difficulties encountered during the *heat of battle*. With an Aggressor force outnumbering the platoon 4 to 1, the need for active control of fires was greatly reduced and usually attempted only during initial engagements. Later they learned that a better platoon standard operating procedure (SOP), which incorporates more fire control measures, the *do-as-I-do* concept, special arm and hand signals, and aborting a fire mission after occupation of a firing position for more than 10 to 12 seconds would improve fire distribution during the confusion of battle. The effectiveness of these measures was evidenced when one platoon "killed" 12 Aggressor tanks with only 24 rounds fired. Initially, a platoon leader relied heavily on radio for command and control, but learned rapidly that the *do-as-I-do* technique of command and prior planning could overcome the effects of electronic warfare (jamming) and battlefield confusion. When visual contact was lost, tanks became separated and were "killed" because they were left behind or became disoriented during the confusion of battle. However, when visual contact was maintained, movement and fires could be controlled by the platoon leader, even when radios were not operating. One tank successfully fought through two exercises with a radio that was out of order. The platoon leader had little difficulty controlling the actions of that tank.

Effective Use of Current Armor Doctrine

It was apparent that, for the first time, many of the individual soldiers learned to employ tactics and techniques that are taught in field manuals because this was the first time that they had ever been in a battle where they could "kill" or "be killed." They discovered that the tactics and techniques they had read about did, in fact, enhance their ability to fight successfully on the battlefield. The overwhelming urge to win also led the players to develop innovative tactics and techniques based upon their own combat experience.

Player innovations first appeared in the careful selection, preparation, and use of tank firing positions. This was evidenced early in the test as a critical factor in survivability and ability to "kill" Aggressor tanks. When camouflage, cover, and concealment were not used in firing positions, the tanks were usually "killed" early in the engagement. When fields of fire were sacrificed for cover and concealment,

the tanks could not engage until the Aggressor had closed too close to allow an orderly egress. Consequently, the tanks were frequently "killed" as they moved out of position enroute to a subsequent position. Cover and concealment alone in the firing position could not protect the tank indefinitely if it was not moved after firing began. After the tank had been exposed (in hull defilade or less) for 10 to 12 seconds, it had to move out of position to total concealment. However, if the tank returned to the same firing position (or in the vicinity of one used by another tank in the same platoon engagement), the Aggressor acquired it as it moved into position and with the overwhelming odds could easily get a "kill" by massing firepower. The players in the test found that they could move into firing positions, engage the Aggressor with one or two rounds, and survive as long as they were in position only 10 to 12 seconds because the Aggressor had difficulty acquiring them in time to fire.

The effectiveness of tank firing positions was enhanced by the use of dismounted observers. The tank remained hidden and moved forward to an exposed position only when the dismounted observer had acquired targets. This made for an effective ambush of the Aggressor force through early acquisition of targets. Early target acquisition was important because the Aggressor had to be engaged at long range to allow contact to be broken in time for an orderly withdrawal. During several exercises, the Aggressor closed to within 400 to 800 meters of the platoon before withdrawal began. The Aggressor, closing rapidly on the withdrawing platoon, gained a terrain advantage and was presented with flank and rear shots on a confused platoon. For the platoon tanks that did survive this condition, the movement to a subsequent position was disorganized and confused due to the stress conditions imposed on the platoon by the rapidly closing and overwhelming force. This also points out the need for covered and concealed routes of rapid egress. When the Aggressor force is using the best avenue of approach in the battle area, the platoon must be able to move rapidly to subsequent positions so that it arrives in time to permit long range engagements. The necessity for long range engagements remains constant throughout the battle. On several occasions when the platoon used good routes of egress, it was successful in ambushing the Aggressor at long range and achieving "kills."

It was soon learned that the platoon could not stand fast and "slug it out" against an overwhelming force at close range. Consequently, they began to successfully use a platoon volley-fire technique. This technique was similar to a naval "broadside" in which the platoon tanks moved into firing position together, fired one or two rounds each in a "broadside" and moved out of position together. On other occasions, a platoon attempted unsuccessfully to maintain continuous fires on the Aggressor using an alternating section volley-fire technique. One section pulled into firing positions and fired a "broadside;" as that section backed out of position, the other section pulled into adjacent positions to fire a volley. The Aggressor, however, rapidly acquired and killed the tanks of the second section as they pulled into position. This section volley technique also required more command and control by the platoon chain of command and added to the confusion of battle.

One platoon was overrun and destroyed during its first two-day defense exercises without achieving any Aggressor "kills." By the time the third day-defense exercise was conducted, the platoon had discovered several reasons for their previous failures. One tank in the platoon survived the Aggressor attack, and two Aggressor tanks were "killed." During the fourth and final day-defense exercise, the platoon successfully "killed" all the Aggressor tanks without suffering a single loss.

The platoon used the volley-fire technique and took maximum advantage of long range fields of fire, as well as covered and concealed routes. The volley fired in the first position achieved no Aggressor "kills." Nevertheless, the platoon withdrew and moved rapidly to the second position where it stopped in total defilade on the reverse slope and dismounted one observer to move forward and acquire the enemy. On a signal from the observer, the tanks began moving into firing positions. The observer met and mounted his tank enroute. The platoon leader issued a platoon fire command for volley-fire. The ambush was so effective that the platoon leader ordered the tanks to fire one more round before withdrawing. Seven Aggressor tanks were "killed" by the three tanks in this engagement. The platoon withdrew rapidly to the third battle position. Using the same technique, the platoon "killed" the remaining five Aggressor tanks. The Aggressor fired only four rounds during the exercise and achieved no "kills" on the friendly platoon.

Problems with Current Armor Doctrine

When the tank platoon was employed in two sections, the firepower of the platoon was piecemealed and the force ratio in favor of the enemy was increased up to 10 to 1. Control of the two sections was extremely difficult to maintain and nearly impossible to reestablish during the engagement. When the light section was left in the initial platoon position to overwatch the rearward movement of the heavy section, it was sacrificed to the rapidly closing Aggressor at double the force ratio. When the light section overwatched from a terrain feature to the rear, it could not usually enter the battle and engage the Aggressor while the heavy section was engaging. Consequently, the heavy section tanks faced 7 to 1 odds in their engagement, and when they handed the Aggressor off to the light section, it faced up to 10 to 1 odds. The separation distances between the sections again made control extremely difficult and added to the confusion of the battle. The platoon leader was too involved fighting his section to orchestrate the battle for the platoon. When the light section engaged the Aggressor, the loss of one tank impacted twofold. A lone tank was left facing an overwhelming force, and the crew became overly cautious and attempted to hide and survive.

A lone surviving tank from a platoon was frequently evident during test operations and when this situation occurred, the crew on the lone tank became more concerned with survival than with "killing" Aggressor tanks. When ordered to move, the lone tank would pick its way carefully, to ensure that the risk of exposure was minimized, and would engage the

Aggressor *only* when the crew sensed a low risk of being "killed" or when cornered. The manifestation of the "lone tank syndrome" occurred in a platoon when a lone tank survived in either section, separated by 400 meters or more. The distance to the tanks of the other section, as well as the concealment sought and used by all tanks in the platoon, usually precluded the surviving tank from marrying up with the remainder of the platoon. In some exercises two lone tanks, one in each section, were found struggling to survive independently.

During the night-defense exercises, several problems surfaced which influenced the ability of a tank platoon to fight effectively at night. The platoon must have some means of acquiring targets at long range. Indirect illumination approached daylight conditions and enhanced the ability of the platoons to acquire targets at long range as well as movement to subsequent positions. When searchlights were used to search for the Aggressor at long range, the position was given away, and the element of surprise was lost. When indirect illumination or searchlights were not used to search for the Aggressor, the opening engagement range closed to approximately 500 meters or less. This did not allow the platoon enough time to react and engage the Aggressor, nor did it allow an orderly withdrawal to subsequent positions. With closer engagement ranges experienced at night, there was a greater need to move rapidly to subsequent positions, thus the requirement to reconnoiter and prepare routes of egress was increased greatly.

Win the First Battle Outnumbered

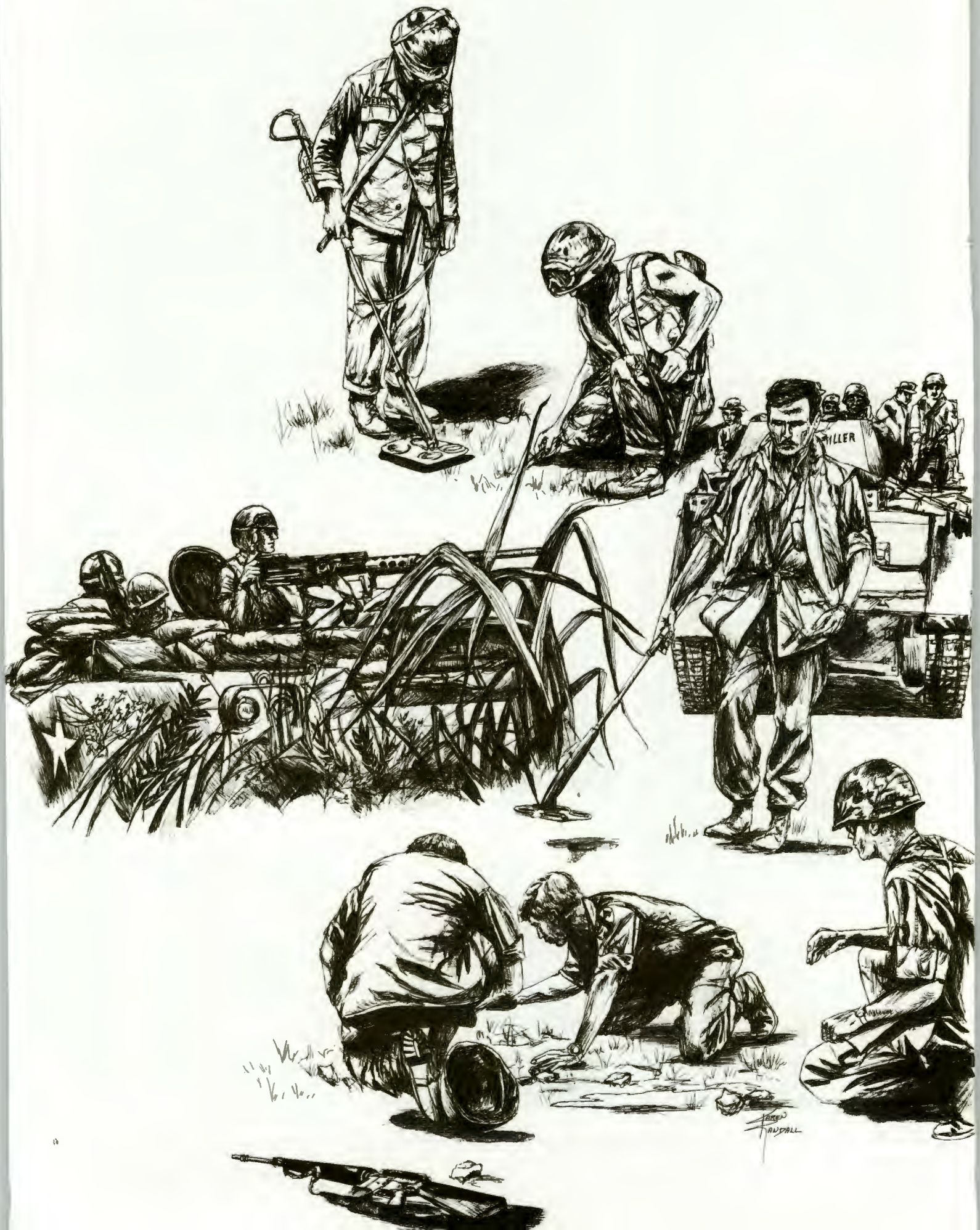
All of the observations presented are important and were made during the conduct of a *test;* however, the most significant impact is best related by the comment heard over and over again by members of the test unit: "This is the best training I have ever seen." Members of the tested platoons gained near-combat experience as they "killed" or were "killed" using the WESS. Few tank crewmen in the Army today have combat experience in tank battles. Those few who are in the Army are being promoted out of tank crews or are retiring. New tactics and techniques are becoming doctrine and are being taught in schools, field manuals, and unit training; however, these tactics and techniques need validating and tankers need to be able to apply more of what is being taught. Although there are some approaches to achieving combat experience through training, they are limited to daylight operations and are expensive in terms of resource commitments. None appear to be effective for testing and evaluation nor do they approach the capabilities of laser simulation systems such as Multiple Integrated Laser Engagement System (MILES), WESS, or SIMFIRE.

MILES is a system under development which applies to a multitude of weapon systems. WESS, which simulates several types of weapons, and SIMFIRE, which primarily simulates tank fire, are available in hardware today and, unlike REALTRAIN, require no dedicated controllers from the units. Control is exercised through the normal chain of command. In addition, they are equally effective at night. The WESS also provides a unique capability of varying the probability of kill (P_K) as a function of range, thus more realistically simulating an engagement by decreasing the P_K from a maximum of 1 at close range to 0 beyond the maximum effective range of the weapon system.

The high degree of motivation generated by the realism of these laser systems represents the capability to achieve a significant differential in training within the minimum training time available to units today. Tank crews may be trained to near combat experience before the next battle is joined. Instrumented hit/kill simulation exercises allow tankers to practice their trade and can provide the near-combat experience which will enhance the capability of the Army to fight and win the first battle outnumbered.

MAJ DARRELL N. BLALOCK was commissioned in Armor upon graduation from Florence State University in 1961. A graduate of the Command and General Staff College, he has commanded an armored cavalry troop and a tank company in Korea and Vietnam. Having previous experience in a variety of troop assignments, ROTC, and the Armor School, Major Blalock is presently assigned to Combined Arms Test Directorate, TCATA, Fort Hood, TX, as a platoon evaluator on the 3x5 tank platoon test.

MAJ HARRY E. MULLIS was commissioned in Armor upon graduation from North Carolina State College in 1961. He has served as company commander in Vietnam and in many R & D assignments, including a tour as Service Test Project Officer at the U.S. Army Armor and Engineer Board, Fort Knox, KY. A 1976 graduate of the Command and General Staff College, Major Mullis is presently assigned to the Command Systems Directorate, TCATA, Fort Hood, TX.



Probing for a Solution

by Captain R. Michael Tesdahl

Who breaches a minefield? Does the Infantry make "hasty" breaches and the Engineer "deliberate" breaches? Once you've pinned down who is going to do it and he's ready to do it, how do you breach a minefield? Don't look to your new "How-to-Fight" manual for the answer. The standard old cliche answer to this one is "carefully, very, very carefully," another way of saying that we don't really have a handle on it. What equipment do you use to breach a minefield? The latest response to this question is a "tank-mounted mine roller." A mine roller? In view of the current emphasis within TRADOC to field a tank-mounted mine roller within a year, it might be appropriate to seriously consider the questions posed above, and other related issues.

Who breaches a minefield? Doctrinally, tankers have it knocked. FM 100-5 states that combat engineers breach and clear minefields. The mechanized infantry also dismounts and clears mines blocking the advance of tank forces or supports combat engineers who may be clearing mines. FM 17-95 outlines how the organic rifle squad of the armored cavalry platoon dismounts to check bridges, roads, shoulders, and other restricted areas for mines, demolitions, and booby traps. These mines and charges are then "best" neutralized or removed by engineers. However, in all probability, engineers won't be available, so the rifle squad must accomplish this clearing. Apparently, this countermine role is assigned to the scouts in the conceptual cavalry organization which has no infantry. FM 71-1 and FM 71-2 pin down the "who breaches" question best. A hasty breach, one which is accomplished rapidly and with little or no reconnaissance or planning, will be accomplished by the company team commander's organic assets. Availability of engineer support cannot be depended upon. A deliberate breach on the other hand, carried out in conjunction with an attack against well-prepared defenses and where time is available for detailed reconnaissance and planning for "special breaching devices," is accomplished by combat engineers. The infantryman, who is expected to dismount and breach a minefield of unknown dimensions and extent will probably be covered by planned direct and/or indirect fires. So, I suspect that there will be very few "hasty" breaches. Hold on, tankers; you don't get off completely. When we field the mine roller, one of your organic tanks will have to conduct the breach for the rest of the company team. Doctrinally, then, literally *everyone* breaches the minefield, depending on what book you read.

How do you breach a minefield? Again, FM 71-1, FM 71-2, and ARTEP 71-2 are the most definitive. Minefields are detected by any number of means; by evaluation of tactical intelligence, interpretation of aerial photography, visual observation, use of detectors, reconnaissance by fire, and by encounter by friendly vehicles or personnel.

On encountering a minefield, the unit seeks covered positions. Tanks and APCs provide overwatching fires, and in conjunction with mortars and artillery, suppress known or suspected enemy locations. The infantry dismounts; some of them provide local security for the team and others reconnoiter to determine the boundaries of the field and whether flanks or gaps can be located. Smoke is used to isolate this portion of the battlefield from enemy observation and fires during the reconnaissance and breach. If flanks or gaps cannot be found, a breaching team is designated, and the breach begins. Infantry secures the near edge of the minefield, while smoke continually isolates the area from the threat. As breaching teams move through the field to clear footpaths, they mark all mines that are identified. Mines which are identified by the breaching teams are usually destroyed in place, or activated by grappling hooks or similar devices.

Clearing of these mines results in a lane large enough for vehicles to cross. Once lanes are established and marked, at least one third of the unit crosses to secure the far edge of the minefield, while overwatching elements protect the movement. When the far side is secure, the remainder of the company team crosses and the original mission is continued.

There is a variation on this method which is not doctrine yet. As the infantry dismounts to reconnoiter and provide security, the tank team commander is frantically getting his 17,000-pound mine roller hooked up to one of his tanks. Then behind a protective screen of smoke and direct- and indirect-suppressive fires, this tank cleans a path through the minefield, followed by the remainder of the team, and the mission is continued.

However, there is one problem. Tanks and APCs are not the same width, so the infantry will still be on the near side of the field, or they may have to cross dismounted. Either way, the team commander has an incomplete solution. I guess the breaching tank has to go through *twice* in order to make an APC path, or two rollers would go through

Table 1. CURRENT BREACHING CAPABILITIES

Tank Company	**Level 1 - Locate mines by mine detector**	**1 metallic mine detector**
	Level 3 - Emplace, remove mines	**1 metallic/nonmetallic mine detector**
Armored Cav	**Level 1 - Locate mines by probing, vision, mine detectors**	**1 metallic mine detector**
	—Emplace mines	
	—Remove mines by grapnel	**1 metallic/nonmetallic mine detector**
	Level 2 - Destroy mines in place	
Infantry Co	**Level 1 - Locate mines by probing**	**NONE (3 ea mine detectors in Bn HQ)**
	Level 2 - Destroy mines in place	
Combat Engineer Sqd	**Level 1 - Breach or clear minefield**	**1 metallic mine detector**
	Level 2 - Minefield reconnaissance	**1 metallic/nonmetallic mine detector**

simultaneously and staggered. If you have a solution to this one, let somebody know soon; you're the first.

The standard breach described above, without a mine roller, is meant to be conducted using current detection and breaching equipment. Regardless of whether infantry, cavalry, or engineers conduct the breach, the sum total of current breaching and detection equipment available consists of a metallic mine detector, a metallic/nonmetallic detector, and the nonmetallic mine probe. The countermine inventory also includes a line charge, but it is so scarce that either you'll never see one, or if you do see one, even your supporting engineers won't know how to use it.

The tank company headquarters has one metallic and one metallic/nonmetallic mine detector assigned. Armor crewmen 11E are trained at skill level I to locate mines using a detector. However, they are not trained to emplace or remove mines until skill level 3. The armored cavalry platoon currently has one metallic and one metallic/nonmetallic mine detector in the rifle squad. Under the conceptual cavalry organization, these are assigned to the scout section. Armor reconnaissance crewmen 11D are trained at skill level 1 to locate mines by probing, by vision, and using detectors. They can emplace mines and remove mines using a grapnel. At skill level 2, they can destroy a mine in place.

Infantrymen can detect mines by probing and can emplace and remove mines at skill level 1. They can destroy a mine in place at skill level 2. Use of a detector is not designated a critical task for the 11B, which is okay, because a mechanized infantry company has no detectors anyway!

Combat engineers are trained to breach or clear a minefield at skill level 1. At skill level 2, they are trained in minefield reconnaissance. Each engineer squad has one metallic and one metallic/nonmetallic detector assigned.

In summary, a tank company team will have two detectors available to it. If engineers are not available to assist, the team will breach primarily by probing and destroying mines in place. Engineers are the best equipped and trained to conduct reconnaissance of the minefield and to breach it.

If it appears that countermine warfare has not advanced since World War II, that's a pretty accurate assessment. However, new countermine weapons are being developed to correct this deficiency. SLUFAE, a rocket delivered fuel-air explosive system, is the most promising. This system delivers fuel-air explosive from a self-propelled 30-rocket launcher at a range of up to 1,000 meters. Because it defeats mines by overpressure, the effectiveness of SLUFAE against other than single-pulse pressure-activated mines is still unknown. Experiments are also being conducted in spraying fuel-air explosive forward of a tank or other vehicle to clear directly in its path. This system may be more practical than SLUFAE, because it would require much less detailed minefield intelligence to employ effectively. Where SLUFAE employment is highly dependent on an accurate location of the disposition, near edge, and depth of a minefield, a vehicle-mounted system could selectively clear a specific vehicle path in any direction the force chose to maneuver until the breach was complete.

Another system for use directly in a vehicle path is an improved British line charge. Still another system is being developed which projects a duplicate magnetic signature forward of a tank to detonate magnetic-fuzed mines in its path. Last but not least, a tank-mounted mine roller is being developed for issue within one year on the basis of one per every tank company in Europe. This roller clears a path for tank tracks. Additionally, a chain between the rollers detonates tilt-rod mines between the tank tracks. The roller is not perfect, however, because it can be defeated by rough terrain, magnetic mines, or complex fuzing. But, it is better than what we have today. None of these systems is perfect nor does any one solve the whole problem. What is needed is a family of countermine systems capable of defeating all types of mines.

However, the biggest void of all still exists, unaddressed. That is the problem of detection and reconnaissance. What is needed is a sure way to identify minefields at a distance, including their location, disposition, and depth. Otherwise, SLUFAE, line charges, or any other system will be almost totally ineffective. Reconnaissance and detection fall into the "too hard" category at present, and little is being done to replace dismounted visual and physical probing and detection in the foreseeable future.

Countermine doctrine among our allies pretty well

parallels our own. Minefield reconnaissance and breaching is an engineer task, but the infantry is also trained to do it. Maneuver units generally conduct hasty breaches and engineers deliberate breaches, using detectors, line charges, and probing.

The doctrine and techniques described above are totally unacceptable on the modern battlefield. The accuracy and lethality of modern weapons, plus the density of those weapons which we can expect to face in a midintensity battle against the Threat, will make it totally unreasonable for dismounted breaching teams to be crawling around probing or using a detector. It is equally unreasonable for the company team to be unable to maneuver for such a length of time; maneuver is used not only to destroy the enemy, but also to survive. The introduction of thermal sights limits the ability to isolate the breaching site with smoke. A company team sitting stationary in unprepared positions while conducting a breach will lay itself open to unacceptable losses. The roller to some extent allows protected breaching of minefields, but even this is not a complete answer.

The philosophy of the ongoing TRADOC Division Restructure Study (DRS) is to free the company commander to concentrate on fighting his primary weapon system; tank company commanders fight tank platoons, infantry company commanders fight rifle platoons. All other support comes from the rear. Under this philosophy, mortars, antitank weapons, maintenance, and all similar functions would be removed from the company and moved to battalion level. The job of commanders above company level is to allocate these supporting resources to insure that the company commander can do his job. Engineers, on the other hand, are supposed to get out of the road grading and construction business and focus on the mobility and countermobility role. The DS combat engineers task is to facilitate our maneuver and prevent or canalize the Threat's.

Does it make sense to expect a tank company commander to transport, maintain, and train for the use of a tank mounted mine roller? Does it make sense to tie up one tank in 17 (or one in 11 under DRS) to push around a roller? Should a rifle company commander have to train his men to be proficient in countermine warfare on such a grand scale? Are the casualties which can be expected in breaching a sophisticated barrier system in our current countermine doctrine and equipment void acceptable? The answers to each of these questions is *NO,* and a number of things can and should be done to correct the situation.

We have to clarify our countermine doctrine and responsibilities. This must be a joint armor, infantry, and engineer effort. We have to pin down once and for all, against a backdrop of FM 100-5 and the concepts which are driving the Division Restructure Study, just who is responsible for what; who breaches the minefield? I vote for the mobility-countermobility people, the combat engineers. Along with this clarification of responsibilities must go a sound 1977-era concept of how it will be done, what equipment is required, and what training is needed.

Once we do the hard part, we have to reallocate equipment and upgrade our training to conform to our new plan. Reallocation of resources is not enough; we don't *have* any equipment. We'll need to develop new equipment specifically for the purpose of breaching as we envision it being done on the midintensity battlefield, not with a non-metallic probe for poking around until we bump into a mine! The very first priority in the new equipment effort should be in the means of detection. Without something new in this area, you can SLUFAE/mine roll/line charge all you want. You're *still* going to take unreasonable losses. You're going to be slowed in your attack. You're *still* going to have mines between yourself and your objective.

If it is decided that maneuver units are to breach the minefield, all soldiers will have to be better and more thoroughly trained. More equipment and new equipment will be required. An advantage of this solution is that it might, depending on the eventual concept for engineer allocation and utilization, be more responsive. On the other hand, it will proliferate training requirements, degrade mobility and firepower of the unit at critical points, and detract from the primary mission of the unit. If combat engineers are going to breach minefields, thought will have to be given to new allocation and employment concepts for engineers so that they are responsively available. This emphasis on mobility enhancement will probably detract from other engineer tasks, but it will also free maneuver commanders to fight their primary systems. It will more efficiently utilize breaching resources by pooling them in one organization, thereby requiring fewer personnel and less equipment.

I've suggested that breaching is a combat engineer task. I've also stated that a whole family of countermine systems will probably be required to reliably breach a Threat obstacle system. Why don't we go for real specialization; why not have a dedicated engineer countermine vehicle equipped with multiple detection and breaching systems? It could have enough armor protection to operate forward in the battle, be powerful enough that it could both push a mine roller and double as the prime mover for the roller, and carry other systems to defeat magnetic mines and possibly spray fuel-air explosive forward of itself. Two or three of these vehicles, with trained engineer countermine personnel, could be assigned to the division engineers. This would allow for consolidated training and maintenance, and either be habitually allocated on the basis of two or three per maneuver battalion or be task organized to match specific missions and threats.

The possibilities are great; the risks, considering where we are today, are minimal. Let's start poking around for some firm answers on HOW-TO-BREACH so that we can get to the objective and exercise what we've already figured out about HOW-TO-FIGHT.

CPT R. MICHAEL TESDAHL was commissioned in Infantry upon graduation from the United States Military Academy in 1969. He has served as an S-3/Air and Recon Platoon leader, a battalion advisor, company commander, and an assistant brigade S-3 in CONUS, Vietnam and Hawaii. An IOAC graduate, Captain Tesdahl is currently assigned to the Directorate of Combat Developments, USAARMC.

Recognition Quiz

This Armored Vehicle Recognition Quiz is designed to enable the reader to test his ability to identify the armored vehicles of armored 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 armored fighting vehicles. 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 appearing in the picture should also be provided. Suggestions for improving or expanding this feature are welcome. — ED.

(Answers on page 61)

NOTES

PATTON MUSEUM BEGINS HISTORIC VEHICLE ORIENTATION PROGRAM

The Patton Museum, in cooperation with the U.S. Army Armor School, has begun a program to acquaint students at the Armor School with historic armored fighting vehicles which have achieved importance in the history of armored warfare. The program consists of a static display of restored operational vehicles in the classroom area of the Armor School. Students are allowed to examine the vehicles in detail and compare their systems with those of more modern tanks. The first vehicle to be presented was the British *Centurion* tank, *Mark V.* Other vehicles to be shown will include the German *Leopard I* tank, U.S. *M-4A3E8 "Sherman,"* U.S. *M-24* light tank *"Chaffee,"* USMC *M-103* heavy tank, German 38(5) tank destroyer *"Hetzer."* As the museum staff completes restoration of other historic vehicles to operational condition they will be added to this program. A German *Panther* tank is presently undergoing restoration and should be completed by next year. Thus far, student response has been enthusiastic and the museum hopes the program can be expanded.

Mr. Charley Jacobs, museum technician, explains the workings of the British *Centurion* tank to Armor School students.

ELECTRONIC TIME FUZE SETTER

An electronic time fuze setter has been developed by the U.S. Army which replaces the "man link" between the fire control computer and the weapon with a more accurate and faster means of setting, checking, and correcting the fuze's setting for detonating the round properly. Designated the *XM-36,* the fuze setter instantly sets, checks, and verifies the fuze electronics of an *XM-587* fuzed round.

During the HELBAT VI test conducted by the U.S. Army Artillery School, Fort Sill, OK, the desired fuze setting was calculated and introduced into the setter directly from a battlefield computer, thus eliminating the need of the man to determine and enter the required information into the setter.

LEOPARD 2 EVALUATION

The Main Battle Tank in the Army's future will not be the *Leopard 2.* They may, however, be "sisters under the skin." In announcing plans for evaluating the German tank, former Secretary of the Army Martin R. Hoffmann said that the Army will study only the major subsystems of the *Leopard 2,* with an eye to standardizing those major components.

Among the subsystems which will be evaluated are the engine, transmission, track, fuel, fire control, and night vision device. The 120-mm gun will also be evaluated.

A cost and technical evaluation board will study the designated *Leopard 2* subsystems. The board report of evaluation will include a formal plan for subsystem standardization.

The announcement on evaluation of the *Leopard 2* subsystems appears to finalize the selection of the Chrysler Corporation's version of the *XM-1* as the new main battle tank, but with the Army's emphasis on standardization of components, the production model may be something of a hybrid. *(AR NEWS)*

HIGH-MOBILITY TACTICAL TRUCK JOINING *GOER*-VEHICLE FAMILY

A "Big Brother" member is being added to the U.S. Army's family of *GOER* vehicles, an 8- to 10-ton high-mobility tactical truck that will complement the *M-520* cargo truck, the *M-553* wrecker, and the *M-559* fuel tanker.

Under development by the U.S. Army Tank-Automotive Research and Development Command, the 8x8 vehicle is designed to carry a 10-ton payload.

Under the $700,000 contract, the feasibility of using the same basic truck chassis to build wrecker and fuel

tanker versions of the new vehicle will also be determined. With a gross weight of 45,000 pounds, it will be 27 feet long, 8 feet wide and 10 feet 8 inches high.

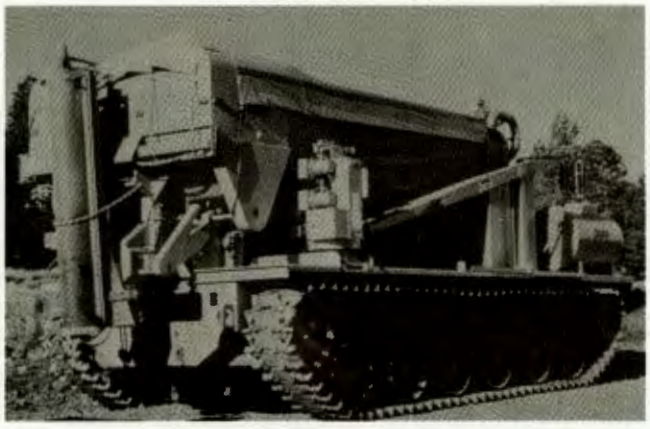
The power-to-weight ratio is 20 horsepower per ton and the vehicle will have a maximum highway speed of 55 m.p.h., with a Detroit Diesel 8V-92TA engine coupled to an Allison HT740 automatic transmission. The first vehicles are scheduled for delivery August 1978.

IMPROVED SUSPENSION SYSTEM

The improved Suspension System Test at Fort Knox is a part of the Project Manager *M-60* Product Improvement Program for *M-60* tanks. Tanks equipped with hydropneumatic suspension developed by National Water Lift Company and advanced torsion bar suspension by Chrysler Defense Division will be compared to standard torsion bar-equipped tanks. The hydropneumatic system consists of 12 units of which units 2 thru 6 are identical on the same side. Damping is accomplished by internal jounce and rebound valves. The front units are different only in the link for track adjustment.

The advanced torsion bar system uses high-strength steel torsion bars at all roadwheels with improved rotary dampers at numbers 1, 2 and 6. Both systems provide 12"-13½" road arm travel, compared to about 6½" for standard torsion bars. Turrets are *M-60A1* (AOS) and *M-60A1E3*. Performance testing will include ride quality, gunnery with emphasis on crosscountry firing at speeds up to 20 m.p.h., mobility/agility, and reliability testing to 4,000 miles. Testing will be completed May 1977.

TANK MIXER?



When an Arizona construction contractor needed an all-terrain, large-capacity cement mixer-transporter to pour foundations for high-tension power towers, he married a cement mixer to an *M-48* tank chassis to solve the problem.

Prohibited from any road construction by environmental authorities, the contractor used the tank/mixer to pour foundations for helicopter-emplaced towers along the Arizona-New Mexico border. Only the tank chassis could afford the payload and maintain the requisite all-terrain capability. (Photo contributed by Kenneth W. Estes, Captain, USMC.)

THE ABRAMS EAGLE

Prints of a commemorative painting, titled "The General Creighton W. Abrams Commemorative Golden Eagle," will be issued by the Cavalry-Armor Foundation in late May 1977. Ray Harm, a nationally-known nature artist created the painting. Two thousand full-color, unsigned prints will be issued in two series with the first release scheduled for Armed Forces Day, 21 May 1977.

NEW TANK HAULER

The U.S. Army Tank-Automotive Materiel Readiness Command (TARCOM), has awarded a 3-year $43,897,-980 contract for 596 heavy equipment transporter (HET) tractors to Oshkosh Truck Corporation, Oshkosh, WI. First year obligation is $13,748,630.

Designated the *XM-911,* this commercial truck tractor has an 85,000-pound gross vehicle weight. It will pull the Army's *M-747* 60-ton semi-trailer, transporting the main battle tank and other heavy military equipment.

Tests conducted at Ft. Hood, TX, demonstrated that commercial HET tractors could be used successfully by the Army instead of more costly military vehicles. The Army estimates that the commercial HET fleet will cost about $40 million less than a fleet designed specifically for military use.

The *XM-911* is one of the Oshkosh Model J-2065 series of trucks used extensively in the oil fields of Saudi Arabia, Bahrain, and Egypt. It will be equipped with two rear-mounted winches to load and unload disabled tanks and a nondriving axle which will reduce axle loadings to prevent possible road and highway damage.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1977—757-041/1

BOOKS

STONEWALL IN THE VALLEY. by Robert G. Tanner. Garden City, NY: Doubleday & Co., Inc., 1976. 436 pages. $10.00.

The Civil War created a number of legendary heroes, of whom Stonewall Jackson was one of the foremost. His early campaigns in the Shenandoah Valley of Virginia quickly established his reputation, but the subsequent aura magnified him out of proportion. "It was not the Army of Northern Virginia the North dreaded, but Jackson. . ."

Tanner takes a more objective look at Jackson in this new study of the Valley campaigns. He gives full credits to Jackson's tactical brilliance and strategic genius, but he also provides new insights on Jackson's peculiar introversion, his consuming ambition, and his frequent blindness to his soldiers' problems and feelings.

The Army of the Valley's reputation is almost as great as Jackson's; what soldier hasn't heard of and admired the exploits of Jackson's famous "Foot Cavalry?" Yet again, the reputation far belies the truth. The Valley Army troops were tough fighters. They won repeatedly over far stronger forces. Yet they never became a really professional army. They were undisciplined, indifferent except in a fight, fiercely independent and often disobedient. This strange but successful compromise of recalcitrant volunteers growing reluctantly into veterans under their reticent, rigid, professional commander provides a striking contrast in history.

This story covers the events in the Shenandoah Valley from the winter of 1861 through the spring of 1862. McClellan was preparing to start his famous turning attack from Fortress Monroe to capture Richmond and end the War. But far away in the rolling hills of the Shenandoah, a little force that never exceeded 4,600 effectives created such a diversion that 20,000 troops, withdrawn from McClellan to secure Washington, were sent to bolster the Federal forces in the Valley. This erosion of strength combined with a remarkable series of Union fumbles to bring the promising attack to a standstill, and the War dragged on another 3 years.

Tanner tells this story much in the style of Freeman, but with a unique approach. His book is not a simple rehash of sequential events, but rather a glimpse of the War from the soldiers' viewpoints. Tanner has drawn heavily on the numerous accounts (some 70-odd, many of them unpublished or privately published and unavailable) written by the men who fought through the Valley, and his text is copiously sprinkled with anecdotes and homespun descriptions of the times. The effect of this is to lift the romantic veil of glory off war and show, in the technique of Tolstoi, the mixture of harsh misery, humor, despair, and courage that is combat.

Tanner includes a particularly effective review of the lessons learned from the Valley campaigns, bringing into focus the applications of the principles of war. There are appendices on interesting sidelights, and an unusually comprehensive set of notes and bibliography. In all, this is a good historical work well concealed in a lively, anecdotal package.

Colonel (Retired) John R. Byers

THE FACE OF BATTLE. by John Keegan. The Viking Press, New York, 1976. 354 pages.

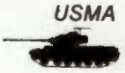
Military histories tend to be written from the perspective of the generals planning and directing the campaigns or the political leaders for whom the campaigns represent an instrument to be applied to gain national objectives. The analysis of the impact of battle on the men who ultimately execute the strategies has been left largely to the war novelists such as Remarque, Hemingway, and Jones. *The Face of Battle* represents a significant historical analysis of battle as it affects the individual fighting man.

John Keegan is the Senior Lecturer in War Studies at Sandhurst. His analysis of the evolution of combat from the Fifteenth through the Twentieth Century focuses upon three specific battles: Agincourt, Waterloo, and the Somme. These battles are dissected in a detailed and orderly fashion starting from the perspectives and actions of men prior to engagement, the reactions of men in what Keegan terms "the killing zone of battle," and the results inflicted upon men by the instruments of war. Particularly illuminating are Keegan's assessments of battle in terms of the effects of one combat arm upon another, whether it be archers against cavalry, cavalry against infantry, or artillery against infantry. He concludes his study by projecting his findings into the future, attempting to construct the face of battle upon which we as soldiers may be forced to look. The final chapter alone is worth the price of the book. There is also an excellent bibliography appended.

Keegan's book is not without flaws. The style is pedantic and the phraseology sometimes convoluted. Readers may also take issue with his conclusion that the growing impersonalization, ferocity, and magnitude of violence that will characterize the future battlefield will necessarily abolish battle. Military professionals may hope Keegan is correct in his assessment, but historical experience suggests otherwise. These problems, however, do not in any way detract from the importance of the book. Keegan has managed to recast the field manual concepts, such as shock action, fire discipline, and the offensive in human terms. More importantly, he has identified the basic dilemma of battle: how does the commander get men to do what is inherently not in their self interest, to overcome fear and exhaustion, to brave the incredibly hostile environment of the battlefield to destroy another man who is intent on doing the same? The reader is tempted to conclude that the remarkable thing about battles is that they are fought at all.

This is a book that should be read not only by the military professional, but by society as a whole. It is not only a military history, but a study of the nature of man.

Major Roger J. Arango
USMA



RECOGNITION QUIZ ANSWERS

1) U.S. M-113
2) U.S. M-113/Vulcan
3) Britain FV 432
4) France AMX VCI
5) Sweden APC 302
6) Japan SX 60

Coming in ARMOR

ANNUAL ARMOR CONFERENCE

Texts of addresses and briefings presented before the Annual Armor Conference at Fort Knox, 16-19 May, will be featured in the next issue of ARMOR along with photographs of other conference activities.

"A LOOK TO THE FUTURE"

James C. Kelton and First Lieutenant Edward G. Albertson describe the Army's newest approach to armored combat vehicle design and development which integrates high mobility and agility with weapons systems, fire controls, human factors, and crew functioning.

"DEADLY AS A PRAYING MANTIS"

*The Air Force's new **A-10** makes it "wise for us to reexamine our premise that, 'the tank is the best antitank weapon,' " says Major Jimmie B. Quinn in his article detailing the history and development of this formidable aircraft.*

"COMMUNICATIONS ALTERNATIVES FOR THE MODERN BATTLEFIELD"

Major L.D. Holder addresses the problem of communications in the face of intense electronic countermeasures and proposes greater emphasis on the use of nonradio signal means in our doctrine and training.

ARMOR

july-august 1977

TANK FORCES MANAGEMENT: MAN AND MACHINE

US 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."

Cover

The modern tank, in the hands of trained tank crews, with its markedly increased effectiveness, is and will continue to be a dominant force on the battlefield. The results of the Tank Forces Management Group's 10-month review of the way the U.S. Army manages its tank forces are reported by Lieutenant General James G. Kalergis in an article beginning on page 5.

July-August 1977
Vol. LXXXVI No. 4

ARMOR

the Magazine of Mobile Warfare

ARMOR Magazine is published bimonthly by the U.S. Army Armor School at 4401 Vine Grove Road, Fort Knox, Kentucky 40121, to stimulate interest in, provoke thought on, and provide an open forum for decorous discussion of professional matters. Unless otherwise stated, material does not represent official policy, thinking or endorsement by any agency of the U.S. Army. Use of funds for the printing of this publication have been approved by the Department of the Army, 23 December 1975.

SUBSCRIPTION RATES: Individual subscriptions to ARMOR are available through the U.S. Armor Association, Post Office Box O, Fort Knox, Kentucky 40121. **Domestic:** $8.00 one year, $14.00 two years, $20.00 three years. **Foreign:** $10.00 one year, $18.00 two years, $26.00 three years. Single copies: $1.50.

CORRESPONDENCE: Address all correspondence to U.S. Army Armor School, ATTN: ATSB-MAG, Fort Knox, Kentucky 40121. (Telephone: Autovon 464-2249 or Commercial (502) 624-2249).

POSTMASTER: Controlled circulation postage paid at Louisville, Kentucky, Department of the Army, DOD 314.

ARMOR may be forwarded to military personnel whose change of address is caused by official orders (except to APO addresses) without payment of additional postage. The subscriber must notify the postmaster.

LETTERS

A Vote For Battleruns

Dear Sir:

My compliments to Major John B. Whitehead for his excellent article stressing the need for platoon battleruns which appeared in the March-April 1977 issue of *ARMOR*. As one who has made the Table VIII run as a tank commander and guided *Sheridans* through the same maze as an armored cavalry troop commander, I am well aware of the strangely inadequate feeling Table VIII leaves one with. As one of my proud platoon sergeants, who had just qualified "Distinguished," told me, "Damn it, if we could do that as a platoon we'd be ready."

As Major Whitehead pointed out, progress is being made and some units are conducting Table IX training. Clearly, we must continue to push for battleruns until all tank and cavalry platoon members can say, "Now, we're ready."

B. B. BELL III
Captain, Armor

Lubbock, TX 79409

Inaccuracies of "Reflections"

Dear Sir:

Lieutenant General Starry's article, "Reflections" (*ARMOR*, January-February 1977) was excellent and certainly summed up our reluctance to learn from past mistakes even though we continue to preach to ourselves to do so. I do feel, however, that the reflections regarding combat service support did not do justice or reflect the true picture of what the dedicated supply and maintenance units displayed in Vietnam.

The statement that maintenance units tended to *want* to operate *well* to the rear seems rather unkind and surprising. Where was the rear in Vietnam? It was everywhere and I suggest that maintenance units, both general support (GS) and direct support (DS) operated the same as the tactical elements; that is, in locations where they could best perform their missions. It is the overall commander's decision to determine what "price" is paid for secure GS/DS maintenance locations and it appears that the relatively secure enclaves were the best locations at the time for the units charged with providing a high level of maintenance support. When a mainentence unit must devote a major portion of its time to fight, it's obvious that the tanks and trucks are not going to be repaired. Moving the maintenance element closer to the customer is surely not the complete answer. It appears to me that the answer is to position service elements where they can best perform their mission and maintain open lines of communication to the forward elements. It should be noted that our sophisticated weapons systems which require complicated test and diagnostic equipment not found at the unit level is one culprit causing much of the problem.

Another culprit mentioned by "Reflections," which did as much to damage the supply system, which in turn made it less responsive to the tactical command in Vietnam, as much as anything else was "scrounging." In order to scrounge, the supplies must have been there in the first place so we really didn't help ourselves by bypassing the system; we compounded the problem. Yes, scrounging put a tire on the jeep and a tube in the radio, but soon all the tires and tubes were scrounged with no replacement coming in because the supply manager was not aware that his wares had been "ripped off." That's when the long, long wait for a part begins.

"Reflections" is only partially correct concerning U.S. Army logistics policy for area support by supply and maintenance units. According to current doctrine, area support is provided by GS units, but what is the real difference between GS and DS maintenance? There really isn't much a GS man can't do that a DS man probably already has tried. It boils down to some more-sophisticated test equipment assigned to GS level. It should be noted that all armor units with the one exception of the armored cavalry regiment (ACR) have organic direct support units. Even now, an organic support squadron for the ACR is being developed based upon repeated recommendations from not only Army tactical commanders, but logistics personnel as well. The 11th ACR in Vietnam did have problems, primarily in Class IX support when moved from one sector to another, and this problem would have been eased to a great degree had it been assigned an organic support squadron.

As for an increase in supply and battlefield recovery vehicles, it would seem on the surface that we should provide the additional vehicles to the armor units. But is this course of action feasible or cost effective? The addition of 12 *M-88's* alone to each of the three active armored cavalry regiments would cost over $6-million. It appears more practical to maintain a central fleet of recovery vehicles and trucks within the GS level which would meet the needs of the combat element with the highest priority assigned by the commander. This flexible reserve pool of assets is the cost-effective answer to fielding combat elements with large quantities of support vehicles.

As for battlefield recovery, current doctrine is sound. Comments in "Reflections" about support units "immobilized far to the rear" are really not fair to the personnel who manned those units or to the commanders who placed them there. The recovery portion of these maintenance units were far from immobile as they continually provided backup evacuation support.

I feel any reflection of past performance or lack of performance from which a lesson might be learned and more importantly, profited by, should answer the following questions:

- Why did maintenance units operate from locations which placed a burden upon the customer?
- Why did the 11th ACR find it necessary to line-haul battle damaged vehicles 150 kilometers without backup support?
- Why was it necessary to scrounge?
- Why haven't we learned from past mistakes?

GEORGE R. ALBERT
Logistics Specialist

Fort Lee, VA

"Enough Already"

Dear Sir:

It is time the Armor community rears back and says, "enough already." I am referring to an article which appeared in the *Army Times* on 25 April 1977. The article indicated that proposals have been made to the Commander of TRADOC, one of which recommends the addition of an additional crewman to tank crews. I wonder if the suggestor intends to strap the extra man to the sponson box on the back deck? I seriously doubt if this individual has ever been in an *M-60A1* tank or the *M-60A2* tank. Perhaps this proposal is to affect tanks not yet developed?

It is difficult enough to maintain a four-man crew per tank without adding another vital position requiring trained personnel, however this is of least concern. Consider the necessary increase in vehicle size and weight to accomodate the additional crewman.

Now, if the proposal is intended to provide this "fifth" crewman as a backup, in order to insure a full "four-man crew"

then, I say, "Do it." Unfortunately, I do not believe that to be the intent.

I cannot understand how a suggestion as preposterous as this could reach the level it did, the TRADOC Commanding General. I have personal knowledge of suggestions, reasonable ones at that, which never get beyond the local division headquarters, how did this one get by?

Okay Armor community, let's have some response.

LYMAN L. HARROLD
Captain, Armor
Arkadelphia, AR 71923

The Messenger

Dear Sir:

The brief article entitled, "Jamming and Aerial Surveillance," that appeared in the Professional Thoughts section of the March-April 1977 issue of *ARMOR* highlights the most important aspect of command and control—communications. Regardless of the level of command, whether it is Joint Chiefs of Staff (JCS) to Commander-in-Chief (CINC) or company to platoon, we must have survivable communications through which to direct our forces. As Major Schultz points out, we credit the Soviets with a significant capability to jam our battlefield communications. He makes a good point regarding the Soviet use of low-frequency carrier wave (CW) and Morse code.

I am gratified to see that Army Training and Evaluation Program (ARTEP) 17-205 for the Air Cavalry Squadron requires the communications platoon of headquaters and headquarters troop (HHT), to establish and operate a CW net at a minimum of 10 words per minute. The ARTEP also states that preventive electronic counter-countermeasures (ECCM) are incorporated into the planning of squadron communications.

However, one particular means of communications, although not excluded, is not mentioned in the ARTEP. This means of communications is probably the most secure and most reliable one we have. I am talking about, of course, messengers. It is not inconceivable that messengers will be the only feasible means of communications available to us on the European battlefield. We have the capability to implement an effective messenger network. We must plan and organize that capability, and we must train to use it. The modes of transportation for the messenger are many and varied. Obviously, the helicopter must be used to the maximum extent practicable. The ARTEP's should specifically incorporate this means of communications.

CARL B. STEVENSON
Colonel, Armor
Maxwell AFB, AL 36112

Oops! My Error!

Dear Sir:

I am writing this note to express my apologies for a gross error, entirely my fault, which is included in my article, "German Antitank Methods" in the March-April 1977 issue.

On page 23, I stated that "Armored fighting vehicles were thrust upon the unsuspecting Germans at the Battle of *Cambrai* in *1916."* This is, of course, wrong, since British tanks first saw action on the Somme, in September 1916.

I assure you that my proofreading and editing, in any future article, will improve!

ROBERT P. ARNOLDT
Oak Park, IL 60304

So will ours. ED.

Credit to Youth

Dear Sir:

Your editorial, "Point to Ponder," (*ARMOR,* January-February 1977) was first rate. But I can't agree with your final sentence; I believe that more and more of our young soldiers are coming around to the philosophy of mobile warfare. As men my age finally filter out of the ranks and take their hardheaded prejudices with them, especially the straight legs, the new breed, the young lions if you will, will dictate the doctrine. And I'm confident that doctrine will be based on highly mobile warfare. Sure, the debate will continue. But that debate, as you have astutely observed, will be on relative strengths, organizations and trade-offs, not on mobile vs. static warfare. Don't worry, our philosophy will be absorbed by lots of people.

JOHN R. BYERS
Colonel, Retired
Alexandria, VA 22308

Dear Sir:

I wish to respond to the letter written by Second Lieutenant Barry D. Nightingale, March-April 1977, in which he indicated that a "gap of understanding" existed between Armor and Field Artillery.

I do not perceive that a gap of understanding exists, but rather what should be perceived as the initiation of communications between the branches. It is encouraging that young officers, such as Lieutenant Nightingale and the FA lieutenant whom he referred to in his letter, are responding with constructive comments and criticisms.

Two years have passed since my article appeared in *ARMOR* and my philosophy remains the same. New developments have come about since then, which have reinforced it—developments such as the handheld laser rangefinder for the forward observer and the three-tank platoon concept which will be tested at Fort Hood. I still insist, just as I did then, that the situation and the commander will dictate what is best to meet the demands of the battlefield at any given time.

Keep up the good work, Lieutenant Nightingale. It is enlightening to see comments on letters and articles from our junior officers and particularly so when an article I have written receives those comments.

LYMAN L. HARROLD
Captain, Armor
Arkadelphia, AR 71923

Possible, But Not Probable

Dear Sir:

I would like to comment on Colonels Bahnsen's, *"A Swarm of Locusts"* (*ARMOR,* March-April 1977).

As everyone knows, the main disadvantage of aircraft (*especially* rotary-wing types) is maintenance. Unless the Bahnsen *LAHX* (light attack helicopter-experimental) can be maintained by two men—pilot and *one* ground crewman—the maintenance and administration tail will wag this locust just as for "normal" helicopters. If this maintenance problem can be solved, then we can have "A Swarm of Locusts."

Colonels Bahnsen's comments on taking advantage of those semi-martial sports such as hunting and marksmanship is politically naive at best. Both of these sports are under constant, heavy attack by the "left-liberal" community, and could well be considered as "endangered species."

As for "camping," I assume that backpacking and mountaineering are referred to here. Most backers and climbers would throw up their hands in horror at their first sight of typical military gear.

As for semi-military "sports helicopters" and competitions, forget it! The FAA would faint at the slightest mention of such a program.

The Colonels Bahnsen have an excellent idea, but some major political changes would have to occur to make their idea feasible.

ROY L. WILSON
Harlem, GA 30814

A Reader Replys

Dear Sir:

In reference to page 49 of the January-February 1977 issue,

"WHAT'S A VART?"

A Vart—is a brief episode of flatulence—auf Deutche!

GEORGE H. BROWN
Lieutenant Colonel, Retired
Morris, IL 60450

THE COMMANDER'S HATCH

MG JOHN W. McENERY
Commandant
U.S. Army Armor School

ARMOR'S PROFESSIONAL HOME

If you wear Armor or Cavalry brass, if you are assigned to an Armor or Cavalry unit, or just professionally interested in Armor, then the Armor Center at Fort Knox is your professional home.

The training system of the Army is designed to support the combat readiness of all troop units. The lethality of a modern land-war battle, which assuredly will become even greater within the next decade, demands that our operating forces attain and sustain the highest possible state of readiness. The combat effectiveness required to meet this challenge can only be obtained with the most modern weapons systems manned by highly proficient individuals and crews and directed into battle by leaders who have mastered the tactics and techniques of modern land warfare. The proficiency of these crews and tactical leaders is the target of training in the Army, which is a joint responsibility of TRADOC and units of the operating forces. Within TRADOC, we at Fort Knox have the training responsibility for Armor and serve as your professional home.

The Armor Center is proponent for the development of doctrine, organization, tactics, and techniques for Armor units and for the professional development of officers and enlisted men.

As the home of Armor, the Armor Center first applies to the training system the combat developments process working systematically with the concepts, weapons, organizations, tactics, and techniques of the future Army. Integrated into combat developments is the equally rigorous analytical effort of training developments, which adds training standards, instructional techniques, and training devices. Training development analysts overlap their products with today's weapons, organizations and tactics. Finally to complete the training system, all the products of the developmental effort must be packaged and delivered to the operating force—the function of training support.

Equally important to force readiness is the function that the Armor Center performs as the entry training ground for Armor officers and soldiers. This initial entry training ensures that new leaders and soldiers have the proper skills and knowledge to be able to serve proficiently in their first duty assignments. At your professional home, enlisted soldiers attend one station unit training (OSUT) wherein they learn how to perform the critical tasks of 11E's and 11D's as well as attend advanced individual training (AIT) where they learn to be tank and turret mechanics (63C, 45N, 45P, 45R). Soldier's Manuals which tell a soldier what he must know or be able to do at each skill level and Skill Qualification Tests (SQT's) which validate proficiency are also developed at the Armor Center. Initial entry training for officers takes place in the Armor Officer Basic Course where the new lieutenant learns how to be a platoon leader.

Reinforcing the readiness support role of your professional home is the periodic return of branch officers and noncommissioned officers for professional development and training. This training prepares them for positions of higher responsibilities in the operating forces. For enlisted personnel it lincludes:

- Primary Noncommissioned Officer Course (PNCOC)—leadership training for prospective junior leaders.
- Basic Noncommissioned Officer Course (BNCOC)—critical skill level 3 training for 11D and 11E.
- Advanced Noncommissioned Officer Course (ANCOC)—advanced training for noncommissioned officers.
- Drill Sergeants School—training for BCT and OSUT drill sergeants.

In the Armor Officer Advanced Course, the Armor Center trains captains to be competent company commanders and battalion staff officers. Additionally, the Armor Center is a source of extension training, such as Field Manuals (FM), Training Circulars (TC), Training Extension Courses (TEC), and the Army Training and Evaluation Programs (ARTEP)—all of which are pointed towards enhancing the combat readiness of the Army in the field.

All of this is the function of your professional home. Most of you have attended initial entry training here and many of you will return for subsequent training or tours wherein you will be contributing members of the professional home. It's this infusion from the field that will keep your professional home viable. Your home also needs new ideas and thoughts from those of you who are in the field. Specifically, some of what we need to know is how our recent graduates are doing, whether the doctrine in the How-To-Fight Manuals is correct, whether our ARTEP's provide you the tools for proper evaluation and training of units for the missions that you perceive your units must be prepared to perform, and whether Soldier's Manuals do the same for the individual and whether the SQT's properly test the performance of soldiers. You can let us know your ideas in many forms—evaluation forms filled out in your ARTEP's, letters and articles in *ARMOR* Magazine, letters to me, or informal comments to your contacts at the Center. In any event, let's continue and expand the dialogue with your professional home.

TANK FORCES MANAGEMENT: MAN AND MACHINE

The Tank Forces Management Group (TFMG) has completed a 10-month review of the way the United States Army manages its tank forces. In fact, this review should be considered the result of a 4-year effort, since the base for the review is the studies conducted by TRADOC, which culminated in the Total Tank System Study (T^2S^2). T^2S^2concluded that the combat capability of the Army tank force was degraded because of existing management deficiencies in the functional areas of personnel, logistics, training, and tactical employment. Our findings not only support, but reinforce these conclusions.

But why focus on the tank? With approximately 36 percent of the Army's firepower, the tank dominates the ground battlefield as the key member of the combined-arms team—a dominance that will be greatly enhanced as new systems enter our inventory.

The TFMG was formed by the Army Chief of Staff and chartered to develop, present and coordinate implementation of a program to optimize the combat potential of the tank force and in turn, capitalize on the opportunity for improved combat capability in this vital part of the Army.

So that there is no uncertainty as to what is meant by a program to optimize the potential of the tank force, let's spell it out. It's a program:

- that gets the best available tank in direct confrontation with our opponents
- in sufficient numbers,
- in time during the critical early days of the battle,
- as part of a combined-arms team,
- with appropriate doctrine and organizational structure
- manned adequately
- with fully trained personnel both initially and continually
- and logistically supported and modernized on a continuing basis.

The modern tank, in the hands of trained trank crews, with its markedly increased effectiveness, is and will continue to be a dominant force on the battlefield.

For example, the *XM-1* is vastly more effective than the *M-48-series* of 20 years ago, and 2½ times as effective as today's *M-60A1*.

The tank is only one of a significant number of more

effective weapons coming into the Army's inventory; e.g., the artillery cannon is 10 times more effective than its World War II predecessors.

More than ever, the next war will be a war of machines manned by men. With this increasing number of modern weapons, the Army has been and will continue to be faced with a steep rise in the management burden caused by both quantity and complexity. As a matter of fact, we have not been getting the full capability out of our modern weapons systems and this is clearly depicted by the current gap between the full combat potential of the tank and the actual performance—a gap caused by the way we manage that part of the force. The challenge is to raise the management proficiency to close this gap and get the full capability out of the tank and other modern weapons systems.

Today, with rare exceptions, the Army basically uses a functional approach to management of its resources. The general thrust is to develop and sustain combat-ready units by improving functional subsystem process efficiency, that is, by perfecting each subsystem process such as development, personnel, etc. To determine the effectiveness of this management approach on the tank weapons system, each of these functional subsystems was examined in detail to determine its ability to focus support on the tank weapons system as well as the Army as a whole.

To do this, it was necessary to step outside of the conventional approach, however, and start thinking about the tank as a total system or a combination of these subsystems of personnel, training, logistics, and hardware. In fact, insight was not really gained until it was recognized that "cutting the problem down to size" could be most misleading in today's complex technological world. *Assuming that the obvious problem is the real one was the wrong approach.* In fact, the visible aspects of a problem were merely symptomatic of much bigger problems in the whole system. Using a total system approach that seeks to optimize the performance of the whole system, it was found that initial and commonly accepted impressions and solutions did not stand up. The interaction between subsystems is critical to the final solution when one focuses on the weapons system, rather than on each functional subsystem.

As a result of our systems approach, we developed a total of 83 specific recommendations which break out by functional subsystem as follows:

Personnel

Requirements	9
Training	4
Distribution	6
Sustainment	6
Management	3

Training

Initial entry training	4
Professional development training	5
Collective/combined-arms training	4
Reserve-component-unique training	2
Organizational training	1
Management	5

Logistics

Fixing	10
Arming	6
Fueling	6
Management	3

Development

Science and technological base	3
Tank system development	4
Resource allocation	2

To capture the gist and substance of these recommendations as well as the total weapons system approach, I will briefly describe and discuss a representative group from each functional area. I will discuss Development in conjunction with **Total Tank Systems Management.**

Personnel

In general, the personnel system could be described as vertical, complex, time-dependent, designed in some cases for peacetime operations, functionally-managed and focusing on the process of the system rather than the product—and definitely not weapon-system oriented.

Tank Crewmen

The most significant personnel finding is that the number of tank crewmen is at the razor's edge. Having precisely four crewmen per tank statistically guarantees inadequate performance during peacetime in gunnery, tactical training, and maintenance. In wartime, it guarantees entry into combat short of trained tank crewmen, an immediate degradation of capability by 25 or 50 percent per undermanned tank, and an inability to fight the tank up to its full capability, i.e., around-the-clock operations. Accordingly, we have recommended that an additional tank crewman, per tank, be authorized to tank companies.

Separate Career Management Field

The source of many management problems was traced to the lack of a separate career management field (CMF) for armored enlisted men. Accordingly, it was recommended that a separate CMF be established for armor crewmen and armor reconnaissance crewmen. This CMF will identify specific skills for specific positions on discrete tanks and other armored vehicles. The introduction of this armor CMF is to be coordinated with the initiation of weapon-system oriented initial entry training for these crewmen.

Additional recommendations include that specialty skill identifiers (SSI's) for Armor officer position identification and career management be established—and that this be coordinated with the beginning of training entry level officers on discrete weapons systems and specific type platoons in the Armor Officers Basic Course (AOBC). This plan is ready; transition into it will take about 1 year.

Formal Training for Reclassified NCO's

If reclassification is required to fill Armor NCO ranks, it must be done right. Fourteen percent of Armor E5/E6 operating strengths in fiscal year 1976 were in that category.

The duties of a tank commander require complete technical expertise in the weapon system. This is not now being accomplished. A recommendation which closely interrelates with other training recommendations is to develop a formal course of instruction providing technical proficiency for NCO's reclassified into an Armor MOS.

Branch-Qualified CSM/1SG

Since 1973, 20 percent of the E7's selected for promotion and assigned as Armor first sergeants have been from other than MOS 11E. In early January 1977, the background of command sergeants major in 37 tank battalions and cavalry squadrons was examined. It was found that 14 had prior Armor experience, 13 did not, and in 10 cases, data was not available. Three of the CSM's without Armor experience were 71D or legal clerks. During the same period, it was determined that there were over 40 Armor-qualified command sergeants major in other than Armor units. Accordingly, it was recommended that only branch-qualified command sergeants major and first sergeants be assigned to Armor battalions and Cavalry squadrons.

Flexible Grade Structure

Internal tank crew turbulence degrades combat readiness. One of the big contributors to this turbulence is the vertical progression system (that is, grade matched to crew position). Our recommendation would be to modify the rigid tank unit TOE structure so that even though total numbers of personnel by grade in the unit would not change, enough flexibility would be permitted the commander so he would not have to move an EM who does his job well and is promoted.

Tank Management Office for Personnel Management

Department of the Army personnel managers focus on Army-wide strength levels and overall MOS balance. The lack of a centralized personnel weapon-system orientation results in policies and actions which optimize personnel processes without considering the impact on the weapon system. This disconnect between personnel management and the weapon system degrades the combat capability of the force in the field. Based on this situation, it has been recommended that the Army organize a tank management office within MILPERCEN, ODCSPER, and selected MACOM's.

Some of the other personnel objectives that will be achieved when the personnel recommendations have been fully implemented include: operational tanker's uniform, readiness reporting (four digits), PI profiles, and a review and analysis capability.

Training

The current armor force is not trained up to the capability of its weapons systems. There is room for significant improvement. Adding to that conclusion is an awareness that armor weapons systems of ever-increasing complexity and types are being fielded to meet the Threat. This can only lead to the realization that rapid changes must be effected in the way Armor crewmen and units are trained if Armor forces are to have the proficiency to achieve their full potential on the battlefield.

There is a continuous interaction of the various trainers in the major areas or phases of training. Professional development, collective, and combined-arms training all continuously feed into one another with the process beginning with institutional entry-level training. There is a shared responsibility by all commanders and resource managers in the training process, whether it be individual, collective, or combined arms. As in the other functional areas examined, to ignore the interdependence and interaction of the other functional subsystems of personnel, logistics, and development could be counterproductive to achieving a lasting system solution.

A major contributing factor to the current lack of technical proficiency is that the current nonsystem-specific tank crewmen and officer entry-level training is not producing the expertise required.

Other causes that I will not cover in detail include:

- The failure to properly identify the product of the Army school system results in distributing trained individuals to places where they are not needed and producing errors in the complex system of determining requirements.
- The failure to properly plan in the development phase means that such things as a full-crew interaction simulator and other training devices are just not available for a proper training program.

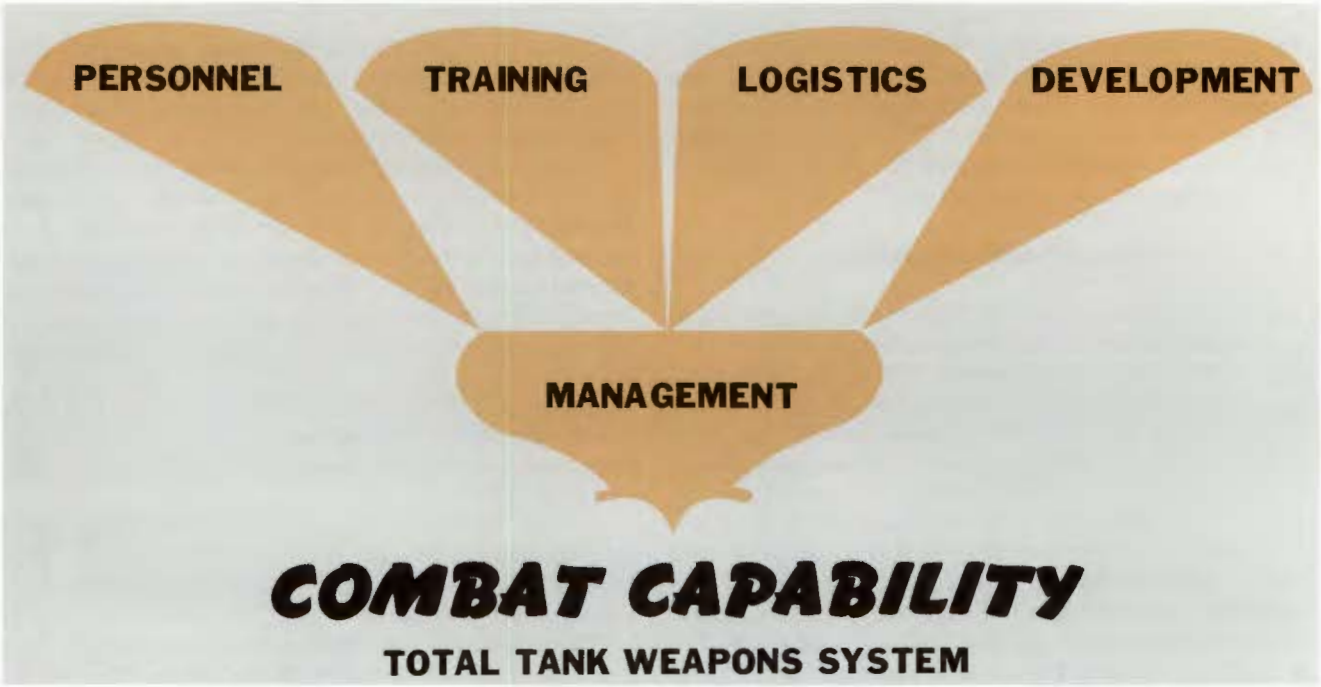
Entry-Level Training

An important finding is that entry-level training for Armor officers is too general and does not produce platoon leaders technically qualified for initial entry duties. Accordingly, the recommendation is to train platoon leaders in AOBC to be technically competent in all crew positions, and as a platoon leader by discrete type tank and type platoon.

In addition, the proposed training program for Armor crewmen at entry level will produce a trained loader/qualified gunner for a type-tank family, or a tactical driver with upgraded maintenance skills for a type-tank family. These changes will require the establishment of transition training to accommodate individuals who are required to go from one type system to another.

Tank Commanders

Tank commanders' skills are not developed fully through the current nonstandard on-the-job experience (OJE). The U.S. Army is the only major Army that does not have a formal tank commander's course. Tank commanders have traditionally been trained through on-the-job experience. The "homegrown" training of the tank commanders is uneven, creates a considerable burden on the training resources of the unit, causes a built-in readiness detractor, and does not have the capability to train tank commanders from Basic Armor Training during mobilization. The Basic Noncommissioned Officer Course (BNCOC) in the Noncommissioned Officer Education System (NCOES) currently focuses on training the tank commander in the nontechnical



aspects of his responsibilities. The proposed tank commander's course would modify BNCOC to include the validation of tank gunner's skills and the qualification of the student in the technical responsibilities of the tank commander at Skill Level 3.

Maintenance Professional Development

Current maintenance training programs are not producing competent tank technical and maintenance management supervisors. Professional development training for most technical maintenance personnel is extremely limited. Maintenance personnel are developed through on-the-job experience which does little to upgrade their technical skills, introduce them to new equipment, or train them in maintenance management procedures. Based on this finding, plans are underway to establish professional development training programs for tank system maintenance enlisted men and warrant officers, which are vehicle specific, provide advanced technical and management training, and recognize separate technical "Master Mechanic" and maintenance management tracks at the higher enlisted supervisory levels.

Training Standardization

Current Tank crew training worldwide is not standardized, degrading crew proficiency and compounding the effects of normal rotational turbulence. As long as the U.S. Army retains the individual replacement system, it will be of utmost importance that tank force soldiers be trained so that they are interchangeable. This finding led to a recommendation to standardize Armor force training and to consider establishing a system to accredit or certify key training activities and facilities.

Other Training issues addressed include:

- Getting a better handle on armor training devices,
- Conducting a cost- operational-effectiveness type analysis to quantify additional assets that would have to be authorized Reserve Component tank units to enable them to meet their readiness objectives,
- Addressing the capability of Reserve Components to recruit and train tank crews in a close affiliation program with deployed divisions, and
- Coming to grips and fixing responsibility for training at the DA level.

A quick summary of the objectives of training recommendations includes:

- Platoon leaders who can fight their tank and train their platoons,
- Qualified entry-level tank crewmen and mechanics,
- NCO's. . .who can train their men,
- More time for combined-arms training,
- Trained RC crews/crewmen replacements,
- Means to conduct more efficient and effective combined-arms training, and
- Best tank . . . at right place . . . in best organization.

Improved entry-level and professional-development training at the institution will reduce the requirement to conduct individual training in the unit. In turn, it will be easier for units to integrate individual skills into collective skills. This will free resources which can be redirected into more-advanced, combined-arms training. Combined-arms training under simulated combat conditions will bring the Tank Force closer to achieving its ultimate goal—full combat readiness.

The equipment investment and combat power return potential of the Tank Force more than justify a greater training investment in terms of resources and priorities. This increased training investment must be long term and in harmony with improvements in the other systems.

It is not the capability of the tank that wins the battle, but rather it is the ability of the crew to use the full capability of that tank which is decisive.

Logistics

The tank is a complex, sophisticated weapon which relies on the proper interaction of equipment, trained personnel, and responsive support. The tank force is highly dependent on timely logistical support for sustained operations.

The current Army logistics system is resource-constrained; therefore, it must balance peacetime efficiency against the capability for wartime effectiveness. It is functionally and commodity oriented without significant weapon system orientation. Logistics is heavily dependent on automatic data processing (ADP) and requires exacting procedures and highly sensitive equipment to accomplish its functions. The system is complex with varied activities requiring interdependency of effort. The technical channel becomes diffuse in echelons above division. Central direction is difficult to achieve.

Again, an example from the logistics area can be used to illustrate the importance of focusing on the total tank weapons system to reach a system solution rather than solely on a functional subsystem such as training, personnel, or logistics.

The TRADOC T^2S^2 concluded that—"Tank availability is hampered by current generalized logistics support system."

This is indeed true, but by no means the complete story. There are also problems definitely caused by equipment turbulence and the organization and problems of the repair part system. But to get a higher availability of tanks, there are improvements needed in the entry-level training of mechanics and prescribed load list (PLL) clerks, and more general support units (*Training*). Increased authorization of maintenance manpower to match the complexity and quantity of equipment is required, as are sufficient tank crewmen to perform effective maintenance (*Personnel*). Finally, proper advance planning during the weapons development phase is required to ensure supportability of the system when it is fielded (*Development*).

Basic to understanding the logistics maintenance system is understanding the role of the input from the lowest echelon which drives the system.

The actions of individuals at the lowest level—the operator, the organizational mechanic and the PLL clerk—drive the *Fixing* function. Supporting organizations respond based on the stimulus to the logistics system initiated by these individuals who are of the lowest ranks and have the least training and awareness of the total system.

The operator must ensure proper operation, perform basic preventive maintenance services, and properly detect equipment failures. The improper completion of these tasks can cause serious disruption in the *Fixing* system and can lead to operational mission failure.

To support the operator, the organizational mechanic must conduct fault diagnosis when equipment failure occurs. If the mechanic's diagnosis is incorrect or the repairs are poorly accomplished, the repair system is stimulated unnecessarily and its actions are improperly oriented.

The PLL clerk's actions are the basis for the Army's system of demand-based repair parts stockage. Improperly completed, these tasks not only cause erroneous stockage throughout the system, but may prevent a critical weapon system from being maintained in an operationally-ready status for want of an essential repair part.

The 25 logistics recommendations fall into the four categories of *fixing, arming, fueling,* and *management.* A discussion of a few findings and recommendations in each of these categories will provide a general idea of the ground covered.

Repair Parts System

The current system of providing repair parts is marginally adequate in peacetime. The objective of maintenance operations must be to attain the highest state of equipment readiness prior to outbreak of war and to ensure the sustainability of the force during the first days of the war. Class IX (repair parts) processing is heavily dependent on continuous automatic data processing equipment (ADPE) operation. Reliance is now placed on the direct support system (DSS) with minimal overseas stockage. The mobility of divisional authorized stockage list (ASL) and PLL stockage is currently inadequate.

Current PLL/ASL stockage does not accurately reflect true combat needs because it is based on peacetime usage constrained by funding considerations. The adequacy of this stockage is further degraded by marginally effective PLL clerks. The end result is that the positioning of repair parts, including DX components and major assemblies, does not appear commensurate with the doctrinal concept of forward tank maintenance.

The basic recommendation covering this was to review current repair parts (PLL/ASL) concepts and develop ways to simplify and improve readiness for war.

Other recommendations in this area included exploring new procedures in an open-ended review which considers:

- Wartime sustainability of management information systems (MIS) operations.
- Validation of Wartime Repair Parts Consumption Planning Guide and Combat Damage Assessment Mode.
- Desirability of shipment and/or prepositioning of "push" packages of tank essential repair parts for emergency purposes.

System Specific Maintenance Training

Tank diagnostic and maintenance tasks too often exceed the abilities of the soldier who receives functionally-oriented, multisystem training. The large quantity of highly-sophisticated equipment which will be introduced into the Army inventory during the next few years will further aggravate this situation. This rapid addition of new technology requires significant additional technical expertise to ensure operational and maintenance proficiency.

The solution of this problem appears to be providing maintenance and supply personnel with system-specific training at the initial-entry level with follow-on corresponding professional development training. This means an entry-level 63C track vehicle mechanic going to an *M-60A1* unit will receive his initial-entry training on that family of vehicles and will cross-train on other vehicles later. Likewise, a general supply clerk who will be a PLL clerk will initially receive training in that field—something which does not happen today.

Technical Documentation

Technical documentation for tank systems is complex, often incomplete and not readily comprehensible to supply and maintenance personnel. Significant advances are possible in this

area. The *XM-1* tank documentation will be improved.

But because this problem was considered so serious, it was recommended that the Army provide improved technical documentation for tanks, supporting vehicles, and equipment of the tank battalions and cavalry squadrons.

Other fixing recommendations focus on the tank as a weapons system and address improvements in providing dedicated support at the organizational, direct support, and general support levels. Many of these concepts are already being tested at Fort Hood. Others will be tested during the Division Restructure Study tests.

In the area of ARMING, ammunition packaging, unit ammunition vehicles, material handling equipment and combat vehicles have been developed independently, resulting in a manpower intensive, time-consuming, rearm operation for armor forces. Packaging of ammunition has remained relatively unchanged since tanks were invented. The U.S. Army has no armored rearm vehicle for use in forward area during combat situations. There are insufficient quantities of properly designed materials handling equipment (MHE) currently available to support wartime requirements for this transportation of ammunition. There clearly exists a need to develop a total tank arming system which addresses packaging, vehicles and MHE that minimize handling in forward areas and expedite rearming of the tank.

Development of an improved ammunition supply/resupply system was directed by the Vice Chief of Staff, U.S. Army (VCSA) on 25 March 1977. DARCOM, in coordination with TRADOC, has started a system review of tank, artillery, and infantry rearming systems with completion date scheduled for July 1977.

The Army logistical management system is complex. Emerging logistical concepts in echelons above division and progressive development of the forward-support concept are causing a favorable refocusing of attention within the retail or user system.

Yet, the current functional/commodity organization is not sufficiently responsive to provide the type of support needed to obtain the maximum effectiveness of advanced weapon systems. The number of complex weapon systems which will be introduced into the Army in the next few years suggests the need for a weapons-system orientation within the logistics system.

Equally significant is the lack of knowledge of Army user personnel in the logistics system. Improved knowledge will tend to build confidence and eliminate, to a large degree, faulty requisitions, processing errors, inadequate reconciliation and informal actions to "go around" the system.

Firm discipline, particularly by the user and the logistician, are essential to ensure adherence to existing procedures. This increased discipline, coupled with efforts to improve responsiveness of the supply system, will lead to a more effective system and should restore user confidence.

A common element with all of these actions is that logistics needs a weapons-system orientation—rather than a commodity orientation—in order to have the ability to focus support required by the Tank Force.

Management

Military managers are faced with an ever increasing rate of technological change. This rapid change has frustrated strategic planners and accelerated the rate of equipment obsolescence. In fact, great segments of the military management structure are in what one writer has called a continuous state of "future shock." Further complicating the management challenges is the realization that within the next 10 years, the Army will receive a significant number of totally new weapon systems—the greatest influx since World War II—with a capability for a range of destructiveness not yet seen on any battlefield. These changes have created a demand for better and more effective management methods. *The current management process is not structured to optimize the combat potential of weapons systems.*

On my office wall, there is a 8 x 15 foot chart depicting the hundreds of agencies, staffs, offices, and departments currently involved in managing tank forces at the major command level and above. It is not decipherable from more than 4 feet away and clearly demonstrates the difficulty in trying to coordinate all the activities necessary to focus attention on tank-related problems through extensive bureaucratic layers. Understanding how to approach a problem in a timely manner, in the current complex structure, is about as clearly defined as is that chart on my wall. The problem facing decisionmakers today is how to work their way through this maze to rapidly focus attention on the issues and formulate decisions in a timely manner.

This problem is further complicated because the defense establishment traditionally manages itself through strong vertical functional lines such as personnel, logistics, research, and development, etc. Further, it manages itself by commodities such as automotive and electronics, or it intensively manages certain hardware systems in development. Operational requirements also require geographical responsibilities and management.

Large groupings in complex, tightly interwoven bureaucratic structures cannot cope with today's difficult challenges except in a slow, time-consuming fashion. Small groups, on the other hand, or individuals with responsibility, can pull and push through this maze.

What is Total Weapons System Management?

Total Weapons Systems Management is an intensive management concept in which *the weapons system is the focal point* for action.

- It is a management concept that concentrates on the total system;
- It seeks to *optimize the performance of the whole system* which may or may not optimize the performance of individual subsystems;
- And while a total systems approach concentrates on the whole system and *deals affirmatively* (and that means actively) with subcomponent actions, it also recognizes:
- *Complexity*—and the need for components to deal with each other, providing perspective, analysis and synthesis in generating order,
- *Interactivity* between the various functional areas,
- *Inderdependence* in that decisions and operations of subsystems affect each other, and
- *Integration*—acts to unify subsystem output with the

overall goal of total system improvement.

Is This Concept New to the Army? The only real weapon system manager in the Army is the battalion commander who:

- integrates people, equipment, parts, facilities, and training; and
- exercises leadership and management to unite these functional areas of responsibility.

Tank Forces Management Structure

Under the systems approach, a special management structure would be added to the current management system. This management process will cut across organizational relationships and also stress the timely integration of all aspects of the tank force including development, personnel, training, logistics, and operations.

A conceptual system with a Tank Forces Management Office at the Office, Chief of Staff, Army level is depicted in the figure at right and is described below.

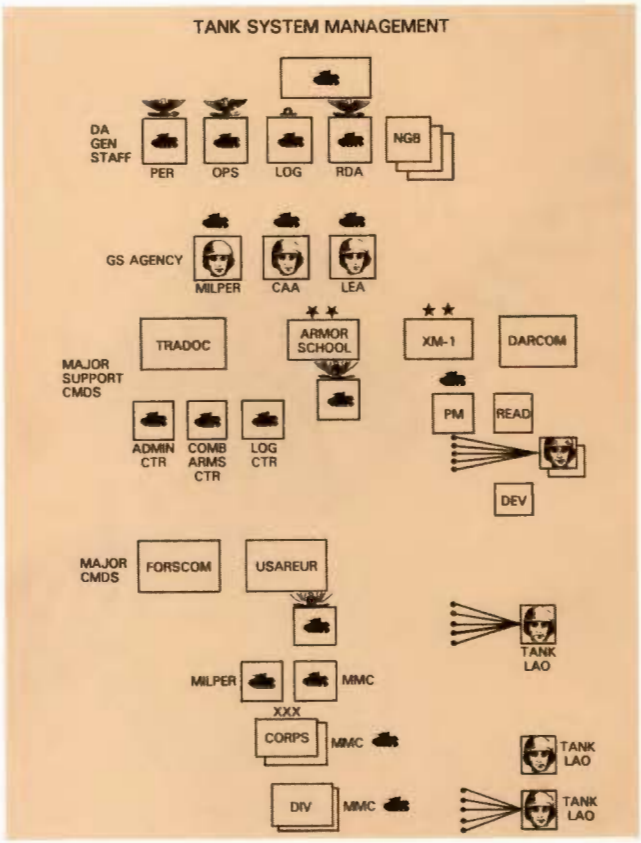
Each of the agencies or elements identified by a face or tank on the chart shows a focal point established to address tank force issues. These focal points are centers of intensive management. They are points of concentration which will be required at each DA General Staff and General Support Agency level. These focal points will also be needed at major support commands to address tank force matters.

Just as there is a project manager for the *XM-1* tank, there is a need for focal points in DARCOM for tank readiness and tank development. In addition, focal points are needed throughout the DARCOM Logistics support system to include the Logistic Assistance Offices down to division level.

The Armor Center Commander's role as the user-representative and the focal point in the Army for tanks, particularly in combat development and training development, is recognized and totally supported. To assist the Center Commander in his functions, there is a need for a focal point in the Armor Center.

There is a need for the focal points to be established at MACOM and Corps level. There is currently a shortage of qualified Armor staff officers at these levels.

This structure is not a separate vertical organization and the focal points do not assume specific assigned functions from existing staff agencies. It works through the existing staff and identifies problems, energizes the staff and assists in coordinating actions of tank-related matters with commanders and managers at various levels.



The goal of Tank Weapon System Management is to exploit the opportunity that now exists in the Tank Force to increase combat capability. By focusing needed resources in a total system environment, there can be a closing of the gap between the potential of the Tank Force and actual performance. Performing up to its design capabilities, the tank as part of the combined-arms team will be better able to fulfill its dominant role on the battlefield.

The Chief of Staff of the Army acted on the findings and recommendations on 27 May. Forty-one of the recommendations which were ready for implementation were approved. Final implementation decisions on the others will be made when continuing studies are completed and resource implications are fully developed. ED.

LTG JAMES G. KALERGIS (Retired) was commissioned from Officer's Candidate School (OCS) in 1942. During his over 33 years of service, he has attended the Field Artillery School, Advanced Course; the Artillery School, Advanced Course; the U.S. Army Command and General Staff College and the U.S. Army War College. General Kalergis holds both B.S. and M.A. degrees.

Within the last 10 years, General Kalergis has served in the following positions: CO, Division Artillery, 2d Armored Division; Deputy Director, Force Planning and Analysis Office, Chief of Staff, U.S. Army; XO to the Assistant Vice Chief of Staff; CG, I Field Force, Pacific-Vietnam; Comptroller, U.S. Army Materiel Command; DCG for Logistics Support, U.S. Army Materiel Command; Project Manager for Reorganization, Chief of Staff, and as Assistant Vice Chief of Staff, Chief of Staff, U.S. Army.

General Kalergis served as the Commanding General, First U.S. Army, Fort George C. Meade, Maryland until his retirement in 1975. He currently heads the Tank Force Management Group.

DEADLY AS A PRAYING MANTIS

by Major Jimmie B. Quinn

The *M-60* was suffering from the grey liberation of many modifications. The *MBT-70* was dying a slow and painful death. The *XM-1* was experiencing multiple birth pains, and nobody could decide who the father should be. And all the while we were fighting a war from the turrets of *M-48's* repossessed from the National Guard. It seemed to those of us who entered the Army in the mid-60's that we might some day regress to fight World War III in *Mark IV's.*

But while the U.S. Army was doing combat with Congress to get a new tank, one of our sister services was quietly ushering theirs off the production line. No, the Marines have not come up with "a few good" tanks. The new weapons system is the Air Force's *A-10* ground attack aircraft. General George S. Patton, Jr. and Daniel Webster might debate the title of "tank" given to an airborne vehicle, however, with the exception of the phrase, "moving on caterpillar treads," this vehicle meets all other prerequisites for being labeled a tank.

It is unrealistic to expect old cavalrymen to think of the *A-10* as a tank, but it might be wise for us to reexamine our premise that, "the tank is the best antitank weapon." Although this awesome jet was developed for close air support (CAS) of ground operations, its optimization as a tank killer should add a new dimension to the air-land battlefield.

Background

Our recently updated Operations Bible, FM 100-5, states "... the Army cannot win the land battle without the Air Force."[1] That's not news to anyone who fought in any of the last three wars. However, what may be surprising is that the Air Force has never supported our ground operations with an aircraft specifically designed and dedicated to a CAS mission. The realization that the Air Force superbly accomplished its CAS mission with aircraft built primarily for air-to-air engagements and low altitude bombings should give us an even greater appreciation for their pilots' dedication and skill.

During the past few years, it has become quite clear that Communist capabilities require us to counter their massive armor imbalance with weapon systems which enhance the antiarmor ability of the air-land forces. Lessons learned in Southeast Asia by the Air Force, reinforced by the current Communist threat, created the need for a close air support aircraft which is "optimized to deliver aerial firepower against enemy armor and mechanized forces."[2] Supersonic speed was not a requirement for the new CAS aircraft because in the CAS role more speed is not necessarily better. Jets won't out run the dense blanket of low altitude air defenses of Soviet combined-arms armies. They must out fly them. It was, therefore, necessary for the new aircraft to be versatile, lethal, and flexible, but even more imperative that it be highly maneuverable and survivable.

Based upon these and a myriad of other requirements, prototypes developed by two major aircraft companies were built and tested during the early 1970's. Tests and evaluations of these prototypes satisfied the Air Force that their specifications had been met. Thus, in January 1973 Fairchild Industries was given the green light for full-scale development. The Department of Defense subsequently approved full-scale productions of the *A-10* for FY 76-77. *A-10's* are coming off the assembly lines now with initial operational status planned for early 1978. The Air Force currently plans to buy a total of 733 *A-10's,* but that figure could conceivably rise.[3] Proponents of the *XM-1* should find it interesting to note here that from the preconceptual to the full-scale production phase of the *A-10,* no one interrupted the process by insisting that the new system have interchangeable parts with any other country's aircraft!

System Description

The *A-10* hasn't been around long enough to have been blessed with an official nickname; but, compared to the graceful, sleek lines of other contemporary jets, it's about as beautiful as a tank in travel-lock. In fact, some fighter "jocks" have referred to it as an

[1]FM 100-5, Chapter 8, p. 8-1, Headquarters, Department of the Army, Washington, D.C., 1 July 1976.

[2]News Release, FI-76-50, Fairchild Industries, Germantown, Maryland.

[3]Fact Sheet, USAF, *A-10 Close Air Support Aircraft,* undated.

"ugly duckling among eagles."[4] With its twin-turbofan engines protruding from either side of the fuselage and its various "gangly appendages,"[5] it looks like a pregnant praying mantis in flight. But, those who must risk their lives in it aren't concerned with its lack of cosmetic aerodynamics. They know that the female praying mantis is so mean she frequently kills and eats her mate after sex!

Test pilots of the *A-10* have been so impressed with the aircraft that some of their praises closely resemble the rhetoric of used car salesmen, describing the system as super, amazing and outstanding.[6] One Air Force officer described the aircraft in real time perspective when he said, "... the *A-10* happens to be the only airplane that will do the job. There is not another aircraft—single or in combination—that can do the close air support mission like the *A-10*."[7]

It is easy to understand why the Air Force is so high on this new jet once you examine the entire system's responsiveness. Beauty was sacrificed for simplicity, and the simplicity incorporates a structure which is about 95 percent aluminum. In addition, it was designed to enable an interchange of many parts from one side to the other. A short takeoff and landing capability significantly enhances its ability to stay in or near the forward combat area. It can actually operate from small, crudely-constructed air strips near the combat zone if necessary. This feature obviously means that we "grunts" (the Air Force's description of *all* Army folks) can rely on greater loiter time from the aircraft. Hours, instead of minutes, over the battle area will mean more pressure on the enemy and will enable us to more "comfortably" accomplish our mission. Bad weather shouldn't stop the *A-10* either. It can operate under ceilings of 1,000 feet when visibility is only a mile. Anyone who has fought the "battles" of Grafenwohr and Hohenfels, Germany, knows how important that all-weather capability will be in a European scenario.[8]

Although considered slow by Air Force standards, the *A-10* can deliver its ordnance at speeds up to 450 knots. Even at these speeds, however, it is considered far more manueverable than any other aircraft. In any case, its payload will be delivered at speeds which optimize performance and at altitudes which give a greater reliability of target destruction.

Herein lies the only real controversy over this new airplane. Some skeptics believe that the *A-10* will never survive in a modern day air-land battle while flying at slower speeds and lower altitudes. The Air Force does not deny that the *A-10* will be subjected to high-intensity antiaircraft fire, and they are honest enough to admit that some aircraft will take hits. But the *A-10* will be extremely difficult to destroy. Its two engines are positioned so as to be partially masked from heat-seeking missles.[9] Specific design features in the airframe allow for hits which will not constitute major damage. Titanium armor plating surrounds the pilot, making him as safe as any tank commander. This same shield protects many of the aircraft's vital controls and instruments. Self-sealing fuel cells and fire-retardant foam permit non-destructive hits in other vital areas of the system. This beauty can even land without any hydraulic power.[10] Additionally, the *A-10* will be armed with the necessary equipment to combat the ever-increasing enemy electronic warfare capabilities. Electronic countermeasures, such as a digital warning system for detection of

---

[4] *A-10 Close Air Support Stone,* by Major Michael L. Ferguson, USAF, *Infantry* Magazine, May-June 1976, p. 26.

[5] Ibid.

[6] *The A-10 Does It Better,* by Major John F. Gulick, USAF, Air Force Magazine, July 1976, pp. 75-79.

[7] Ibid.

[8] News Release, Op Cit.

[9] Ibid.

[10] Ibid.

radar lock-ons with subsequent surface-to-air missles (SAM's) and air interceptors as well as chaff, flare, and jamming pods, will play an important role in the *A-10's* survivability.[11] Couple these technological advancements with its maneuverability and devastating fire power and you can see that the *A-10* can survive the next war.

Survive to fly again it will, but not before it delivers up to 8 tons of ordnance on enemy armor and ground forces. Yep, you read it correctly. The *A-10* will deliver 16,000 pounds of hot steel, which includes laser-guided bombs as well as conventional bombs, cluster bomb units, *Maverick* TV-guided missiles, and antitank rockets.[12] But perhaps the most lethal weapon aboard the *A-10* is a new Gatling gun developed by the General Electric Company. The new gun, *GAU-8/A,* fires a 30-mm. high explosive projectile which will place over six times the total energy on a target than conventional 20-mm. rounds do. It has a capacity of 1,350 rounds which can be fired at a pilot selectable 2,100 or 4,200 rounds-per-minute and can be loaded with armor-piercing rounds.[13] This ammunition has already proven effective against surplus Soviet *T-62* tanks. The Air Force has never had a fighter-mounted gun with the armor defeating capability of the *GAU-8/A* and, with its proven accuracy, it will be extremely effective against all softer targets as well.[14]

Conclusion

Some Army aviators might be concerned that the *A-10* will replace the advanced attack helicopter (AAH) in its tank-killer role, but there should be no concern about that. The roles and missions of these two aircraft are completely different, and they will simply complement each other. There will be a wide array of enemy armor on any future battlefield—more than enough for everyone to "enjoy." Whether one views the *A-10* as an airborne tank or competitor for our attack helicopters, there is no need for professional jealousy here. The *A-10* is a welcome weapon system to our combined air-land forces, and its value to the Army was aptly summarized by our previous Army Chief of Staff, General Fred C. Weyand, "It is heartening to see the *A-10* close air support aircraft attain operational status with the Tactical Air Command. With its ability to range over a wide battlefield, mass to meet heavy armor attacks, carry a varied ordnance load, and add depth to combat beyond the front lines, the *A-10* is a valued partner in the Army-Air Force combined-arms team, one greatly appreciated by the ground soldier."[15]

So the Air Force has a new tank—or airplane—or weapons system by any name. The Army finally has a close air support aircraft specifically dedicated to its support—a war machine as deadly as the praying mantis!

---

[11] *Is EW Still A Pentagon Stepchild?* by Harry F. Eustace, EW, July-August 1976, p. 29.

[12] Fact Sheet, Op Cit.

[13] General Electric Company brochure, 024-516c (3-73), Airborne and Surface Gun Systems, *GAU-8/A,* 30-mm. AVENGER ARMAMENT SYSTEM.

[14] Fact Sheet, Op Cit.

[15] Statements About the *A-10,* furnished by the U.S.A.F. Public Information Office.

MAJ JIMMIE B. QUINN was commissioned in Armor upon graduation from Henderson State College in 1965. A graduate of AOB and AOAC, he has served as a tank platoon leader, company commander, battalion S-3, and regimental assistant S-3. He also served as aide to the CG of Fort Knox and on the staff and faculty of the U.S.M.A. Major Quinn is attending the Air Force Command and Staff College.

Defense of the Ditch

by Captain Maxwell O. Johnson, U.S.M.C.

Most *ARMOR* readers are probably familiar with the annual series of exercises held in Germany known as *REFORGER*. However, outside of a few officers serving on joint or combined staffs, it is equally probable that most *ARMOR* readers are not aware that a Marine Corps Amphibious Brigade was a major participant during the fall of 1976. The 4th Marine Amphibious Brigade (MAB), composed of two battalion landing teams (BLT) from the 8th Marine Regiment, two tank companies from the 2d Tank Battalion, and appropriate air, logistic, and artillery support functions, participated in *Exercise Teamwork 76* in Norway and in *Exercise Bonded Item* in Jutland, Denmark, and in Schleswig-Holstein, Germany. By concentrating on a small but significant tactical episode which evolved during *Exercise Bonded Item* in Germany, I hope to give *ARMOR* readers some insights into the role of the Marine Corps on the northern flank of NATO. None of what is written here is intended to be doctrinal; rather, it is from the perspective of a tank company commander.

The Schleswig-Holstein area of Northern Germany (map 1) is of primary interest to Soviet Bloc and NATO contingency planners because control of this terrain equates to control of the Baltic Approaches, the vital Northern Flank of any Bloc thrust into Central Europe. In the general scenario of *Bonded Item,* Phase III, the mission assigned to Regimental Landing Team 8 (RLT-8) by the Commanding General, 4th MAB, Brigadier General A. M. Gray, was to prepare a linear defense in central Schleswig-Holstein against Orange forces attacking from the South. In front of RLT-8 would be the 6th Reconnaissance Battalion (Germany), which would be slowly withdrawing under increasing Orange pressure and which would pass through RLT-8's lines at a time and place to be determined. The RLT's Reaction Force (Task Force GARY) was comprised of a mixed bag of helicopters, gunships, a section of tanks, a platoon of tracked landing vehicles (LVT's) and trucks, and an attached infantry company. What follows is the story of the 3d Battalion, 8th Marines (3/8).

The Ditch: the Boholzer Au

Not only was the 3/8 given the mission of defending the left or eastern portion of the forward edge of the battle area (FEBA), but it also had to provide the RLT's Combat Outpost (COP) in their zone of action. To assist in this, 3/8 was given operational control (OPCON) of Bravo Company, 2d Tank Battalion, and a section of eight TOW missile systems. Kilo Company was, on order, to prepare defensive positions along the right side of 3/8's sector, while Mike Company was to do likewise on the left. Each of the rifle companies had a platoon of tanks and four TOW missiles to bolster its antimechanized defenses.

The day before forces were actually brought into position, the officers conducted a thorough reconnaissance of the area. Without consciously working through a laundry list, all utilized those time-honored and combat-proven precepts of mission, enemy, terrain, troops available (METT) and key terrain, observation, cover and concealment, obstacles, and avenues of approach (KOCOA) in selecting the most advantageous defensive positions. One of the most serious problems to face all of us was to orient our thinking toward the defense and to the possibility of a retrograde operation. With Vietnam as a dim memory to most of us, we had to dust off our basic tactical lessons learned at The Basic School (TBS) and Amphibious Warfare School (AWS). At the same time, the new and unique (to the Corps) possibilities offered by mechanization of infantry and by the availability of heavy armor and of antitank (TOW) weapons had to be given serious and far-reaching tactical consideration, particularly in planning the defense.

Frag order

Once the ground reconnaissance was completed, the 3/8's commanding officer (CO) and his S-3 briefed the company commanders on the overall situation and the general mission. The CO digressed to state that "...when I was a company commander, I always wished for more latitude and flexibility on the part of my CO and his S-3 so that I could use more innovation in executing a given mission." He then issued his fragmentary order: "Gents, there is the Ditch (the Boholzer Au); the Orange enemy is coming from that direction (pointing south), and we will defend here, and be prepared to withdraw on order of RLT-8." He then departed with his S-3 to look after his other three rifle companies, leaving us to organize the defense along the lines stated above. However, he left us with one final commandment: "The enemy shalt not cross the Ditch."

Enemy Forces Opposing RLT-8

A brief word about the Orange Forces order of battle is necessary. Facing RLT-8 was a brigade which possessed an actual total of 54 *Leopard* tanks and mechanized infantry mounted in over 100 armored personnel carriers (APC's). Organized along the lines of the Soviet Motorized Rifle Division, it could reasonably be expected to employ traditional Soviet tactics, such as massing artillery fires, quickly and decisively penetrating the opposing forces' FEBA, utilizing mechanized infantry to widen the gap, and pushing armor through to exploit the penetration. However, in this case the Orange forces first had to ford or breach the ditch.

The Ditch Again

As can be seen from map 1, the Ditch could potentially be an effective antiarmor water obstacle. Although little more than an irrigation ditch, it was wide enough to prevent tanks from going straight across; its sides were so steep and composed of such soft muddy soil that any attempt by a tank to breach it would result in disaster. None of this, however, was apparent from simply map reconnaissance. This knowledge was gleaned from a patrol during which a few experienced tankers reconnoitered possible crossing sites for Orange armor. Furthermore, friendly questioning in German of several of the local farmers revealed that they had never seen tanks successfully cross the Ditch. This was indeed a valuable piece of intelligence. The conclusion was reached that there was no way Orange armor could cross the ditch without mounting a major engineering effort or employing infantry to force a bridgehead before Armored Vehicle Launched Bridges (AVLB's) could be deployed.

However, a high-speed, high-capacity bridge that existed on the extreme left flank of 3/8's defensive sector had to be neutralized. A platoon from Mike Company provided security for German engineers attached to the 6th Recce Battalion, who were to blow the bridge as soon as the last 6th Recce vehicle had crossed it. Once this was accomplished, the Orange forces would be canalized into a killing zone whose lethality was to be beyond even our expectations. At the same time, engineers attached to 3/8 installed minefields in the vicinity of possible fording sites along the ditch and on potential avenues of approach to the COP.

Tanks and TOW's: A Formidable Defense

As darkness fell on 18 October, the tank and TOW assets were quietly brought into position. Camouflage was extensive and continuous; tankers spent most of the night attempting to totally conceal their firing positions from forward or aerial observation by Orange forces. The latest situation reports received from the 6th Recce Battalion indicated that at 2200 hours they were still slowly withdrawing under increasingly heavy enemy pressure and were then located approximately 10-12 kilometers south of 3/8. It appeared that the first signs of Orange armor could be expected around noon the next day, 19 October.

It should be noted here that not all Blue tanks were in forward firing positions. Some, in fact, were employed in antimechanized reverse slope defense, utilizing dismounted crewmen with binoculars to observe the approaching enemy. TOW's were employed on the flanks in concealed positions, using the best natural cover available to protect them from enemy artillery fire.

Supporting Arms in the Defense

By late that evening all the organic antiarmor forces were locked into position. One vital ingredient, however, remained to be taken care of: the plan for defensive fire support. Because Orange naval forces still controlled the Baltic Sea, friendly naval gunfire was unavailable. Both Kilo and Mike Companies had forward air controllers (FAC's) with them, so appropriate air

missions were requested for the following day, 19 October, between 1100 and 1800 hours. Artillery targets were plotted laterally along the ditch, along the Orange force's likely avenues of approach to the Ditch, and on suspected assembly areas and attack positions in the tree lines 2,000 meters south of the Ditch. Finally, artillery targets were plotted on our own positions to cover any possible retrograde operation.

Retrograde—"Retreat, Hell! We're Just Attacking in Another Direction!"

Although the coordinated, thorough, and detailed planning appeared to assure 3/8 of a successful defense of the Ditch, if Blue air forces did not possess at least local air superiority or maintain air parity, and if the Orange force adopted its traditional tactics of employing rolling, massed artillery fires, using smoke to screen the progress of its maneuver elements; it was recognized that our position could become untenable. At that time, serious consideration had to be given to planning a retrograde operation. There was also the added factor of the scenario. Based on somewhat bitter experiences in Norway during *Operation Teamwork 76,* it was conceivable that the umpires might simply order us to withdraw, disregarding tactical reality and relative combat firepower ratios, since the scenario or script called for that to take place within a given time frame.

If a retrograde operation is to be executed correctly, with minimal friendly casualties, no unfavorable decisive contact with the enemy, and maximum losses inflicted on the enemy by supporting arms, it must be very carefully planned. Adding to this innate complexity, in this particular situation the retrograde operation had to be planned to be totally mechanized (except for TOW), a singularly unique evolution in the Marine Corps.

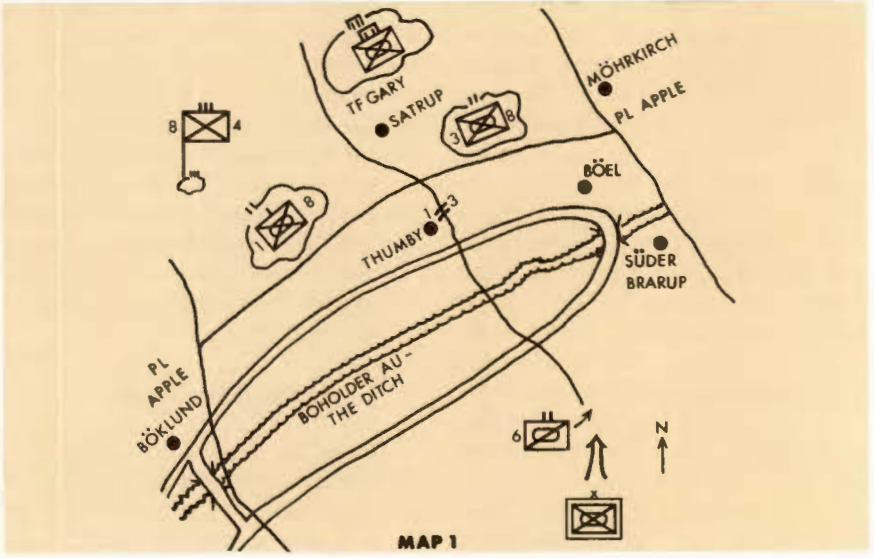
Many new details had to be worked out; in many cases in eclectic approach, with innovation and improvisation, was the key to success, Some terms and actions were vaguely familiar but had to be thoroughly briefed and understood by all concerned. These included the selection of initial delay positions (in the case of an actual delaying action); the designation of colored and numbered routes of withdrawal and the reconnaissance of these routes, including rehearsal, if time and tactical situation permit; the location of mechanized check points, rally points, and phase lines; arrangements for passage of lines at the new FEBA, including recognition and linkup signals; fire support planning to cover the rear and flanks of the retrograding units, and the plan for the organization of new defensive positions.

The primary objectives of this particular planned retrograde movement were to disengage 3/8's defensive forces on the COP rapidly after forcing the enemy to deploy, to deceive the Orange forces as to our new positions and intentions, to delay and disorganize him, and to gain time while attempting to draw him into an unfavorable situation. If and when the Orange commander finally and decisively committed his forces, they would hopefully be forced into kill zones forward of the new FEBA, where the 16 reserve TOW missile systems, backed by on-station *A-6* aircraft and *AH-1T* (TOW) *Cobras,* would destroy them.

The initial plan called for a withdrawal without enemy pressure just after ending evening nautical twilight (EENT) on 19 October, utilizing stealth and deception. However, we were to be prepared to withdraw under pressure or to fight a delaying action, pending devolution of the scenario and its relation to actual developments on the ground. The mechanized infantry assets were to be withdrawn along predesignated, concealed routes to the northwest and northeast, with the tanks and TOW's comprising the detachments left in contact (DLIC). The next step was for the TOW's to quickly withdraw in trace of the infantry to the new positions 1,500 meters north of the COP. Once in place, they were to cover the withdrawal of the tanks. This final withdrawal was to be accomplished using overwatch in reverse; this was unique in that tanks and TOW's had never worked so closely before, especially in defense.

The Orange Assault Begins—The Ditch Defended

By 1300 hours on 19 October, with all Blue forces in position, the first Orange tanks were observed within 5,000 meters of the ditch. The last vehicles of the 6th Recce Battalion crossed the eastern bridge shortly before 1900 hours; within 90 seconds there was nothing left of the bridge. The CO of 3/8 was informed of the imminent armor threat. All units were on the lookout for dismounted Orange infantry or armored reconnaissance patrols; we were caught totally off-guard by the sight of several platoons of *Leopard* tanks boldly coming out from concealed positions and approaching the Ditch.



MAP 1

TOW's immediately opened fire, getting credit for eight confirmed kills in less than 5 minutes. Shortly thereafter, Bravo Company's tanks opened fire from both platoon positions, accounting for another six kills. The few *Leopards* which managed to reach the Ditch unscathed quickly

realized that it was an impassable obstacle. The Orange commander, making a hasty estimate of a disastrous situation, ordered an immediate withdrawal.

By this time, Blue *A-6's* were on station to attack targets of opportunity. To avoid confusion and possible fatal error, since all tanks look alike from above 500 feet, all Blue tanks placed air panels, visible to the *A-6* pilots, over their rear decks. The *A-6* strikes were absolutely devastating, accounting for another 10 confirmed Orange tank kills. These casualties were assessed and confirmed by umpires on both sides; an immediate evaluation by maneuver control confirmed that one Orange armor battalion had been rendered combat ineffective.

Orange Mistakes and Lessons Learned at the Ditch

It was patently obvious that the Orange commander had no fore knowledge that the Ditch was impassable. He had failed to send out armored reconnaissance patrols and he had failed to have mechanized infantry accompany his tanks. He had also neglected to employ his organic supporting arms. This resulted simply in the total annihilation of his two lead tank companies. Furthermore, he did not appear to have the slightest notion as to the strength, location, and disposition of the Blue forces which opposed him. The one scout helicopter which he had sent out in the morning had been downed by a quick-thinking TOW gunner.

The 3/8 Commander was apprised of the situation; he ordered all hands to hold position. Throughout the remainder of the afternoon occasional light sections of *Leopards* attempted to dash across the open area and cross the Ditch. In every case they were destroyed or forced to turn back by the lethal fire of the TOW's and tanks and by the onstation *A-6's*. By nightfall it appeared that the Orange commander had finally ordered a total withdrawal to an assembly area some 5 kilometers south of the Ditch in order to reorganize his battered forces. At this point, the situation on the ground was some 6 hours behind the scenario schedule.

Around 2000 hours, it became apparent that the Orange commander had ordered that at least one bridgehead be secured across the Ditch by Orange infantry forces. At that point it became imperative that Blue infantry forces move forward to positions alongside the tanks.

After a quick briefing on the precarious situation held in the Bravo command post (CP), a barn 800 meters behind its forward tanks, each company commander brought forward two platoons to the predesignated release point (RP). There they were met by Bravo's tank commanders, each leading an infantry squad to the general vicinity of his tank. All of this was accomplished with total noise and light discipline and much resembled the preparations for a night attack or a night ambush patrol. All personnel were thoroughly inspected for rattling entrenching tools, banging weapon slings, and jingling dog tags.

The object of this stealthy and rapid reinforcement was to employ organic infantry assets and supporting arms to destroy the Orange infantry while it was attempting to establish a bridgehead. Tanks and TOW's would not be employed until such time as the Orange armor threat caused the Blue infantry's position to become untenable. At the same time, the tankers used infrared (IR) binoculars to observe the enemy and refrained from running their engines so as not to reveal their positions. Also, every other tank had an antipersonnel round (APERS-*Beehive*) loaded in its tube.

Once again, the scenario, which by then was nearly 10 hours off schedule, was thrown out of kilter. Senior umpires and maneuver officials conferred and agreed that the defense of the Ditch was still impregnable. However, as soon as Orange infantry forces came within Blue small-arms range, a cease fire would be declared by maneuver control and Blue forces would administratively withdraw. At approximately 2330 hours, a squad-sized patrol from Mike Company uncovered the enemy's bridgehead, opened fire, called in supporting arms, and precipitated the cease fire, which was declared shortly after midnight on 20 October.

Retrograde—Execution of the Attack in Reverse

Although safety considerations dictated artificial constraints, a tactical withdrawal without enemy pressure was executed as planned. The infantry pulled back off the lines, covered by TOW's and tanks, mounted their LVT's and withdrew to the northeast and northwest. Then the TOW's departed as planned. The tank platoon on the left flank withdrew north to a hard surface road, then headed west to flip-flop with the right flank platoon, which headed east after being detached from Kilo's position to join Mike Company.

The object of this exercise was to sow some confusion in the eyes of the Orange forces, to disorient him and to deceive him as to our future intentions, dispositions, strength, and location. Picture, if you will, at 0200 hours, 10 LVT's heading to the northeast, another 10 heading to the northwest, five tanks heading north and then east. Finally, seven tanks (consisting of the left flank platoon and the two CP tanks) heading due north for 2,500 meters, then suddenly disappearing. The key element to all of this was that all tracked vehicles (32 or 37, depending on how deceptive we were), because of German safety regulations, drove with headlights on high beam and with flashing yellow caution lights mounted on the turrets. Stealth, no; disorientation, yes. Undoubtedly, the Orange S-2 got very little sleep that night while trying to sort it all out.

A Final Blocking Position—Deception Again—(The Coup de Grace)

The seven tanks which had headed north disappeared behind a small village 2,000 meters behind the COP. After reaching a concealed position, all lights were extinguished; however, tank engines were kept running and were periodically revved to simulate continued movement. A thorough reconnaissance in the dark by jeep uncovered an ideal blocking position some 1,500 meters north of the town.

Judging that the Orange forces would attempt, at first light, to penetrate the FEBA between the two retreating mechanized rifle companies, guessing that they had no inkling that Blue armor lay between them and the FEBA, and hoping to suck in the preponderance of Orange armor assets into a lethal kill zone, a suitable position was selected. It consisted of a horseshoe-shaped hedgerow on high

ground, which overlooked and bound a perfectly compartmentalized avenue of approach that the Orange armor almost had to use. Each tank was quickly led into position, assigned sectors of fire and observation, and given orders for 50 percent alert. By this time, it was nearly 0400 hours and sleep was the last thing on any of the tankers' minds. Some 1,500 to 2,000 meters to our rear were located the 16 TOW systems, which would be brought into play once the Orange armor pressure became too great and the order to withdraw was issued.

Almost as if we had written the Orange frag order, the first platoon of *Leopards* appeared shortly after dawn. They were allowed to approach to within 500 to 800 meters of the Blue position. After first ensuring that they were advance reconnaissance elements and not part of the lead company, Blue armor opened fire and destroyed all five of them, suffering only minor damage in the ensuing firefight. At that point, Blue armor was ordered to withdraw, while TOW gunners picked up the cue and continued to blunt further Orange attempts at penetration, while covering our circuitous and deceptive withdrawal to a new rally point behind the FEBA.

Conclusion

The action continues beyond this point, but was influenced by two factors: the impact of the time-phased scenario and the planning and organization for the next (and final) day's counterattack by Task Force GARY. The latter was perhaps the more critical since all Blue armor assets had to be consolidated and reorganized for this final bold thrust designed to cut off the Orange retreat to the south.

For our purposes here, it is fair to state that the Marine Corps in general and 3/8 in particular can hold their heads high with pride for they indeed stopped the Orange forces at the Ditch, proving that the combined-arms team is a formidable defensive tool. Furthermore, through this action, as well as the equally successful defensive and offensive operations by 1/8 and by Task Force GARY, the Marine Corps clearly and capably demonstrated that not only can it compete in a mechanized environment in Northern Europe, but also that it would be a valuable asset to NATO in the event we were sent into a similar scenario with live ammunition.

Lessons Learned

To do justice to the lessons learned from these NATO exercises, one would have to write a book-length essay. Some may, perhaps, seem to be obvious considerations, while others are somewhat innovative. In any case, they proved to be sound in the ultimate test.

- A successful defense against a mechanized foe includes all the elements of an offensive action but entails some additional considerations. These include employment of supporting arms, not only to destroy the enemy as he approaches the FEBA but also to cover any form of retrograde operation, and the use of air assets for forward and flank security.
- Any type of retrograde operation is a complex evolution. It must be thoroughly orchestrated and understood by all major participants and a rehearsal should be conducted if time and tactical situation permit. Special terminology and methodology apply to this operation and it is imperative that all hands are capable of executing in a timely and professional manner.
- The battle-proven precepts of METT and KOCOA must be religiously applied when organizing the defense.
- Camouflage and cover are absolutely imperative for survivability. If possible, get out forward of the defensive position to check how effective it appears from the enemy's vantage point.
- Mechanized infantry, supported by tanks and TOW's (and soon *Dragon's*) can be a formidable defensive, as well as offensive, weapon if utilized correctly.
- Air assets, including *A-6's, AV-8A's* (*Harriers*), and *AH-1T* (TOW) *Cobras,* are capable of providing devastating antimechanized fires as well as flank security.
- The antimechanized barrier and obstacle plan must be totally integrated with the plan for defensive fire support both in the defense and in the retrograde. Additionally, engineer support is a must, including mine laying and removal, and the capability to deploy AVLB's.
- The reserve or counter-attack force must have sufficient armor and mechanized infantry assets to enable it to execute its mission. Had the Orange forces massed their artillery fires and achieved local air superiority, it is entirely possible that they would have been able to create havoc and destruction in the RLT's rear areas. At that point a strong, heavily-armored counterattack would have been called for. Yet 90 percent of the RLT's armor and antimechanized assets, which eventually were to become part of Task Force GARY, were in fact on or forward of the FEBA.

It is indeed questionable whether an effective counterattack could have been launched on 19 or 20 October, had the Orange forces penetrated the FEBA. It is strongly recommended that each battalion landing team be assigned OPCON or have attached, as a minimum, one full tank company, and that the RLT or MAB have at least one additional tank company in reserve. While shipping constraints dictated otherwise this time, in a real world, live ammunition scenario, to have fewer armor assets than this would be at least folly and most probably suicidal.

CPT MAXWELL O. JOHNSON was commissioned in the U.S. Marine Corps upon graduation from the University of Santa Clara in 1968. He has served as an S-3 air, platoon leader, and intelligence officer. A graduate of the Amphibious Warfare School, Captain Johnson is currently the commanding officer of Company B, 2d Tank Battalion, 2d Marine Division, Camp Lejeune, NC.

The Second Lieutenant and His Map

If there was ever a stereotype difficult to overcome, it would be that of a second lieutenant wandering around aimlessly in the woods with a map and compass. But progress is being made and there should be some pleasant surprises for field commanders. Not only is the U.S. Army Armor School's (USAARMS) Course of Instruction (COI) being expanded significantly in the area of mapreading, but there has been a very heartening upward trend in Armor Officer Basic course (AOB) students' performance on mapreading diagnostic tests and land navigation field examinations.

Statistics show the upward trends on GO or NO GO diagnostic tests. All AOB classes receive a map reading diagnostic test during their first month, consisting of 11 tested objectives. The table below indicates the percentage of each recent class who received a NO GO on one or more of these objectives.

AOB CLASS	PERCENT OF NO GO'S
3-76	60.1
4-76	85.2
5-76	86.1
6-76	67.9
7-76	88.7
8-76	59.4
9-76	42.6
1-7T	33.8
2-7T	47.2
1-77	60.4
2-77	40.3
3-77	38.6
4-77	32.0

For those who maintain that statistics can lie, we'll admit that those above do, to a certain extent. Beginning with AOB 2-7T, a 2-hour class on fundamentals of mapreading was instituted prior to the diagnostic test. This class covered the basics of elevation and intersection and resection. As a result, the pass rate jumped considerably. What is significant, however, is that the passing rate on *all* objectives improved concurrently. When the fundamentals class was instituted, the School also adopted a new programmed text (kudos to the Engineer School) and a mapreading workbook. At the same time, the USAARMS Learning Center picked up a new series of mapreading Training Extension Course (TEC) lessons. It was encouraging to note the heavy volume of use of the training material for these subjects. Not only have the officers been studying more during the past 8 months, but they honestly seem to have been much better prepared by their precommissioning training. A side note here; regardless of source of commission, most of the lieutenants who receive NO GOs do so in one of four areas: determination of elevation, identification of relief features, intersection, and resection.

Anybody who receives a NO GO completes 6 hours of remedial instruction after duty hours and then is retested on the objectives he failed. He also receives a packet of 100 problems which he can work on his own for additional study. As a motivational incentive for study (albeit negative) anyone who fails the retest is placed on academic probation.

Once the student is well-rooted in the basics, he moves out of the classroom and into the field, where he belongs. Here the biggest gap in ability by far is encountered, depending upon where a particular student attended school before coming on active duty. In field work, the student is required to do everything he's expected to do in a unit. It's surprising to see the confidence most of these young men have in their land navigational ability (yet dismaying at times to see how unwarranted their self-confidence may be).

The AOB students first class under the new COI is terrain association, which is presented on Snow Mountain—a familiar land mark to Armor School graduates. This site serves as the center of the course, where students put their feet on the terrain and constantly maintain orientation. The limitations of the standard Army 1:50,000 map soon become apparent, but it also becomes apparent that one can learn to *use* the map with confidence.

They are then administered a 4-hour Land Navigation Performance Examination, which tests them on the two primary goals of land navigation: to determine where one is now, and to navigate from one point to another to find a given location. The students first complete six stationary requirements, including map orientation and modified and formal intersection and resection. They then complete a series of orienteering requirements for both accuracy and time.

Night navigation, a skill in which probably most members of the Army could use some refinement of their ability, is the next subject. The AOB student learns use of the compass at night, deliberate offset, and avoidance of obstacles. As part of a three-man team, each student is required to locate two stakes after covering a distance of up to 5,000 meters. When each of the stakes is located, a direction sign tells each team to go a certain distance on a specified azimuth.

If students fail either of the two field exams, the Armor School's relatively new grading policy insures that commanders won't receive incompetents in their units. Each student who fails is retrained, then retested. If he fails a retest, he may be referred to an academic board. As a consequence, many new Armor platoon leaders become quite accustomed to working extra hours at night or on Saturdays before they leave the School.

Yet, all of the tasks which the student has undergone to this point certainly do not qualify him for the duties of a tank or armored cavalry platoon leader. The crucial question of fitness as a platoon leader concerns his ability to navigate *mounted,* cross-country. This element of training has always posed a dilemma for the Armor School, because mounted land navigation training is expensive. It costs a lot of fuel, vehicles, and men. Still, when the Commandant visited

USAREUR last fall, the ability to navigate mounted was almost unanimously pointed out as a major shortcoming in tank platoon leaders. Well, you don't have to be in a tank to navigate mounted over rough terrain.

With added impetus provided by the Assistant Commandant, the new Mounted Land Navigation Course places the students in three-man teams. Each team is assigned a ¼-ton vehicle and is given the six-digit grid coordinates of five widely separated points. Their goal is simple: find the five points. At each of the points they find an instructor who signs their score sheet and who is prepared to conduct a detailed critique. The course is tough. They can't use existing road networks to turn their topographic maps into glorified road maps.

A 4-hour stretch in the woods, however, won't give you a rolling Daniel Boone. The next critical step is to get the most out of the training dollars we do have. An optional course, using privately owned vehicles, has also been established. Those who do have a sincere desire to improve their ability (and believe us, most of our AOB students do) are offered this course (again, a tough one), which they can run in their own cars on the weekends. The scopes of the courses in mounted tactical training, Armor (MTTA) and mounted tactical training, Cavalry (MTTC), have also been expanded in recent months to require each officer, in his rotational role as platoon leader, to use that map to move his platoon from one point to the other.

Also in the works is an adaptation of the nap-of-the-earth (NOE) flight simulators recently developed for use at the U.S. Army Aviation Center at Fort Rucker. For example, their map interpretation and terrain analysis course (MITAC) has some excellent possibilities for Armor School use. By using a 16-mm. film, it is possible to simulate terrain as seen while on the move. It is entirely feasible to use adaptors on the projector lens to show the same terrain as seen buttoned-up. A great variety of mounted problems can be depicted in a relatively very inexpensive mode in the classroom.

In short, for those of you in the field who have a 3 x 5 card index of jokes about a second lieutenant and his map—throw them away. We're out to destroy a myth!

Observed Fire Trainer

The Indirect Fire Branch, Weapons Department will be receiving a computer-operated observed fire trainer (OFT) that is designed for training students in forward observer (FO) techniques. The OFT was developed with the assistance of the Artillery School. The Weapons Department will conduct an evaluation of the device to determine the feasibility of its use in the Armor School environment.

The lightweight, self-contained, portable OFT can be used for realistic, economical training of artillery and maneuver personnel in the adjustment of indirect artillery and mortar fire, as well as for supplemental training in mapreading, survey, and sound adjustment.

The OFT projects terrain scenes on a screen in natural color. The instructor has several terrain scenes available with "fixed" targets of various types and sizes at different locations. He also has the capability, through the keyboard and computer assemblies to project "moving" or "fleeting" targets on the terrain scene for additional realism.

A shell burst presentation system will simulate the appearance of airburst, airburst with ground effect, and graze burst with associated sound consistent with the observer's location, type and number of weapons, fuze, and terrain features.

Similar OFT's will be evaluated at Fort Sill, Fort Bliss, Fort Benning, and in Europe.

Simplified Test Equipment/ Internal Combustion Engines

As a result of the U.S. Army's continuous effort to provide the organizational mechanic with top quality simplified test equipment, the Simplified Test Equipment/Internal Combusion Engines (STE/ICE) has been developed and is in its final stages of testing.

Why should the mechanic be required to become proficient in the use of many pieces of test equipment in order to perform troubleshooting procedures when it is possible that one piece of test equipment could do the job? The concept is to simplify.

STE/ICE was designed to perform the majority of the tests on vehicles and vehicular systems that the mechanic now performs. The STE/ICE could replace the Low Voltage Circuit Tester (LVCT), the multimeter, the tach-dwell gage, compression gages, and vacuum gages.

STE/ICE can be used in two modes. One mode uses a centrally located Diagnostic Connector Assembly (DCA) that is a part of the vehicle and would be placed on the vehicle during manufacture. This mode would already be located on the vehicle when purchased by the U.S. Army.

The other mode is the Transducer Kit mode (TK mode). It consists of the wiring, connectors, sending units, and probes that are required to make the STE/ICE operational on the vehicle. This mode is installed on the vehicle by the mechanic during troubleshooting and would be used on existing vehicles in the U.S. Army inventory.

In either mode, the STE/ICE has a small test meter with a light emitting dial (LED) that, when attached to the DCA mode or TK mode, provides the mechanic with an easy to read and easy to interpret test result. All that the mechanic must do is refer to the test manual that is provided with the STE/ICE, place the specified test into the STE/ICE system by using the coded test number, and dial it on the three numbered switches on the box. The manual explains the test result to expect and what action the mechanic must take in the event he receives a different reading. The STE/ICE is relatively easy to install and operate. The manual will also be written at the user's level of understanding. STE/ICE is exactly what its name indicates . . . *simplified test equipment.*

Requests For Publications

The Armor School frequently receives requests for Army publications, but because they do not stock publications, they therefore cannot fill large orders. However, the Armor School will respond to individual requests for one or two copies of a manual. Copies should be requisitioned on DA Form 17 from either:

USA AG Publications Center
2800 Eastern Blvd
Baltimore, MD 21220

OR

USA AG Publications
1655 Woodson Rd
St. Louis, MO 63114 ▲

MASTER GUNNER'S CORNER

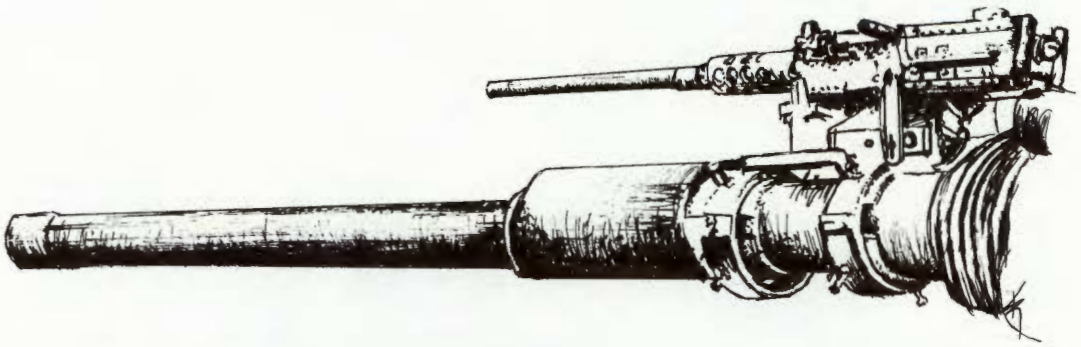
When was the last time your unit received "help" from the Armor School without your asking for it? We at Fort Knox tend to get wrapped up solely in our jobs like everyone else. However, we are the institution from which Armor doctrine is supposed to emanate and flow. Too often we only help those units who ask and assert themselves aggressively either by letter or by telephone. More often than not, these units are Reserve Component units that are scheduled for training months in advance. The Weapons Department, however, is taking steps to insure that correct and timely information is sent directly to the units in the field.

In March 1977, a letter was sent to all Armor battalion and ground cavalry commanders explaining a concept known as the Training Assistance Team (TAT). This concept grew from a need to provide information via a direct link to the Master Gunner in the field and, in units where no Master Gunners are assigned, to the battalion or squadron commander.

This concept is very simple. Each Armor and Armored Cavalry unit is assigned a point of contact. This individual is a Master Gunner Instructor (NCO) who monitors, coordinates and serves as an institutional advisor to your unit's Master Gunner. The table on page 24 shows that in USAREUR the points of contact are broken down by unit. In CONUS and Korea they are further delineated by geographical locations including FORSCOM, TRADOC, the Armor School, USMC; and in two instances, Reserve Component units. Additionally, each unit is assigned a primary and an alternate point of contact. (See table for the Master Gunner assigned to your unit or geographic location). This insures a reasonable amount of continuity over a long period of time. The TAT's are an information source and not a directive or tasking agency. Each team maintains a file which is divided into three main sections, Gunnery, Maintenance and General Information. A log is used to record incoming letters or phone conversations and a copy of each piece of material sent to the unit is reproduced and posted to the file *each time* information is sent.

For example, let's use the *M-60A2* battalion 3/33 Armor, Third Armored Division, as an illustration. To date, the following information has been sent to that unit:

- A letter explaining main gun equilibrator accumulator assembly failure with attached PM *M-60A2* message.
- A letter explaining laser alignment checks. (Clarification of the technical manual.)



• A laser safety message on the *M-55* laser gunner trainer.

What about the other *M-60A2* battalions in the Army? This information was sent to the other *M-60A2* battalions in the U.S. Army as well, regardless of whether or not they requested the information. The same rules apply for all other type Active Component battalions. We are going to expand this TAT concept to Reserve Components as well in the near future. Obviously, units in USAREUR and Korea are at a slight disadvantage when attempting to reach us by telephone, but this is by no means a genuine handicap. We prefer that everyone put their requests or problems in writing—it is more professional, thorough, and less likely to cause error.

We have made four TAT visits to date. These visits are made at the unit's request and funding. The purpose of the visits are to assist the units on specific problem areas such as range layouts, turret maintenance or the new FM 17-12.

For example, a TAT team recently visited Fort Bragg, NC to discuss the 82d Airborne Division's new armor/antiarmor complex. The division G-3 and the 4-68 Armor's Master Gunner wanted a "third" person's opinion on the construction and of the complex which includes a Table VIII, TOW and *Dragon* firing ranges, and air cavalry gunnery. One afternoon was spent on a prebrief of the range while the remaining time was spent on a range reconnaissance discussing such matters as terrain, firing positions, impact areas, and moving targets. The G-3 of the Division is using the Master Gunner, SSG Baker, in a key role; that of planner, advisor and implementer. Scaled ranges were already planned close to the 4-68 Armor's garrison area. One could not help being impressed by the innovative approach taken by this division and their hard-charging Master Gunner.

Incidentally, our AUTOVON number is 464-8530 and the address is: Assistant Commandant, USAARMS, ATTN: ATSB-WPG (Master Gunner), Fort Knox, Kentucky 40121.

JOHN B. WHITEHEAD III
Major, Chief Master Gunner Branch
Ft. Knox, KY 40121

Due to an editing oversight, SFC Bernard Restrepo was not credited with authorship of the first article appearing in the Master Gunner's Corner. ED.

TRAINING ASSISTANCE TEAM CONUS		
LOCATION	**PRIMARY**	**ALTERNATE**
Fort Knox	SFC Lilly	SFC Magee
Fort Hood	SFC Magee	SFC Telfare
Fort Bliss	SFC Telfare	SFC Restrepo
Fort Riley	SFC Magee	SFC Serna
Fort Lewis	SFC Telfare	SFC Copeland
Fort Bragg	SFC Eldridge	SFC Dular
Fort Carson	SSG Harrell	SFC Serna
Fort Polk	SFC Copeland	SSG Harrell
Fort Benning	SFC Restrepo	SFC Farrow
Fort Sill	SFC Restrepo	SFC Farrow
Fort Stewart	SFC Eldridge	SFC Lilly
EUROPE		
8th ID	SFC Magee	SFC Copeland
3d AD	SFC Dular	SFC Restrepo
1st AD	SFC Restrepo	SFC Telfare
3d ID	SFC Telfare	SFC Fairfax
2d ACR	SFC Fairfax	SFC Serna
11th ACR	SFC Serna	SFC Copeland
Berlin	SFC Copeland	SFC Magee
1st ID (FWD)	SFC Farrow	SFC Eldridge
KOREA		
2d ID	SFC Lilly	SFC Eldridge

Should a Captain of Cavalry Command from his Horse?

The ARTEP evaluator approached the tank company team commander. "... Throughout the ARTEP, I'll want to be right with you; I assume you'll be in your tank...?" The company commander wasn't so sure.

The evaluator's question highlights a perplexing and ongoing dilemma: Where should a tank company team commander be mounted to efficiently command and control his team? In a tank? The current TOE provide each tank company commander with the tank and radios to affect control. In fact, the TOE provides for a company headquarters tank section of two tanks [the operative theory being that the artillery forward observor (FO) is mounted in the second tank]. Each year tank company commanders are tasked to qualify their tanks during tank gunnery. So, the question is settled; or is it? There are several considerations before that question is answered:

• For training purposes, moving a tracked unit in USAREUR "on the economy" (on autobahns or local roads rather than in training areas) will most often require the commander to lead in his jeep.

• There are tactical situations where a more spacious and "reconmobile" vehicle than a tank is required.

• "Fighting a tank" and commanding a company team may become mutually exclusive for even the most skilled commander.

Heresy you say! But, let's face it—maneuver damage and safety requirements are occasionally such in peacetime training than a jeep is a prudent command center. The latter consideration creates a requirement that is most often filled by "robbing" the *M-113* personnel carrier from the mechanics in the tank company's maintenance section. [This solves the commanding officer's (CO's) problem, but what do the mechanics use on the battlefield?] With the requirements for overlays; fire plans; voluminous task force operations orders; nuclear, biological, and chemical (NBC) prediction equipment; tactical reports and their volume of formats, the commander finds himself in need of people and space for those people. The *M-113* fills the bill! Heresy you insist! Maybe so, but a quick poll might find more commanders moving out of their tanks and into their carriers. This is particularly distressing in the fact that the October War found division commanders mounted in tanks to survive the onslaught of the Syrian Army in the Golan.

Historically, tank-unit commanders have attempted to deal with the question of *where to command from.* Erwin Rommel is quoted as saying, "...Command from the *Schwerpunct*...," but a quick reference to World War II German vehicles fails to uncover one designated as *Schwerpunct.* Such a reference does detail, however, that Rommel wasn't afraid to command from a tank. However, he and his subordinates more often commanded from the front in what they called a "signals vehicle" (a half-track or a captured British wheeled prime mover with additional radios mounted). Interestingly enough, the World War II German Army also had a variety of tanks in its inventory built specifically for commanders. The tank was the same as a standard tank in all aspects but one; the gun tube was a wooden dummy. As a result, the usable space in the turret was greatly increased (due to the absence of a breech, fire-controls, and ammunition) and provided for additional personnel, radios and map displays. There is precious little written as to the success of these vehicles. It would appear that it was a waste of a combat hull and turret (without a main gun) then, and with projected *XM-1* costs, totally unfeasible today.

In discussions with more senior tankers, I've found that the *M-75* carrier was utilized in the command-post role. Several commanders I know have suggested the use of an *M-577* as a company command post. However, in my opinion, the decreased mobility and the "command" visual signature that the *M-577* presents mitigates against its use in the main battle area by company team commanders.

The most recent development is the modified *M-113A1* (command and control). Mr. Chester Milstead (an old friend) is the project officer for the Armor board which has distributed a questionnaire asking pointed questions—(to be fair, the questionnaire is aimed at higher than tank company commanders)—i.e., what vehicle do you command from; how have you modified this vehicle to fit your needs? Although the article is aimed at battalion and brigade commanders, the best source of improvement ideas may well be the many tank company commanders who, with the help of the battalion welder, have zealously built a "palatial command center."

It is pointless to argue further as to where the commander should ride. The battle situation and the sting of incoming artillery will probably quickly end the debate. The point Erwin Rommel made is the best answer, "... the commander commands from the *Schwerpunct* (critical point) ..." Tank company commanders may mount their tanks to lead attacks; for example, provide decision-making fire power, or they may choose to overwatch in an *M-113* in order to weight (or reconstitute) a platoon with the addition of the two company headquarters tanks. The point is that jeeps and personnel carriers have their place. *A commander must never assume, or "be assumed" into a position that detracts from his ability to command.*

The modifications to transform a *M-113A1* into a command vehicle are simply accomplished and easily disassembled when an annual general inspection is impending. However, they provide for an efficient work space for planning operations and for occasionally controlling them. When the commander chooses to command from his tank, the modified *M-113A1* command track also provides for an alternate command and control vehicle should the commander be killed in his tank.

Let's look at the crew the CO needs to command properly:

Company commander	CPT
Artillery forward observer	2LT/1LT
Heavy mortar forward observer	SGT
Operations/NBC NCO	SGT
Driver	PFC

A commander would be hard put to assemble the above crew to function in the dual role as tank crew and perform in the job descriptions cited above. Could a gunner gun and plot a chemical attack? Can a loader load and be an FO? Let's look at this situation realistically. When the commander moves to his tank (as he must), he will leave most of these important people behind. But for as long as he can stay in a carrier, he can have this valuable command group available to him.

In summation, I recommend:

• That there be an augmentation to the company TOE of one additional *M-113A1* for a command vehicle. This would provide the commander with a command vehicle alternative and still allow the company maintenance section a reasonable degree of protection on the battlefield.

• That initially the "command vehicle" modifications be accomplished locally to suit the using commander.

• That eventually, the *M-113A1* be modified to permit forward and flank viewing periscopes on each side of the *M-113A1* cargo hatch, thus allowing the commander and FO to observe while "buttoned up."

The decision of where to command from is (and should be) a personal one, but at the risk of continuing a controversy, ask yourself this, "Would a cavalry officer command from his horse?"

STEPHEN N. MAGYERA, JR.
Captain, Armor

APO NY 09034

THE MICV IS AN OFFENSIVE WEAPON SYSTEM

In the early years, when many of us were getting our first taste of "la guerre d'Indochine," the advisers to the Army of the Republic of Vietnam (ARVN) armored cavalry units realized the potential advantage of mobility and supported the practice of mounting automatic weapons on the *M-113*. It was obvious that this gave the more heavily-equipped ARVN soldier an ability to close with his enemy and, firing from the vehicle, gain the victories his morale and confidence so badly needed. Despite occasional setbacks, the tactic was good for the simple reason that it worked.

Perhaps the directive which was issued during the summer of 1964 was misinterpreted and incorrectly applied as it moved down the chain from Military Assistance Command, Vietnam (MACV) Headquarters, but whatever the cause, U.S. advisers to the armored cavalry were strongly criticized for permitting the ARVN soldiers to fight from the *M-113*. The directive went on to point out that the vehicle is a carrier, not a minitank, and ARVN must be required to dismount and fight on foot as the suspected point of contact was approached. Well, as we all know, some South Vietnamese officers were good, while others were less capable, but almost all were, by their culture, extremely courteous. However, not even this cultural trait could carry the ARVN cavalry commanders through the shock of having their advisers tell them that their people had to get off their vehicles and once on foot, carry out their primary role as infantry by assaulting enemy positions dismounted. They were simply astounded, and things were never quite the same.

You know where this story ends. As U.S. units joined the battle, the ACAV was borne of necessity, and the prohibitive directive was disregarded—but for many, it was never forgotten.

The point of all this is that the mechanized infantry combat vehicle (MICV) is an offensive weapon system. It shields the infantry when that is required, provides him a significant mobility advantage, and is designed to provide for engagement of fleeing targets and for suppressive fires. The concept is absolutely correct under the proper conditions.

But what are the battle conditions we may expect in Europe during the initial days, weeks, and perhaps months of a conflict in that theater? Despite the opportunities which may occur for limited counterattacks, spoiling attacks and—in the wonderful tradition of Armor—sweeps to assist in disengagement of overly-committed smaller units, the basic nature of the battle will be defense. Unless we have been wrong for many years, every dismounted soldier is an additional forward observer; he is a primary means for covering deadspace and otherwise unprotected possible avenues of approach into his location; when properly trained and controlled, he can distribute fires to engage an enemy effectively across the entire defensive position. If enemy fires are heavy, one of his best defenses is dispersion. The defense of

a position can be most effectively conducted only if the infantryman is on the ground doing the thing he is so superbly trained, equipped, and led to do.

A very short note is called for at this point, to prevent a communications block. The words, "defense of a position," as used here do not necessarily imply a static defense of a prepared position. It is only the acknowledgement that fighting must be done, and that the coordinated use of advantageous terrain, regardless of duration, must be the "bottom line."

So what does all this have to do with the MICV? It shouldn't be too hard to track the sequence of events which almost inevitably must occur if infantry units in Germany are provided this new vehicle. First, there will be squad (or will they then become crews?) training. What should we expect of them? Unless our infantry has changed, every squad will work unceasingly to be the "best damned MICV team in the Army." Battle drill with the vehicle will occupy the training time, stressing movement, communications, control (and, peculiar to control, formations of vehicles within the platoon and company), vehicle camouflage, firing through the ports, and gunnery with the vehicle's main weapons. The men will establish an understandable attachment to the vehicle, even if it is generated by hate. The net result would seem to be a movement away from getting soldiers out on the ground, and thereby the loss of the exact things they are most needed to provide.

Does it absolutely have to occur this way? Is it possible for our units to establish a more detached association with their vehicle? Perhaps a particularly strong commander at some level will be willing to direct that they not train too much on the tactical use of the infantry combat vehicle in its primary role, the offense. But if he does, the soldier is going to be astounded, and things may never be quite the same.

I might do well to end this now, and let you decide to your own satisfaction how and when the MICV should be employed, by whom, and at what cost. But for those who may have acquired an aversion for individuals who complain without offering a solution, I suggest:

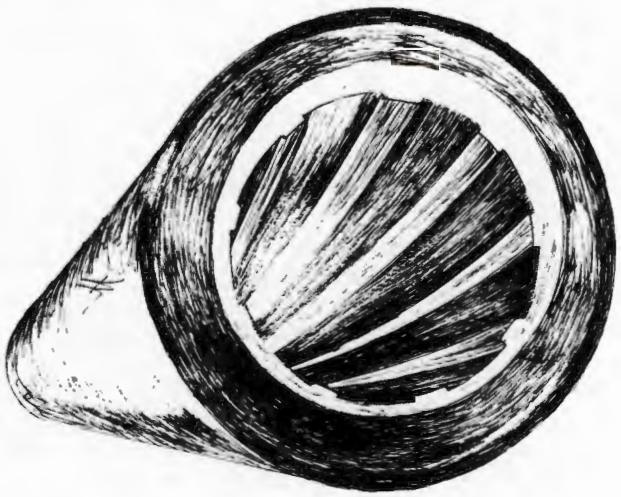
- Do not equip infantry units presently in Germany with the MICV. The *M-113* is a proven and suitable vehicle for transportation, and is well-adapted for moving infantry from one fighting position to the next, particularly in a defense environment.
- Develop the MICV, but in due time and with adequate planning. Determine the optimum weight, size, and weapon system, resisting the addition of any "nice-to-have but not essential" features.
- Cancel the initial buy now planned. There are sunken costs to be lost, but whatever funds can be saved should be transferred to the several splendid training innovations being initiated by TRADOC.
- When the vehicle is ready, determine precisely which organizations will be used to regain the offensive in Europe, and equip these elements with the MICV. Should these be reserve component forces, so much the better, for the act of providing them with the latest, mission-specific equipment could only result in better training and a closer-knit U.S. Army.

The war story which opened this discussion was not intended to discredit anyone. Those in positions of authority at the time obviously believed that it was proper to change the method of employment of the ARVN forces. There is little doubt that these same individuals, because they are professional officers, would now freely admit that the directive issued in the summer of 1964 was in error. The question today is, are we about to make an error concerning the mechanized infantry combat vehicle?

The MICV is a weapon system for the offense.

NIVEN J. BAIRD
Lieutenant Colonel, Armor
Carlisle Barracks, PA

DON'T BE A SMOOTHBORE, GET RIFLED!



Should the future *XM-1* tank gun be rifled or smoothbore? The pros and cons of each gun solution are currently being argued in an ever-expanding international arena. Since the outcome of this debate will have its most profound effect on you and I, the Armor Corps, we must have a voice in the decision. The primary contenders for the replacement gun are the German 120-mm smoothbore gun and, a new arrival, a British advanced-technology 120-mm rifled gun (not the current *Chieftain* gun). I am personally convinced that the choice of a smoothbore gun, regardless of the national origin, could have grave consequences on future battlefields. Therefore, the purpose of this article is to try to bring the U.S. Armor Corps into the rifled-gun camp.

First, let's review the alleged advantages of a smoothbore gun. The proponents of smoothbore guns list them as:

- Higher muzzle velocities than rifled guns, thus higher

projectile striking velocities and greater armor penetration.

- Less gun tube wear, thus longer tube life. [An effective full charge (EFC) life of 6,000 rounds was originally claimed for the German smoothbore, though this claim subsequently proved to be unfounded.]
- Easier manufacture because the rifling process is no longer required. [This is relatively insignificant in practice, as barrel costs are only a small part of overall system costs.]

It is now necessary to examine each of these alleged advantages in detail. First, it is true that for a given shot weight, charge weight, gun calibre and steel strength, a smoothbore gun can achieve a higher muzzle velocity than a rifled gun. However, this point may no longer be valid because steel technology now exists which will allow the production of rifled guns which will withstand stresses in excess of 30 tons per square inch. This new technology will allow rifled guns to fire armor-defeating projectiles at velocities far exceeding anything now attainable with rifled guns. Thus, a rifled gun made from high-strength steels can be produced which will equal or exceed the current German smoothbore performance. The kinetic energy lost in spinning the round in a rifled gun is minimal. For example, even though the performance of the German fin-stabilized, armor-piercing, discarding-sabot (*FSAPDS*) round is formidable, the British have achieved equal results with a FSAPDS fired from their current *Chieftain* 120-mm rifled gun. Thus, no mystique should surround the smoothbore FSAPDS.

Now let's consider the problem of gun tube wear. It has been alleged, but not proven, that a smoothbore gun has less wear than a rifled gun. Although the Germans first claimed a tube life of 6,000 EFC's for their 120-mm. smoothbore, they now have reduced that claim to around 400 EFC's. This figure is comparable to our current 105-mm. gun tube life. The alleged wear resistance of the German smoothbore is achieved by plating the bore with chromium—an expensive and difficult industrial process. The effects of chromium plating are not always predictable, as the chromium tends to flake, a fact the American artillerymen have found to be true with their 175-mm. gun. Also, the expense of chromium plating partially negates the reduction in cost due to the absence of rifling in manufacture.

Additionally, it is a popular misconception that a rifled gun tube is condemned because the lands and grooves have worn beyond an acceptable level. In fact, wear occurs at the commencement of rifling because of the extreme heat and erosive properties of most propellant gases. Wear at this location can be equally severe in a smoothbore gun. If chromium plating technology can be applied to solve this wear problem for a smoothbore gun, the same technology could perhaps be applied to a rifled gun. Thus, the smoothbore enthusiasts cannot truly claim reduced wear as a singular characteristic of smoothbore guns.

However, we have not yet touched on the *vital* difference between the two concepts: VERSATILITY. The difference in versatility is caused by the different methods of projectile stabilization. A smoothbore gun fires fin-stabilized projectiles. Thus, the smoothbore can fire a FSAPDS round or a fin-stabilized, high-explosive, antitank (FSHEAT) round and that's it. To my knowledge, the Germans have not yet developed a satisfactory training round for their smoothbore. However, look at the list of rounds which can be fired from a rifled gun; armor-piercing, discarding-sabot (APDS), FSAPDS, high-explosive, antitank (HEAT), high-explosive, squash head (HESH), white phosphorous (SMOKE), antipersonnel (APERS), discarding sabot—training (DS-T), spinning, tubular projectile (STUP); in fact, any round you may want to fire. That is not to say that these rounds could not be developed for a smoothbore gun, but development would be costly and subject to high technical risks. No such problem exists if one adopts a rifled gun.

Why is this versatility important? Other tactical considerations aside, it is important because of the emergence of a new armor. This armor, commonly known as Chobham armor, was developed by the British and will be used on the *XM-1*. It is a formidable array, indeed, and although its construction is highly classified, we know that it can be designed to defeat all types of armor-defeating projectiles. Although no Russian tank to date has appeared with any armor as sophisticated, it surely is only a matter of time before they have an equivalent armor. To limit our options of attack on this type of armor to HEAT or FSAPDS rounds may be playing into the hands of the Russians, as the defeat of such armor may require the development of an entirely different round. Whatever round may be required to defeat the armor, it can be fired from a rifled gun. This crucial flexibility is missing in any smoothbore gun. Thus, an American tank armed with a smoothbore gun could possibly find itself in the embarrassing position of impotence against a new generation of Soviet tank. Think about it.

There is my argument. For these reasons the American Armor community should insist that the choice of a new tank gun be delayed until the implications of new armor, ammunition, and gun technology can be properly assessed. Additionally, we should delay a decision until the British complete development of their New-Technology rifled gun which will allow a choice between two 120-mm. candidates. The British are working on a crash program to complete development of the gun in one year in order to have it available for the *XM-1* in the early 1980's. With this information I hope I have brought you into the rifled-gun camp, and if I have, remember the motto, "Don't be a smoothbore, get rifled."

J. R. WALLACE
Captain, Armor

APO NY 09114

Recognition Quiz

This Armored Vehicle Recognition Quiz is designed to enable the reader to test his ability to identify the armored vehicles of armored 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 armored fighting vehicles. 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 appearing in the picture should also be provided. Suggestions for improving or expanding this feature are welcome. — ED.

(Answers on page 73)

Keynote Address

The following is a summary of an extemperaneous address by General William E. DePuy, Commanding General, U.S. Army Training and Doctrine Command (TRADOC), at the opening of the 1977 Armor Conference.

I have a few thoughts that I want to gratuitously leave with you which may or may not be important. They seem important to me however, and I have talked about the first one at length. Some of you have heard me dwell on it *ad nauseam.* For that I apologize, but some of you haven't, so I am going to address it again. I am more and more impressed with the problems that the Army has in understanding what a modern Army is, what it's requirements are, and even what it's nature is. There is one "thing" with which all of you, who are on active duty will be coping, hopefully with success, continuously over the next 10 to 20 years. You must cope with it. That "thing" is the image of the Army which is held, unfortunately, by all too many people in the Department of Defense, in the Office of the Secretary of Defense, in the Congress, in the Administration, in the public, in the press, and believe it or not, in the United States Army as well. The image is that the Army, unlike the Navy and Air Force, is a manpower intensive, weapons- and capital- light type of organization; that it is the soul of simplicity and it's only real disadvantage is that it costs a lot because people cost a lot.

Well, you know, that's really not true on any account. In the first place, the manpower costs of the other services approach the manpower costs of the Army, but that is not the important point. The important point is that over the years the Army has become a weapons-intensive, weapons-dependent organization—nobody understands that better than the armor community. You've been there for a long time, but the Army as a whole is still visualized as an infantry battalion walking down a dusty road as the archetypical

element of the Army. That sort of takes them back to the days when one infantryman was pretty much like any other one. But we haven't been able to successfully explain to all those people I mentioned that, in fact, the Army today is a different breed of cat entirely.

Back in the Civil War, they had some 8,000 soldiers per kilometer of front. In World War I it was still pretty bad, about 6,000 soldiers per kilometer of front. In World War II it got down to about 2,000 soldiers per kilometer of front, and now it is down to about 400 soldiers per kilometer; if you count everybody, including the generals, sergeants major, clerks, typists, mechanics, and everybody else. But if you count the 11-series MOS, the fighting MOS's—the maneuver MOS's—in a division in Europe there are about 75 men per kilometer of front who are holding muskets and shooting tanks and shooting antitank guided missiles. Seventy-five; and I don't know whether or not that can go any farther, it may have already gone too far, but the point is that those 75 people there on the line of contact are the agents for the combat power of he United States Army. There is inherent essential combat power in our divisions—tanks, antitank guided missiles, and rifle platoons. But in addition to that, their agents are bringing power from the rear—whether it is attack helicopters, six different kinds of projectiles, or tactical fighters and so on.

Teeth to Tail

They also are the recipients of support from a tremendous support organization. If you look at the so-called teeth-to-tail ratio, the thing that Senator Nunn keeps bugging us about, you will find that he has a pretty good case in one respect. In the Civil War, the ratio of the teeth-to-tail was about 5 percent (tail) to about 95 percent (teeth). The 5 percent were sutlers or something like that. Now it is 18 percent (teeth) to 82 percent (tail). In other words only 18 percent of the Army is involved in the delivery of ordnance against the enemy.

If you'll look at the firepower available to a soldier on the front—a 11E, 11B, 11D—back a long time ago he had a musket and maybe he had a grenade of some sort. As late as World War II, he had about 150 pounds of firepower available to him, if you spread firepower in a division across the 11-series MOS. Now he has 1,600 pounds—a factor of 10.

Sophisticated Equipment

When you add up all of the equipment in the Army that is more complicated than small arms, by this I mean trucks, generators, missiles, tanks, air-defense weapons, radars, artillery pieces, and so on, you'll find that today there is seven-tenths of one of those pieces of equipment for every single soldier in the division forces of the Army.

Now I don't think that the American public understands that; I don't think the secretary of defense understands it; I don't think the Army understands it; I don't think anybody understands it, but you are going to have to explain it to them because a lot of things can go wrong if that's not understood. This is one of the Army's biggest unsolved problems. It's worthy of your attention and it is worthy of your effort, and wherever you go and to whomever you talk you must try to explain that, and it goes far beyond the Armored Corps.

The next thing on my mind has to do with the fact that it is going to get worse. Starting about 1978 and extending for a period through 1985 and probably beyond, given not only the problems and vicissitudes of the budget, Congress, and decision makers—who are many—we are going to take on more modern, complex, expensive but highly-capable equipment in the next 7 years than ever in the history of the Army. I don't think any of us can grasp what that really means. My guess is that it is a much bigger problem that we can appreciate at this time. In any event it is all expensive; but if we've done our work right, that equipment in every case, is much better than the piece of equipment it replaced.

The *XM-1* tank is much better than the *A1, A2,* or *A3.* The mechanized infantry vehicle is going to revolutionize Infantry combat. No question about it. You don't really know that by talking about it. You've got to see it, you've got to watch it, then you've got to get in it and shoot it and see what it can do.

The artillery: nobody really knows how we are going to handle six kinds of major ammunition—we do know we need more artillery. We don't really understand the impact of TAC fire, battery computers, and artillery locating radars. What this does, of course, is that it places a very large obligation on the Army to prepare itself to receive and use these capabilities on the battlefield.

I am quite certain in my mind that we are just sitting back and saying, "When it does arrive, we will absorb it into our current unit with our current tactics, with our current logistics, and with our current understanding." I really don't believe that because I think, taken in full, it is a new ballgame.

In any event, the Army is obliged now to prepare itself to receive this deluge of new, marvelous, highly-capable equipment. We missed one generation of modernization while we were in Vietnam. The Soviets went through almost two (generations) so we almost missed two generations. With this new generation (of equipment) we will, hopefully, be caught up in most fields, ahead in some, but we are going to be in for some nasty surprises because they are still working.

When you think about all this new equipment and what it means, the mission of the Army—written into the law—is very clear—"organize, train, and equip forces." That is what, it is said, the Department of the Army is for. I will add to that, "and employ them properly."

Restructured Division

As you know, TRADOC has proposed an alternative organization to the division we have now. Known as a restructured division, it is designed to cope with this influx of new equipment.

My advice to you is to first think about the principles involved, the objectives that we are trying to reach, the problems that we are trying to overcome, before you get hung up on some little bit or piece of it that you might not particularly want. You will find that some people don't like three-tank platoons, other people don't like 100-man rifle companies, other people don't like eight-gun batteries, and still other people don't like having an air-defense artillery commander as well as a division artillery commander, and so on. You'll find somebody in the Army who doesn't like it.

In addition to adding artillery and the other things that I

have talked about, there is one very fundamental principle which lies at the heart of the new division; that division provides a higher level, more quantity and quality, of leadership per 100 men, 100 tanks, 100 guns, or 100 of everything.

Today, there are some of us who believe that the Army with the 800-man Mechanized Infantry battalion is archaic. What I mean by that is it doesn't have enough leadership per every 10 soldiers.

At the risk of offending people, I would have to say that I have never seen an Infantry battalion in my 36 years in the Army that ever generated more than about 10 percent of its combat power on the battlefield. Infantry battalions of 800 men would very rarely have 80 soldiers on the right side of the battlefield firing their muskets at the enemy at the same time. So, what we have is a problem. We have too many soldiers per leader.

We had a test conducted at Fort Hood that had to do with the three-tank platoon versus a five-tank platoon. It was very interesting. Perhaps it was not the final definitive test, but what it showed was that, if you put three-tank platoons and a five-tank platoons against different target arrays, only about 8 percent of the tanks in three-tank platoons failed to engage; meaning that they either didn't see the target or they were on the wrong part of the battlefield at the wrong time. On the other hand, 34 percent of the tanks in five-tank platoons were in the wrong place (to engage).

Now we have to run a test with Infantry. I can tell you right now what the results will be. I can't tell you exactly what the percentage will be, but I will tell you that the number of Infantry soldiers on the right part of the battlefield, doing the right thing at the right time will be proportionate to the number of leaders mixed among them—and smaller units will work much better than big units. I venture to say that if you constructed an infantry battalion out of 100 men and had three companies of 30 men each, and had five officers in each company of 30 men, meaning one for every six men, and proportionate NCO's, you could give an 800-man battalion a fit; simply because you would have these expensive, well made, highly capable weapons doing what they were designed to do.

When you look at the new division, the restructured division or whatever we call it—at the heart of its concept lies a conscious decision to increase both the quantity and quality of leadership by the simple device of having smaller units with the same number of officers.

Leadership in turn equates to lieutenants and sergeants and to the training of quality personnel, and lieutenants of Armor are going to do a lot better because their training will be oriented toward making them in fact, Armor lieutenants. The same will be true of Infantry lieutenants. Therefore; don't get hung up on the details of the restructured division until you understand the principles.

Individual Training

Training is always a problem to the Army. It is expensive and time consuming, and it has many competitors and detractors. It is clear to all of us that regardless of whether you pay a million dollars for an *XM-1* tank or only half a million dollars for an *M-60A3* tank, the contribution of a trained crew to the effectiveness of that tank on the battlefield is as important. It can be even more important than added range and stabilization, and the ability to acquire targets and determine range. In a tank platoon, the range of exploitation or utilization of its potential varies. We would like to assume that the platoon is perfect. That it is 100 percent in all respects—filled with perfect crews, under a perfect lieutenant, and equipped with the finest tanks available. Not so! Out in the force we have, on any given day, tank platoons operating at 10 percent. We have other tank platoons that, at certain times per year, get themselves up to be around 80 percent effective, then it fluctuates up and down during the year. That difference between 20 percent effective platoons and 80 percent effective platoons is like multiplying the number of tanks by four. I submit to you that a tank battalion operating at 80 percent efficiency could whip four or five enemy battalions, but a tank battalion operating at 10 percent effectiveness would get whipped by only one or two enemy battalions.

These are very ugly facts of life. The problem is that even with all this new equipment, the problem of training just gets bigger. It is not only a question of: Is the gunner trained? Or, is the tank commander trained? It is a list. Is the mechanic trained? Is the platoon leader trained? Is the company commander trained? Is the battalion commander trained? How much of that marvelous potential put into our hands by the taxpayer are we able to utilize or exploit? Finding answers to these questions is our challenge! It is a challenge to the infantry, artillery, and air defense—you name it—and armor.

The Noncommissioned Officer

We have all more or less agreed that, insofar as individual training goes, we have to get the noncommissioned officers corps back in the saddle.

There was a time when unit commanders were totally absorbed in trying to train a unit to do what it was supposed to do, even after they got on the battlefield. Unfortunately, I think the Vietnam War had a lot to do with that. The Army became accustomed to receiving trained soldiers. Well, they really didn't receive trained soldiers, they received partly trained soldiers and that was all anybody could do about it. Now we know that there is no way for us to deal with the problem of only partially trained soldiers being sent to our units, what with all of the pressures against the pipeline and training bases. There is no way that TRADOC, or any training establishment, can train all soldiers up to the skill levels you need.

The sergeants are going to have to get at the training problem. We have tried to give some assistance to it at TRADOC; however, we recognize as you in the operating force do, that all training comes together at battalion level—that's where all the soldiers are. More correctly, most of them are not at battalion, they are down in the companies, platoons, and squads, and in the tanks. I want to make a very simple point. The continual training of our soldiers is a problem that won't go away. It's going to get worse! And it can't be solved by generals! A lot of the problem must be solved by sergeants. The sergeants major of the army, the first sergeants, and platoon sergeants have to pick up that particular ball and run with it. If they don't, we're not going to make it!

If you put all of this new equipment in an Armor,

Mechanized Infantry, Artillery, or Air-Defense battalion, and you are able to use it, tactically employ it, and operate it correctly, it will sort of be like being in the National Basketball Association as opposed to the North Central Conference. *Potentially you are in the big leagues,* there aren't any real big secrets between the Russians and ourselves and the Germans and anybody else. There are no secrets about warfare: there are maybe just a few little technical secrets such as the inside of a thermalsight or details of how a diode works. But they are probably the only secrets left. So, as everybody knows, you can only put five men on a basketball court or 11 men on a football field, but left unanswered is the question, can we train them up? Can we train our army up to the equipment it has, knowing that the range of opportunity is all the way from 10 percent to 60, 70, or 80 percent effectiveness?

Air Mobility, Tactics, and Missiles

One of my worries, which I would like to have you share and preserve, has to do with air mobility. In Vietnam the United States Army pioneered air mobility. When we came back from the Vietnam War and turned our attention to Europe, our attention was drawn automatically more and more to tanks, mechanized vehicles, and attack helicopters. I ardently hope that the Army will not lose it's worldwide superiority on a conceptual basis and on an actual capability basis. I see signs of the Russians getting ahead of us. They are certainly building more helicopters. Let's remember that there is only one real Cavalry left in the Army and that is Air Cavalry. That is offensive to some of you but what I am saying by that is that the Cavalry originally was distinguished from the Infantry by the fact that they were on a horse, which meant that they could get around faster and by being able to get around faster they could do things—they could run down to the crossroads to see what was going on down there.

Right now our ground Cavalry is held to the same relative speed of other ground elements, and understandably so. There is no way to make much difference in mobility with heavy tank battalions and mech battalions. So the only real mobility differential we have is air mobility. I suspect that that is trying to tell us that in the far distant future, or maybe even the approximate future, we may be missing the bet. When the Germans broke open the World War I combat in Poland in 1939 and again when they went into France in 1940 and Russia in 41, they did it with Armor.

We haven't broken open the armored warfare of World War II, the Sinai, and the next battle in Europe, which will be a heavily armored battle. There is no question about that. The question is, however, is it going to be a 5-mile-an-hour war? That doesn't mean that some tank isn't going to go faster than that, but it means that when you are averaging it out, the force going across the terrain is going to be making maybe 30 kilometers a day or, if you are lucky, may be 30 to 40 kilometers a day.

The real question of the future is whether or not somebody will break the shell of that. It is going to be the U.S. Army or is it going to be somebody else? I ask that because so many of the architects of air mobility are Armor officers, and Air Cavalry is the franchise of this group. I am just saying to you, don't forget the potential. I think that someday there may be another breakthrough. We thought we had it—and we did, in a low-intensity war. There also may be one in a high-intensity war and it will be in the mobility differential. We have just got to keep our eye on that.

The last point on tactics is that, generally speaking, we in the American Army still haven't learned how to use our *Panzer Grenadiers.* Of all the forces on a very highly-mobile, highly-lethal, armor-dominated battlefield, armored infantry or mechanized infantry presents us with the most difficult problem of correct combat utilization. None of us are very good at it. We are still puzzling over it. The Israeli's are puzzling over it just as we are. So are the Germans, and the Russians are debating with themselves like mad as to how they ought to employ mech infantry. All that I want to say is that I don't regard all Armored officers as experts. I don't regard many of the Infantry officers as experts right now on this. I think we just have to acquire a lot more understanding across the board, and you guys in Armor are susceptible to dismissing the problem. Don't do it! You can't go it alone! Among other things that Armored officers cannot quite do right is employ antitank guided missiles. The antitank guided missile came into the Army as a tag-a-long weapon with the infantry. The Infantry didn't know how to use it because you put the Infantry over in the woods and no place is quite so awkward for a 3,000-meter missile as a position over in the woods. So, everybody is trying to get the missiles on the right part of the battlefield, the Infantry on the right part of the battlefield, and the tanks on the right part of the battlefield.

So what the Armor people have to understand is that there is a new horse in the race. The armor-protected, tracked-mounted, antitank guided missile is in fact another element of combat power. It is now just a part of the Infantry. In the new division study we have lumped some of them right into the tank battalion. There again the Army as a whole, and not the armored corps, in particular, certainly has got to be able to cope with that, but hasn't yet.

The army of the infantry battalion walking down the dusty road, which is in the minds of so many people, was a kind of a grossly managed army. It succeeded on battlefields by sheer brute force and awkwardness in most cases. Even today, the only management system that I can think of that is not gross is our aviation management system, and we had to learn the hard way, in Vietnam, that it had to be a precision program. Now, we find that we have got these vast differences in potential between 10 percent and 80 percent effectiveness. A lot of that has to do with maintenance and a lot has to do with crew selection, a lot has to do with crew training, and a hell of a lot has to do with turbulence and assignment, maintenance training, spare parts—the whole 9 yards. What we see in the Army today is an army which over the years has specialized—we even have OPMS career fields in which we have specialized, quote, logistics. We have specialized in personnel. Now, what has happened is that that works pretty well. It almost works. What we don't measure, until you get into that battalion, is how the battalion commander is trying to put together the equipment with the people with the logistics support. Back up where all of those systems originate, you hear people talking about personnel management, promotion structure, and equity of overseas assignment. In the logistics system you hear about demand satisfaction, demand accommodation, and invento-

ry in motion. Now all of those things are very important but we have not focused them on the end product on the battlefield; except in the case of aviation, and even there we are not all the way home and dry. What it says to me is that we don't deserve additional sophisticated equipment under the present system, because it will either not be manned or will be manned with the wrong people who are only partially trained, will be only partially supported, and in fact will be down around 20 percent effective on the battlefield instead of up around 80 percent.

So, because the tank is so important, and because only 2 percent of the Army is inside the tanks, and that some 33 1/3 percent of the Army's capability in Europe comes from tanks, it is a marvelous opportunity for leverage. It is a marvelous opportunity to see whether or not we can focus management into a total systems approach where the tank, its crew, its maintenance, its spare parts, the training of its tactical employers and so on is all wrapped together.

The Army is at a crossroads. I can tell you that there is no universal enthusiasm for this. There is worry and skepticism—worry about the fact that the tankers will become an elite corps. All I can say is I wish you were in every battalion in the Army. Because you know that you do not have an elite tank corps in the Army today, but we need one. The Army's on trial and has chosen to use the tank corps as the guinea pig. Gentlemen, it has to succeed. If it doesn't succeed the first time, it will have to succeed the second time. It is the wave of the future. It has to be understood by all tankers that you've got to do everything in your power to make it work, you've got to put your shoulder behind the wheel and lead the Army into the future in terms of specific weapons-systems oriented management actions. I visualize that if this one works, and it has to work sooner or later, that it probably would be extended in the next step into the very difficult to maintain and operate air-defense systems like maybe the *Roland* and the improved *Hawk* where again the capability of the system on the battlefield ranges from practically zero in many cases up to 90 percent. I would like to say that some 10 months ago, after TRADOC had made a study of the tanks we found enough that was rotten in Denmark, to persuade the Chief of Staff that the situation with our tank force was unacceptable. Then we decided to bring General Kalergis back from retirement to expand and explode the examination of the problems and come up with a solution. General Kalergis is an old friend of mine and I've had something to do with having saddled him with this problem, and he has done his usual superb job. As you listen to him I want you to not only think of the tank corps as a system that needs total management, but carry that on into your understanding of the rest of the Army. So, I've rambled on about a few thoughts, about which, as you can tell, I feel very deeply, so I thought I would impose some of them on my captive audience. I wish you all luck and I am going to miss working with you.

ARMOR CONFERENCE 77777777

MICV TBAT II

by Brigadier General Stan R. Sheridan
Project Manager, MICV Systems

Since receiving the "green light" for development of the MICV TBAT II last November, FMC has been working to finalize the design concept and meet the user's requirements. During this time two design concept reviews were conducted with user participation. Most recently, a major milestone was passed when the user reviewed a completed engineering mock-up of the vehicle on 14 and 15 March 1977. The mock-up review included representation from Fort Benning and Fort Knox and was complemented with a nine-man demonstration squad of infantrymen from the 7th Infantry Division, Fort Ord, California. Other organizations in attendance were: DA, OTEA, TRADOC, DARCOM, HEL, TRANSANA, and AMSAA. A general officer review, including the Infantry and Armor Center CG's, was conducted on 16 March during which approval was given to the basic design permitting the start of the detailed engineering and fabrication phase of development that will lead to the DT/OT II testing in 1979.

I want to strongly emphasize that this material is tentative, subject to further review and analysis, and should be considered as conceptual only.

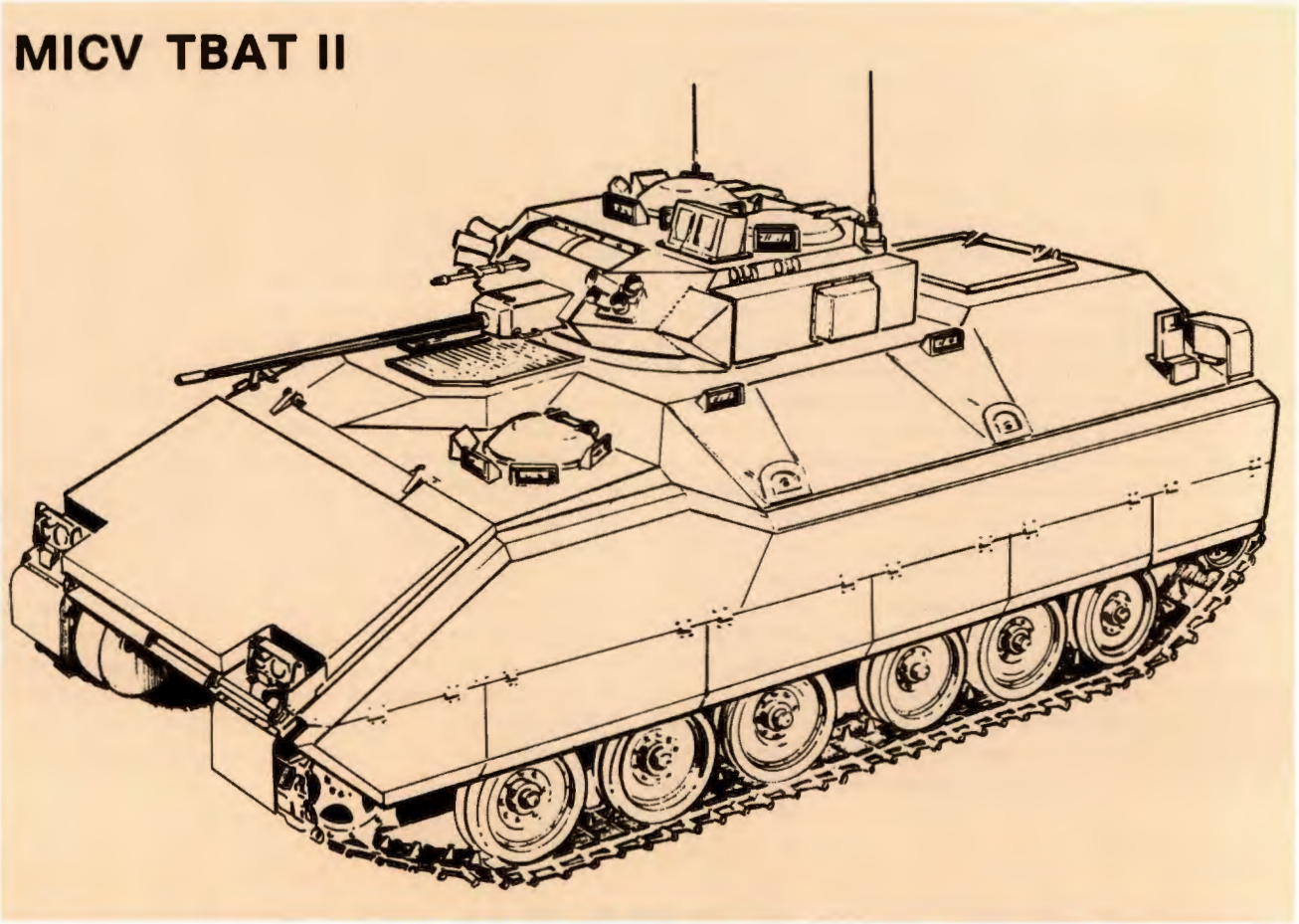
The MICV TBAT II system is the result of the integration of the TBAT II turret into the MICV, along with a nine-man infantry squad and specified equipment. Baseline for the vehicle hull and automotive subsystems is the present MICV configuration. That design has been modified where necessary to accept and facilitate the distinctive arrangement of equipment and personnel for MICV TBAT II.

To maximize squad compartment space, the turret is located as close as possible to the engine compartment and to the lower, right-side plate. The right fuel tank is reshaped and the engine cooling fan and radiator are moved forward 2 inches to clear the turret. The hull top plates and exhaust grille are adapted to the larger turret. Fuel has been relocated from the left rear corner to a forward tank below the turret.

One squad member is seated just back of the driver and five squad members with their weapons and ammunition are seated to the rear of the turret. Gun ports are relocated for squad use with two on the left side, two on the right and two in the ramp.

Primary and secondary ammunition is stowed on the

MICV TBAT II



sponsons and recessed into the floor in the squad compartment.

Five dual-purpose missile stowage racks for TOW and *Dragon* are located to the left rear in the squad compartment—three horizontal and two vertical. Three LAW missiles are stowed horizontally on the left side.

The cargo hatch is moved toward the rear to clear the turret, and the opening is contoured and increased 2 inches in length to facilitate TOW loading.

The personnel heater is in a vertical position next to the weapon station.

TBAT II Turret Characteristics

Primary Armament and Ammunition

25-mm. (SP or EP) weapon, dual feed
- Traverse ..... 360 degrees continuous
- Elevation ..... 60 degrees
- Depression ..... 10 degrees
- Slew/traverse rate, max ..... 60 degrees/second
- Slew/elevation rate, max .... 60 degrees/second
- Tracking rate, min ..... 0.05 mil/second

Rate of Fire
- Low controlled ..... single shot/100 s.p.m.
- High controlled ..... 200 s.p.m.

Ammunition, Ready Rounds
- AP ..... 75 rd.
- HE ..... 225 rd.

Secondary Armament and Ammunition

7.62-mm. *MAG-58* ..... coaxially mounted
- Rate of fire ..... 750-950 s.p.m.
- Ammunition (7.62-mm.) ..... 660 rd., ready

TOW Launcher ..... 2 missiles
- Traverse ..... 360 deg continuous
- Elevation ..... 30 deg
- Depression ..... 20 deg
- Slew/traverse rate, max ..... 15 deg/sec
- Slew/elevation rate, max ..... 15 deg/sec
- Tracking rate, min ..... 0.05 mil/sec

Fire Control System

Vision and sighting equipment

Commander
- Panoramic, 360-deg vision ... 8 unity periscopes
- Hard optic relay ..... 4x and 12x day, and night

Gunner
- Panoramic, 180-deg vision ..... 2 unity periscopes
- Integrated day/night sight for weapons and TOW... 4x and 1x day, and night
- Power drive and stabilization ..... electric

TOW electronics ..... missile guidance set

Ring gear ..... 60 in. pitch diameter

The primary elements and other specified on-vehicle equipment are positioned to optimize the personnel/equipment interface and assure efficient use of space.

The MICV TBAT II carries:
- 9 squad members
- 900 rounds of 25-mm. ammunition

300 ready rounds in turret
600 rounds stowed in vehicle

- 4,400 rounds of 7.62-mm. ammunition
  660 ready rounds in turret
  3,740 rounds stowed in vehicle
- 6,160 rounds of 5.56-mm. ammunition
- 5 TOW and/or *Dragon* missiles plus 2 TOW's in launcher, and 3 LAW missiles
- 197 gallons of fuel
- 10 gallons of water

The MICV TBAT II Scout vehicle carries:

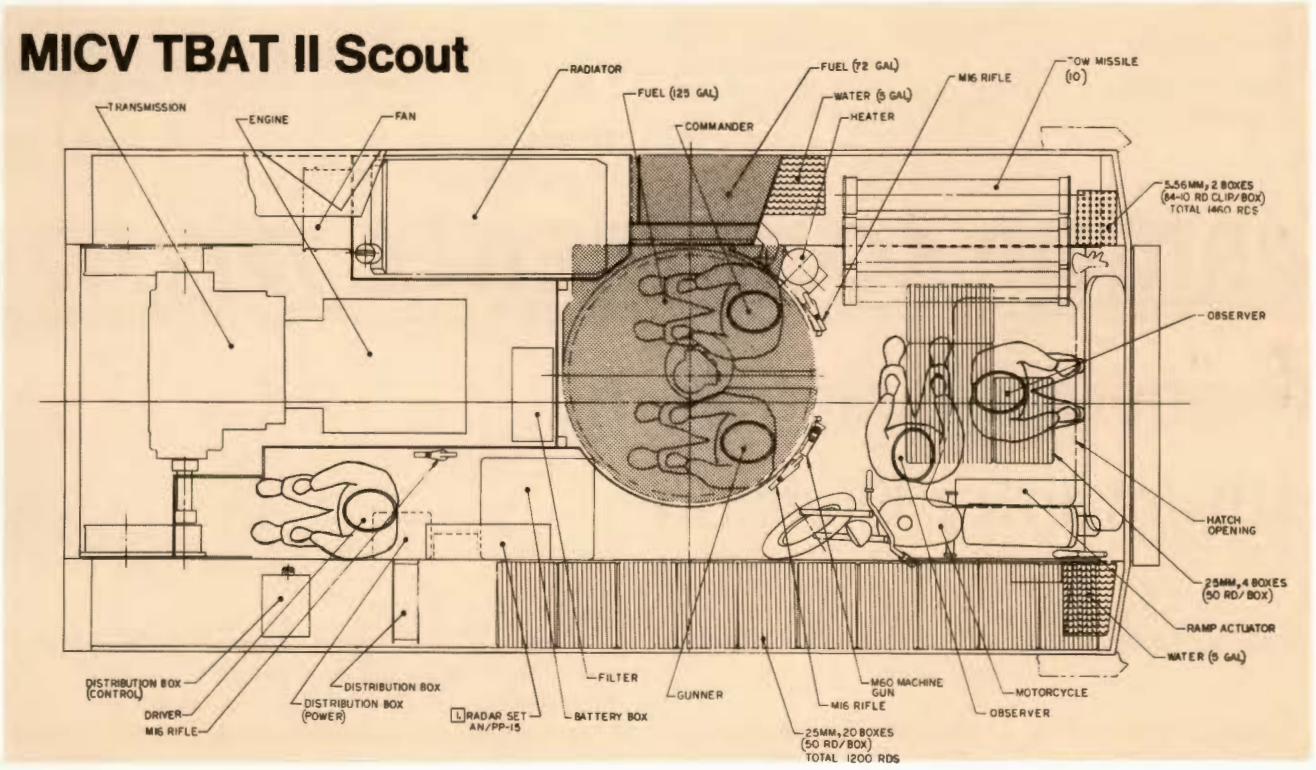
- 5-man crew
- 10 TOW missiles plus 2 in launcher
- 3 LAW missiles
- 1,500 rounds of 25-mm. ammunition
  300 rounds in turret
  1,200 rounds stowed in vehicle
- 4,400 rounds of 7.65-mm. ammunition for the *MAG-58* machinegun
  660 ready rounds in turret
  3,740 rounds stowed in the vehicle
  (located inside on sloped sides of vehicle, not shown in below plan view).
- 197 gallons of fuel
- 10 gallons of water
- 3,200 rounds of 7.62-mm. ammunition for the *M-60* machinegun,

The MICV TBAT II (TOW Bushmaster Armored Turret, Two-Man) provides full armor protection for the vehicle commander and gunner. The commander, seated to the right of the gunner in a 60-inch azimuth ring, is provided approximately 360 degrees peripheral vision through unity vision periscopes for maximum command and control of the vehicle. The gunner is afforded unity frontal vision through the integrated day/night sight and adjacent unity periscopes. Both crew members have individual hatches, with the commander having "popped hatch" capability.

The primary armament system, consists of a 25-mm. high-velocity automatic weapon (self-powered or externally powered), with dual feed armor piercing (AP) or high energy (HE) rounds and capable of being loaded, aimed, fired, and charged by the gunner from a fully protected position. As a secondary armament, a *MAG-58* machinegun, 7.62-mm. weapon, is coaxially mounted with the primary armament. The *MAG-58* is capable of being loaded, aimed, fired, and charged by the commander. The *MAG-58* also can be controlled by the gunner. Additionally, as a secondary weapon, a ballistically protected externally mounted two-missile TOW launcher is capable of being loaded from under partial cover through the cargo hatch.

All electric controls for azimuth and elevation powered/stabilized modes of operation for the primary and secondary weapons are provided to the gunner, with override capability for the commander. A manual backup mode of operation to control movement of the weapons into firing position is available to the gunner.

The multiple TOW launch system is locked in a tactical travel mode position alongside the turret and decoupled from the primary sight when not in use. An electric actuator lifts the launcher to the horizontal position where it is elevated about a separate rotor axis with a separate TOW elevation drive. Automatic controls maintain missile line of flight coaxial with the primary gunner's integrated day/night sight within specified elevation and depression limits. Stowage within the turret consists of necessary communication equipment for commander and gunner. Two antennas are mounted on the turret. Two sets of smoke grenade launchers (4 grenades per set) are mounted on the turret to provide a smoke screen.



MICV Statistics

General
- Weight (combat loaded) ..... 45,000 lb.—47,000 lb.
- Weight (air transportable) ..... 35,000 lb.
- Ground pressure (combat loaded) ..... 7.5 p.s.i.
- Personnel capacity ..... 9 men
- Fuel tank capacity ..... 197 gal.
- Air transport *C-141, YC-14, YC-15, C-5A*

Performance
- Speed on land (0% slope) ..... 44 mi./h.
- Speed on land (10% slope) ..... 17 mi./h.
- Speed cross-country ..... 20 mi./h.
- Speed in water ..... 5 mi./h.
- Acceleration (0 to 30 mi./h.) ..... 18 sec.
- Stopping (20 to 0 mi./h.) ..... 28 ft.
- Range (@25 mi./h.) ..... 300 miles
- Turning radius ..... Pivot to infinite
- Slope 60%
- Side slope 40%
- Trench ..... 100 in.
- Vertical wall ..... 36 in.
- Gross horsepower-to-weight ration 21.3

Engine
- Make and model ..... Cummins VTA 903
- Displacement ..... 903 in.
- Type ..... 4 cycle
- Fuel ..... Diesel
- Gross horsepower 500

Transmission, Automatic
- Make and model ..... G.E. HMPT-500 or Allison
- Type ..... Hydromechanical
- Steering ..... Hydrostatic
- Brake type ..... Multidisc, oil cooled

Final Drive
- Type ..... Geared

Running Gear
- Suspension ..... Return roller
- Springing media ..... Steel torsion bar in steel tube
- Number of wheels ..... 6 pair each side
- Wheel size ..... 24-inch diameter x 4 inches
- Track Type ..... Steel single pin with detachable rubber paids
- Shock absorbers ..... 3 per side
- Number shoes ..... 83 per side
- Track pitch ..... 6 inches
- Track width ..... 21 inches

Night Vision Equipment
- Sight (drivers) *AN/VVS-2*

Firepower
- Main weapon ..... 25-mm. automatic cannon with dual feed
- Secondary weapon (coaxial) ..... *MAG-58* machinegun

Other (launcher or infantry fired) gun
- Machinegun *M-60*
- Firing port weapon ..... 6 ea. *XM-321*, 5.56-mm.
- TOW and *Dragon* missiles ..... 5 in any combination
- LAW missiles 3

Ammunition
- 25-mm. ..... 900 rds
- 7.62-mm. ..... 4400 rds
- 5.56-mm. ..... 6160 rds

Electrical System
- Generator
  - Amperes 220
  - Voltage ..... 28 Vdc
- Batteries ..... 4 type 6 TN, 100 amp-hr, 12-volt each

Armor
- Front, sides, rear ..... 14.5-mm. AP
- Top ..... 155-mm. air burst
- Bottom
  - Front 1/3 ..... Antitank mine
  - Rear 2/3 ..... Antipersonnel mine

Fire Extinguisher
- Fixed ..... 7.0 lb. Halon in engine compartment (1)
  5.0 lb. Halon in personnel compartment (2)
  Automatic detection and suppression in personnel compartment
- Portable ..... 2.75 lb. Halon

ARMOR CONFERENCE 7

Gunnery Training in the 4th Infantry Division

by Colonel Richard R. Cook, CO, 1st Brigade, 4th Infantry Division

During my presentation, I will discuss the tank gunnery programs conducted by the tank battalions in the 4th Infantry Division, the results achieved by each battalion and our future plans for firing Tables X and XI.

We believe that the 4th Infantry Division has been in step and, in some cases, ahead of the new tank gunnery methods and techniques. Tank gunnery at Fort Carson in 1975 was

the starting point for several vast improvements in our program.

Division Interest

During 1975, several key things happened. One of those was that the 1st Brigade Commander, later to become Assistant Division Commander for Support [ADC(S)] of the 4th Division, put his time and effort into qualifying a tank on Table VIII. This senior officer involvement has continued to date. In fact, this year our ADC for Maneuver [ADC(M)] and 2 brigade commanders fired and qualified on Table VIII. The depth of understanding and appreciation for the problems encountered in tank gunnery is now more fully appreciated at the highest levels in the division.

TGAT

Another important event was the formulation of the division tank gunnery assistance team (TGAT). The team is composed of an Armor captain, officer-in-charge (OIC) and an noncommissioned officer (NCO) from each Armor battalion. Their charter is to prepare, organize and supervise the 4th Infantry Division tank gunnery program. This team, in conjunction with the Fort Knox-trained master gunners, is the backbone of our program.

Since 1975, TGAT has been deeply involved in all aspects of tank gunnery training. Specifically, they prepared and administered our own master gunner training program which enabled each company in the division to have an NCO that was highly trained in tank gunnery. Additionally, the TGAT organized and administered the tank gunnery program of instruction during the division's 11E reclassification training program in 1976. Most significant is the innovative and professional manner in which they have planned, organized and administered the Table VIII qualification firing of the 4th Infantry Division.

In 1975, it was decided that to allow a crew to have only one chance on Table VIII was counterproductive to training. A crew that has a rerun on Table VIII and qualifies is certainly much more combat ready than one that bolos and doesn't fire again until the following year. TGAT was instrumental in the construction of a ranging, quick-lay, and target-acquisition range, a dry-run crew course and several new syncronization pads. All of these facilities are located close to the motor pools and are, therefore, convenient and easy to use.

Through the TGAT efforts, the tank gunnery subcaliber devices are being used extensively in the 4th Infantry Division. The field miniature tank range, using the .22 cal. rifle has been fired in the past with great success. This year, the *M-55* laser, .50 caliber (*Telfare*) device and 20-mm. in-bore cannon were all used extensively. The 4th Infantry Division Armor battalions use these ranges and subcaliber devices extensively prior to the firing of any main-gun ammunition.

The 4th Infantry Division is fortunate in that we have a truly outstanding Table VII and VIII complex. Both ranges have permanent facilities that support the best training possible. Their location is such that we can fire at realistic ranges with all types of main-gun ammunition. These range complexes are presently being used for firing Table X, and in the future will be used for firing Table XI. The Commanding General, Forces Command (FORSCOM), General Kroesen, during a recent visit to Fort Carson, stated that Table VIII was one of the best and most realistic he has ever seen.

I have addressed the facilities and some of the programs we have in tank gunnery. Now I would like to go into more detail in presenting this year's firing—what we have learned and where we are headed.

A prelude to this year's tank gunnery season was the ADC(M)'s concern for finding the optimum tank gunnery program for our four Armor battalions. This concern brought about some distinct differences in each battalion's program in an effort to find the optimum solution. You will see built-in variances in the amount of pregunnery training, subcaliber devices used, actual time on ranges, type of ranges fired, and amount of main-gun ammunition fired. These variances were then evaluated against the battalion's overall performance during tank gunnery.

The firing of the four battalions took place from January-April this year. I will present each battalion's program separately, and at the end, summarize the results of the comparison.

2-34th Armor Gunnery Training

The first battalion to fire was 2-34th Armor. Their training was programmed initially to be an off-season or midcycle gunnery program, however, due to several factors, the training became their regular qualification gunnery. Their program from its onset was oriented on qualifying crews with the minimum amount of range time and ammunition expenditure. This factor was closely tied to their overall training plan of firing more frequently, i.e. quarterly. Most of all, the training enabled the battalion to fire all platoons through Table X, and eventually each company through Table XI. Table X was initially set-up and organized at Fort Carson by this unit. With this background in mind, I will discuss their gunnery training program. Please envision that it started as a midcycle program, but ended as their qualification firing. The battalion had 2 weeks of intensive pregunnery instruction during which time the *M-55* laser gunnery trainer was used. This battalion has used the *M-55* trainer extensively for the past year. Upon completion of their pregunnery instruction, the battalion went directly to Table VII where they boresighted, zeroed, and started their crew main-gun firing. While on Table VII, they were told to continue to Table VIII for record. After spending 2 weeks in a pregunnery phase and 3 weeks on the ranges, they achieved the results shown. Subsequent to Table VIII, all platoons fired tank Table X with oustanding results shown in Table 1.

6-32d Armor Gunnery Training

The second armor battalion to fire was the 6-32d Armor. They were given a 2-week notice to prepare and implement a tank gunnery qualification program. The 6-32d Armor, even with a short notice, used a more conventional program. They had 2 weeks of pregunnery instruction during which they incorporated the use of the ranging range, quick-lay and target-acquisition range, and the dry-run crew training course. Subsequent to their pregunnery instruction, they

Table 1
2-34th Armor Tank Gunnery Results

Number of Crews fired	54
First-Run Qualification	36 (66%)
Total Cost of Main Gun Ammunition	5,621 Rounds $702,625
Total First-Run Hits	460/1,080 (42%)
Average Hits/Qualifying Crew	9.5/20
Average Hits/Nonqualifying Crew	6.99/29

Table 2
6-32d Armor Tank Gunnery Results

Number of Crews Fired	54
First-Run Qualification	36 (66%)
Total Cost of Main Gun Ammunition	7,309 Rounds $913,625
Total First-Run Hits	484/1,080 (44%)
Average Hits/Qualifying Crew	11.35/20
Average Hits/Nonqualifying Crew	7.35/20

Table 3
1-77th Armor Tank Gunnery Results

Number of Crews Fired	54
First-Run Qualification	40 (74%)
Total Cost of Main Gun Ammunition	8,530 Rounds $1,066,250
Total First-Run Hits	479/1,080 (44%)
Average Hits/Qualifying Crew	9.75/20
Average Hits/Nonqualifying Crew	6.11/20

Table 4
4-40th Armor Tank Gunnery Results

Number of Crews Fired	54
First-Run Qualification	32 (59%)
Total Cost of Main Gun Ammunition	9,893 Rounds $1,236,625
Total First-Run Hits	421/1,080 (39%)
Average Hits/Qualifying Crew	8.76/20
Average Hits/Nonqualifying Crew	4.76/20

moved to the range complexes and fired Tables I - III using a modified *Telfare* (.50 cal. device) called the *Gagnon* device. This device was designed and built at Fort Carson, by a master gunner of 6-32d. The principle difference is that it used the *M-85* .50 cal. machinegun instead of the *M-2*. We believe that it has several advantages, and its use on Table I - III proved very successful. Upon completion of Tables I - III, the battalion fired a standard Table IV and V and subsequently moved on to Table VII. Table VI was omitted due to time constraints, however, additional machinegun training was conducted on Table IV and VII. This battalion continued extensive dry-run training throughout its program. After 2 weeks of pregunnery instruction and approximately 4 weeks on the ranges, they fired qualification with the following results shown in Table 2.

1-77th Armor Gunnery Training

The third Armor battalion to fire was 1-77th Armor. Their program was very close to that prescribed in TC 17-12-5 as far as time and ranges fired. This battalion had approximately 7 weeks of pregunnery instruction and dry-run range utilization. 1-77th Armor used the *M-55* laser, and 20-mm. in-bore device extensively in firing Tables I-III. Additionally, the concept of "dry-fire" was used heavily throughout their training program. Upon completion of their intensive pregunnery period, the battalion spent approximately 3 weeks on the live-fire ranges firing the relatively standard Tables IV - VII. They fired on Table VIII with the results shown in Table 3.

4-40th Armor Gunnery Training

The fourth Armor battalion to fire was the 4-40th Armor, our reconstituted battalion. Their training program was also very close to that prescribed in TC 17-12-5. In addition, this battalion also fired midcycle gunnery for 2 weeks approximately 6 weeks prior to their qualification gunnery. Their program was a mixture of very extensive subcaliber firing and the standard main-gun tables. This unit spent approximately 3½ weeks in pregunnery instruction. The 4-40th used the .22 subcaliber device on the Field Minature tank range, and the 20-mm. in-bore device. Upon completion of subcaliber firing, they fired relatively standard Tables IV-VII. Their results on Table VIII are as shown in Table 4.

Final Comparison

In the final comparison of the four training programs, there are several factors that must be considered.

- All battalions, except 1-77th Armor, had a large percentage of new tank commanders from the 11E reclassification program.
- 1-77th Armor had not fired tank gunnery since early 1975, and had not fired under the new scoring system due to their deployment on *Brigade 76*.
- 4-40th Armor was reconstituted in early 1976 and was filled with AIT "train and retain" troops and 82 percent of its NCO's were from the 11E reclassification program.
- Dust and target obscuration were significant problems for all battalions. This fact coupled with the discarding sabot-tracer (*DS-T*) ammunition being fired at plywood panels, almost totally negates accurate BOT.
- Personnel turbulence has a continuing effect on all battalions' ability to retain intact qualified crews. Later this year, the 4th Infantry Division hopes to run a test on the impact of crew turbulence.

Conclusions

- An Armor battalion can, in a relatively short period of time, train and qualify its crews on Table VIII.
- The subcaliber devices in the inventory are adequate and, in fact, the mix can be utilized effectively to reduce time and ammunition required to achieve satisfactory results during qualification firing.

- Dry-firing on ranges, such as the dry tank-crew qualifications course (TCQC); ranging, quick-lay and target-acquisition range, is vital to a good training program.
- The more time spent in pregunnery instruction the greater the depth of knowledge of gunnery skills.

As a result of the comparison of this year's firing, we feel the best program is a combination of all that were fired. The program should include a well-planned, organized period of pregunnery instruction followed by extensive subcaliber firing and finally the firing of Tables VII through XI with main-gun ammunition. Additionally, we are investigating the possibility of firing Table X quarterly and will have more conclusive results at the end of 2-34th Armor's quarterly firing program.

The true combat readiness measure of tank gunnery should not be based on individual tank qualification but on the qualification of a platoon on Table X.

As can be seen from Table 1, it is possible to take less time and ammunition than is normally considered adequate, and still qualify approximately 70 percent of your crews. With the importance of Table X, cost of main-gun ammunition, and the premium on range time, we at Fort Carson believe this is the direction in which to head. However, not shown is the fact that the majority of the number in the summaries of each battalion of crews who failed to qualify on their first run only took 1 more day or night run to achieve a qualifying score. Additionally, these crews were found to be extremely effective when they went on to Table X.

- An item of interest to the Armor Center is that out of 72 crews that failed to qualify on its first run, 20 were commanded by platoon leaders. In other words, less than 50 percent of our lieutenants qualified on their run. The need for tank gunnery instruction in AOB is apparent.

Future Plans

Now that you have some basic understanding of how we have fired during this year's tank gunnery qualification, let me briefly discuss our concept of the future of tank gunnery at Fort Carson. Tables X and XI are the pinnacle of achievement in tank gunnery for an Armor unit. Although individual tank crew marksmanship is important, it is vital that the crew perform its gunnery mission as a part of the platoon team. We learned this lesson during the 2-34th's firing on Table X. Regardless of how the crews had fired on Table VIII qualification, their performance as a member of the platoon on Table X varied greatly. We found crews that had qualified high on Table VIII but could not effectively fire under the platoon leader's control, and yet some crews that were weak on Table VIII responded exceedingly well to the platoon leader's directives. We sincerely believe that the training readiness indicator for an Armor battalion should be changed from the number of individual crews qualified to the number of platoons qualified on Table X.

The course is run on our existing Table VII complex. It is set up and run with a minimum amount of support. Most importantly it is a combat course, by this I mean that a platoon is given a minimum of rounds to zero and it is up to the platoon leader to get his tanks zeroed. From that point on, the platoon is faced with multiple target engagements, including multiple moving targets,—the most realistic combat environment we can establish. Incorporated into the course is artillery call-for-fire, close air support, platoon fire plans, and the platoon distribution of fire. The true value of Table X can be based on the reaction of the platoon leaders who have fired it. They are overwhelmed by its value. Future plans for Table X are to develop it into an active-defense and delay type scenario. With these possibilities, the training value for our tank platoons is immeasurable.

The 4th Infantry Division fully supports Major John B. Whitehead's article in *ARMOR* Magazine (March-April 1977) and Major Harry's article in *ARMOR* Magazine (March-April 1976) where he said, "Table VIII may qualify you to shoot, but Table X will teach you how to fight."

With the existing range complexes at Tables VII, VIII, and IX, we can very easily accommodate a full 3-platoon tank company or a company team with a mechanized infantry platoon in a live-fire exercise. Obviously, command and control will be somewhat more complicated having three platoons on line in a live-fire role. However, with our existing terrain and range complexes we believe Table XI can be fired and fired safely.

If our armor troopers are to be expected to fight in the active defense and kill up to 60 tanks in the first 12 minutes of a Soviet assault, they must be not only highly trained crews, but they must also be completely effective team members. We feel that the tank gunnery program in the 4th Infantry Division will accomplish the mission.

ARMOR CONFERENCE 77

M-60A3 Tank Program

by Colonel Robert E. Butler, Project Manager
M-60 Tank Development

The basic premise for produce improving the *M-60A1* and introducing the *M-60A3* is that they will remain our front line tanks until such time that a sizeable number of *XM-1* tanks are introduced into the inventory. Therefore, there is a

definite need to improve the combat effectiveness of the *M-60*-series tanks in order to keep pace with the technological advances of other nations and state-of-the-art improvements.

In 1969, a senior officer materiel review board recommended that the *M-60A1* tank be product improved. In 1971, the top loading air cleaner was introduced, followed by introduction of the add-on stabilization (AOS) in 1972, the *T-142* track in 1974, and the RISE engine and improved electrical system in 1975. The three passive image intensification night devices and the deep water fording kit were incorporated into Army production tanks beginning this month.

In 1978, the *AN/VVG-2* laser range finder, *XM-21* solid state computer, *M-239* smoke grenade launcher, and the *M-240* machinegun will be incorporated and the designation will be changed to *M-60A3*.

The *M-60A3* production models in late 1978 will include a tank thermal sight in lieu of the gunner's *M-35E1* passive periscope.

The *M-60A1* RISE tank (with passive night sights), evolved from the *M-60A1* and represents the tank currently being produced at the Army tank plant. It is planned that all *M-60A1* tanks currently fielded will eventually be converted to this baseline configuration during depot overhaul.

The *M-60A3* is an *M-60A1* RISE tank (passive) equipped with a new fire control system consisting of the ruby laser range finder and the *XM-21* solid state electronic computer. A thermal shroud is also included to reduce main gun tube bend due to solar radiation. The laser and computer afford a significant improvement in first round hit capability at all ranges.

Two other improvements have been added to the *M-60A3* tank. The Belgian *M-240* machinegun is at least five times as reliable as the current *M-219* machinegun, and the UK *M-239* smoke grenade launcher reduces vulnerability by giving the tank a built-in defensive capability especially against antitank missiles.

We will also install the *M-240* machinegun and *M-239* smoke grenade launcher on tanks already in the field. This program will begin in October 1977 in Germany with the smoke grenade launchers, followed by the *M-240* machinegun early next year.

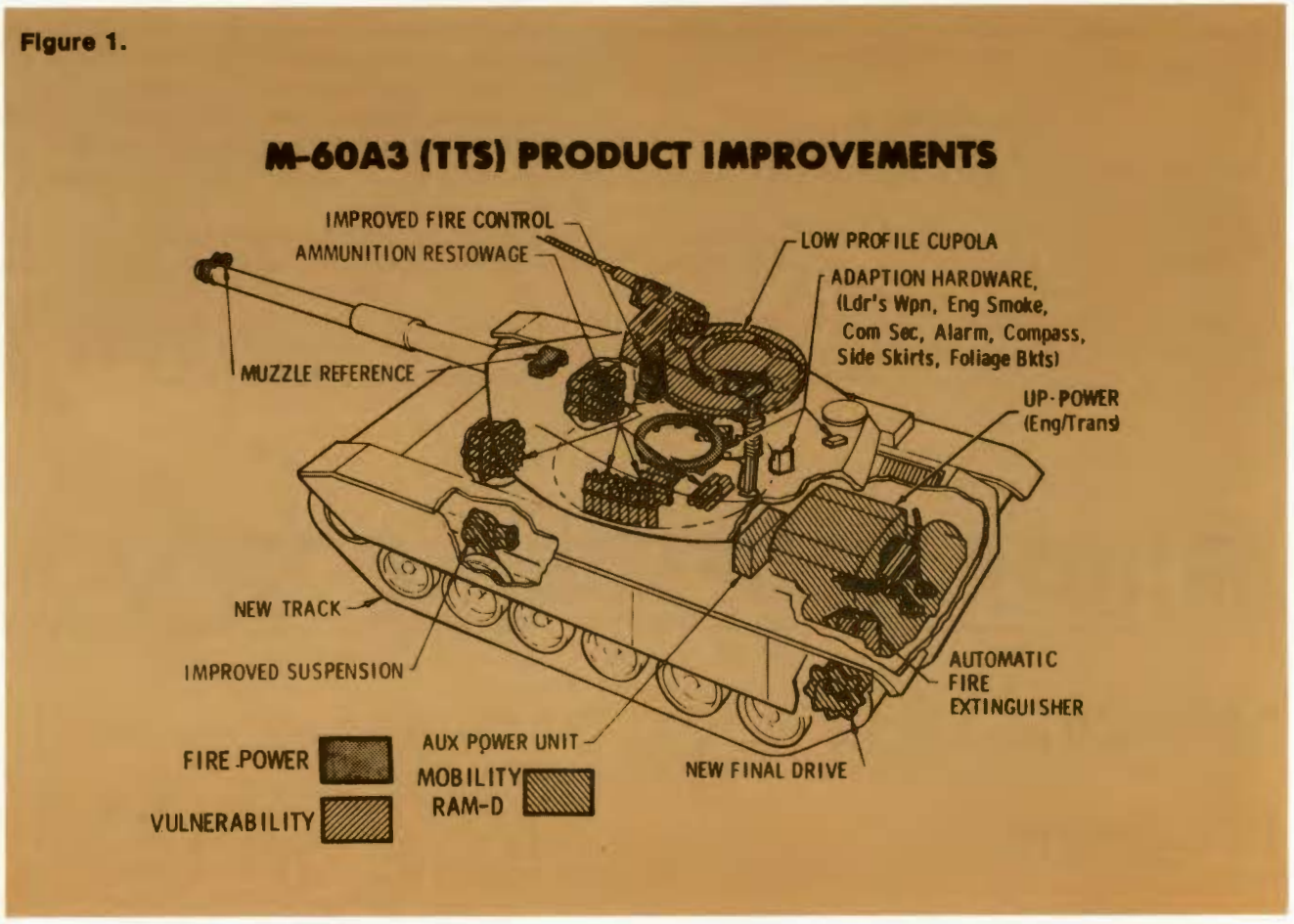
The first *M-60A3* tank will be produced in February 1978. Current Army plans are to produce at least 2,000 of the *M-60A3* tanks through March 1981. A Development Test (DT) III/Force Development Testing and Experimentation (FDTE) of the *M-60A3* will be conducted during 1978 at Aberdeen Proving Grounds, MD; Fort Knox, KY; and Fort Hood, TX.

Fielding of the first *M-60A3* tank currently planned for Europe will take place in early 1979 following the completion of the DT III/FDTE.

Fire Control Improvements

I would like to discuss in more detail the major fire control improvements in the *M-60A3*. Not only do we gain a 30 percent daytime effectiveness increase in hit probability

Figure 1.



through the incorporation of the laser and computer, but a synergistic effect is provided by combining the laser with the passive night sights, revolutionizing our ability to fight at night.

Previously, our ability to fire on the move, hit a target beyond 2,000 meters, and range at night were extremely limited. A vast improvement in all these areas has been realized with the *M-60A3* fire control.

Lastly, the ability of the gunner to range and fire the main gun independently, is a major advantage of the *M-60A3* tank.

The *M-60A3* tank fire control will be further enhanced by the replacement of the gunner's *M-35E1* passive night periscope with the tank thermal sight (TTS), a revolutionary improvement permitting near daylight tactical operations under conditions of limited visibility. Thermal imaging is independent of ambient light, because it senses heat emitted by a target and forms an image on a screen. The TTS has an elbow which allows the commander to view the same scene as the gunner, thus enabling the commander to fire the main gun independently during periods of limited visibility.

Testing has shown that the TTS is able to detect targets at much greater ranges than the *M-35E1* passive image intensification (II) sight. It can sense targets through smoke, haze, fog, and rain which the passive night sight cannot. It enables the tank crew to use the extended range capability of the *M-60A3* fire controls during these periods of limited visibility. The TTS is more than twice as effective as the *M-35E1* passive sight.

Due to the success during testing and potential operational impact, the Army has decided to accelerate the TTS program. The technical risk in this accelerated program is deemed to be low since proven thermal imaging modules common to other Department of Defense (DOD) systems had no failures during Development Test/Operation Test (DT/OT) I testing.

The accelerated program will permit the Army to combine *M-60A3* and its testing and introduce the thermal sight into tank production in late 1978. The ability to combine these two tests is keyed to awarding a low rate initial production (LRIP) contract by June 1977 since the first units require a 10- to 12-month lead time.

Currently, we are awaiting congressional approval of a DOD requested reprogramming action to award an LRIP contract option for the first 300 units.

Increased Performance

Although the *M-60A3* tank (TTS) has not been fielded yet, several other areas of improvements have been identified for development and future application to enhance the tank's effectiveness.

Three objectives have been established in the quest for improving the tank. The primary objective is to increase the tank's performance in the areas of fire power, mobility, and RAM-D while reducing the tank's vulnerability. Cost reduction for expensive fire control components without system degradation is another objective. The third objective is commonality or inter-operability with the *XM-1* tank to enhance support efficiency for the total tank fleet.

Shown in figure 1 are 19 improvements considered applicable in meeting one or more of these objectives.

On the left of figure 2 are those improvements which have been approved and funded for development. With the exception of the improved suspension program, which was initiated during the *M-60A3* development phase, the improvements listed will be initiated this summer.

Figure 2.

CURRENT PROGRAM STATUS

FUNDED FY77	POTENTIAL IMPROVEMENTS
MUZZLE REFERENCE SYSTEM	IMPROVED FIRE CONTROL
AMMO RESTOWAGE	UPPOWER:
IMPROVED SUSP	X-1100 TRANS
FINAL DRIVE	1500 H.P. TURBINE
LOW PROFILE CUPOLA	XM-1 TRACK
ADPT HARDWARE:	AUTO FIRE EXT
LDR'S WPN	AUX POWER SUPPLY
RADIAC ALARM	ADPT HARDWARE
CHEM ALARM	ENG SMOKE GEN
COMSEC	SIDE SKTS
COMPASS	FOLIAGE BKTS

On the right are other programs for which program approval and funding have been requested. Recent congressional action has been favorable toward starting a competitive program for the improved fire control this fall. This program consists of a minilaser and micro-processor computer, two improvements which will reduce the cost of the tank fire control.

Major Product Improvements

One of the major errors in hitting accuracy stems from gun tube distortion caused by thermal energy. A muzzle reference system (MRS) has been designed to correct for this distortion. Hit performance improvements up to 20 percent have been projected. By correcting for the change in the gun tube position, the accuracy obtained during zeroing will remain effective for longer periods and reduce the cost associated with ammunition required to rezero.

The MRS can be manually operated or automated into the solid state computer. The manual version could be applied to *M-48A5, M-60* and *M-60A1* tanks. The automatic form provides corrections without any gunner involvement and is being considered for all *M-60A3* tanks.

The *M-60A3* tank has a thermal shroud on the gun tube to aid in heat dissipation. It is anticipated that the corrections provided by the MRS will eliminate the need for the shroud.

A request for proposal will be released in June 1977 for the MRS. Two competitive prototype designs will be selected for the first program phase of 12 months. The winner will be awarded a contract for a second phase full scale engineering development program. Tank application of the first production units is planned for October 1980.

Stowage

A lesson learned from the Mideast Wars was that a large percent of tank hits are above the turret ring. To lessen the vulnerability of the *M-60A1* tank, a program was initiated to relocate all the 21 rounds of main gun ammunition located in the turret bustle below the turret ring. This will improve the tank survivability, while retaining the total tank complement of 63 rounds of main-gun ammunition. The use of

nylon curtains (kevlar) to achieve added spall protection for all the main rounds will be explored. Segmenting the hull ammo racks will permit disassembly of the racks with in the vehicle so that major subassemblies can fit through the hatches during repair. A new commander's and gunner's seat will be designed to increase flexibility of movement and enhance operational performance. Another item included in restowage is a five gallon water storage tank which will extend operations in a contaminated environment. Two restowed tanks will be developed for testing late this year.

Suspension

The current torsion bar suspension system on the *M-60*-series tanks is approximately 20 years old. Three improved suspension candidates are being considered: The hydropneumatic suspension produced by National Water Lift Company, the advanced torsion bar design similar to the *XM-1* suspension system developed by Chrysler, and the hybrid system which is a combination of the other two.

The objective of the improved suspension program is to provide a suspension system which will improve tank mobility, ride quality, gunner performance, RAM-D characteristics, and be a cost effective replacement for the current system.

The full hydropneumatic suspension system (HSS) consists of independent modular type hydropneumatic suspension units externally mounted at each wheel station (six per side). These units provide both springing and damping action.

The advanced torsion bar (ATB) suspension system consists of higher strength torsion bars made from electro slag remelt steel. These higher strength torsion bars are used at all wheel stations and improved rotary shock absorbers are also used at wheel positions 1, 2, and 6.

The hybrid HSS/ATB suspension configuration will use HSS units at wheel positions 1, 2, and 6; and ATB at 3, 4, and 5. This system eliminates the rotary shocks which are high dollar components of the full ATB.

Side-by-side testing of the hydropneumatic suspension and ATB tanks was started in October 1976. Testing of the hybrid suspension was initiated at Fort Knox in February 1977. Tests are currently underway at both APG and Fort Knox for all three systems. The entire test is scheduled for completion this month. A decision on which system will be selected for full scale engineering development will be made this summer.

New Final Drive

The final drive used on the *M-60A1* tank was originally built for the 50-ton *M-48* tank. The weight of the tank today is in excess of 56 tons. In these heavier tanks, the final drives have a higher failure rate with a mean miles between failure of only 2,900 miles.

A new planetary final drive has been designed primarily for use with the X-1100 transmission of the *XM-1* tank. With hull modifications and an auxiliary gearbox, it could be retrofitted into all *M-60A1* tanks with the DC 850 transmission. The new final drives will weigh about the same as the current ones, although the added auxiliary gearboxes will increase the total tank weight by 440 pounds. The reliability of the final drive should more than triple with the incorporation of this improvement.

The improved final drive will also provide potential for future power and performance growth. An engineering contract for advance development will begin this summer.

The *XM-1* low profile cupola can be adapted to fit in the larger opening of the *M-60A1* tank and will reduce the tank's vulnerability with its lower profile and reduced weight. A pop-up hatch similar to the type used by the Israelis will also provide the commander a 360 degree unrestricted view with overhead protection.

Unlike the IDF cupola, the *XM-1* low profile cupola provides a .50 cal. machinegun mount with the capability to fire the weapon using a 3X sight for aiming while in the closed hatch mode of operation. The use of an electrical power assist to traverse the cupola independent of the turret is also unique to the *XM-1* design. Addition of six vision blocks in the cupola body provide closed-hatch, all-round vision for the commander. The engineering development will begin this summer and two prototypes will be tested in 1978. The cupola is scheduled for tank application during the 1981 depot tank conversion program.

Navigation System

One of the most significant improvements for the tank is the compass. When traveling cross-country in the absence of well-defined landmarks, such as jungle or desert environments, night operations, or during other periods of reduced visibility, the ability to navigate a tank is limited. Presently, the high steel content of the tank makes use of the handheld lensatic compass impractical without dismounting.

Tests at Fort Knox have indicated that the use of a low cost magnetic sensor will provide $\pm 3°$ of accuracy when gun tube position is constrained to a combat ready compensation point. By adding an auxiliary sensor such as a directional gyro, accuracy can be maintained without gun tube restriction.

Both concepts envision a heading indication read out for the driver and a remote display for the commander. TRADOC has placed an urgent requirement on the development of a heading reference unit for the tank.

The project manager for navigation and control systems is in the process of initiating a competitive prototype program for a non-developmental system. My office is developing the adaptation hardware. Two systems have already demonstrated $\pm 3°$ of accuracy and several firms have shown interest. The selected system should be fielded in 1980.

Future Improvements

Miniaturization in state-of-the-art tank fire-control systems has been realized primarily by large-scale integration circuit technology. The product is a system using *XM-1* technology which maintains *M-60A3* hit performance, significantly reduces the cost of the fire control, and enhances tank reliability.

There are two minilasers available today that could be integrated into *M-60A3* thermal sight. Either the *AN/GVS-5* handheld minilaser rangefinder or the *XM-1* Hughes minilaser could be used by removing the daylight module

from the sight and substituting a combination daylight and laser module.

Microprocessor Technology

At the same time, computers using microprocessor technology have also been developed which will reduce the size and cost while maintaining the performance achieved with the *M-60A3* computer system. There are several feasible approaches to incorporating microprocessor technology into the *M-60A3* tank: One is to use the *XM-1* digital computer, another is to modify the existing *XM-21* solid state computer, while a third approach is a design which incorporates all the computer functions into the same black box as the minilaser for integration directly into the thermal sight.

Since there are many feasible options, a competitive program is currently being designed for a start later this year. The development effort will take about 3 years, and the approved system will be used to retrofit *M-60A1* tanks in lieu of *M-60A3* fire control if the program is approved and funded.

To offset the need for a commander's main gun daylight sight, which would be a part of the deleted *M-60A3* laser, the *M-17A1* rangefinder of the *M-60A1* could be retained.

One option considered, but not recommended, was use of the same fire control system as that of the *XM-1* tank. The problems with this approach are physical interference of the sight, extensive modification of the hydraulic system to fully utilize the *XM-1* stabilized sight, and increased program cost in comparison with a competitive program.

Propulsion

The installation of the complete *XM-1* propulsion system—including the 1500-h.p. AGT-1500 turbine, X-1100 transmission, air cleaners and cooling system—in the *M-60A3* was proposed to the Army staff in January 1977. This alternative was selected over three up-powered diesel candidates and would be the preferred power train for the *M-60A3* program if shown cost-effective.

Since the *M-60A3* will operate in the field alongside the *XM-1*, it is highly desirable that the *M-60* be uppowered to have equal mobility. It is also desirable that the propulsion system selected be both usable in the *XM-1* and interchangeable to the maximum extent possible. Selection of the turbine for the *M-60* has the advantage of combining the requirements for the two tanks which should result in economies due to quantity and lower overall support costs.

The installation of the entire *XM-1* propulsion system would achieve maximum standardization with the *XM-1*, but requires extensive hull modification to accomodate the longer powertrain. However, a similar hull modification, although less extensive, was necessary in converting *M-48A1* to *M-48A5* tanks.

A product improvement program has been submitted for the FY79 start which would permit us to do the development necessary to prepare a technical data package for possible future incorporation of the *XM-1* powerpack in the *M-60A3*.

Up-powering the *M-60*-series tanks to the 1500 h.p. requires the improved suspension discussed earlier and may necessitate other suspension changes. Increased tank speeds may require redesigned wheel bearings, larger roadwheels, and a new track with larger diameter pins to provide adequate suspension durability. A new final drive hub and sprocket will also be required. We would plan to use *XM-1* common components where possible.

Fire Extinguishers

The last major improvement I would like to discuss today is an *XM-1* type automatic fire extinguisher system. This system employs the use of halon to provide instantaneous supression of fires in the crew and engine compartment. It can be activated manually or will react automatically, with significantly more effective supression than the current manual carbon dioxide system.

The Army is currently planning to convert all carbon dioxide systems to halon. The *M-60A2* and *M-48A5* portable extinguishers are currently being filled with halon. Current fixed and portable systems for the *M-60A1* will be converted from carbon dioxide to halon as soon as a system check test confirms safe toxicity levels. The product improvement program to incorporate the *XM-1* type automatic system will commence in 1978.

Another action taken to reduce secondary fires is the incorporation of fire resistant fluid (FRH) in the tank hydraulic system. This program, which uses a rust inhibited, synthetic hydrocarbon base hydraulic fluid, will raise the flash point from 210°F to 425°F. The conversion plan for the entire *M-48A5* and *M-60* fleet has been recommended to commence this year.

Design Improvements

In addition to the major development programs I have discussed, numerous design improvements have been made without the visibility given to major components. However, the benefits derived from these changes are considered noteworthy and I will mention a few of the more significant ones. (Table 1.)

Table 1. IMPROVEMENTS IN PRODUCTION

- **ARMORED AIR CLEANER**
- **STEEL SUPPORT ROLLERS**
- **DRIVER'S VIEWER STOWAGE BOX**
- **CAMOUFLAGE BASE PAINT**
- **DRIVER'S ESCAPE HATCH**
- **PERSONNEL HEATER**
- **10 H.P. TURRET MOTOR**

This list represents changes already in the current production tank. Vulnerability of the top loading air cleaner (TLAC) to small arms and artillery fire was reduced by changing from aluminum to steel. Use of steel should also overcome the problem we have had with broken cover door hinges. Several other maintainability and reliability improvements were incorporated into the armored TLAC. These include captive bolts to prevent loss of bolts and to improve sealing. A servicing decal for the operator, removal of sharp edges on the door lip to prevent filter damage, a more accessible blower motor opening, and an air restriction indicator to remind the crew to clean the filter.

A kit is being engineered for those maintainability and reliability changes which can be made for fielded aluminum

air cleaners. The kit will include a protective guard to keep the cover door hinges from being broken.

Steel support rollers eliminate the troublesome wear plate used with the aluminum support rollers and reduce the procurement and maintenance costs. A minor weight penalty of 40 pounds per tank is offset by a significant improvement in reliability.

Introduction of the smaller passive driver's viewer permitted redesign of the stowage box located under the main gun. By reducing the size of the box and moving it rearward, there is less hull ammo rack handle and main gun cylinder servo valve interference. The redesigned box also facilitates its removal from the tank.

Production *M-60A1* tanks are being painted with a camouflage base coat. Since different areas require varying patterns, the Department of the Army directed that completion of the painting would be done by field units.

A driver's escape hatch with an improved seal and a new personnel heater with an improved igniter have been incorporated in production to reduce maintenance problems and improve crew comfort. Additional improvements are being tested for both of these items. A positive locking device to prevent the hatch locking handle from vibrating open has been designed and is undergoing test. We have also improved the starting characteristics for the heater and plan to incorporate the improvement later this year. To provide sufficient power to meet stabilized turret electrical requirements, the turret motor has been changed from a 5 h.p. to a 10 h.p. motor. The heavier motor is being used on all new production tanks.

Potential Improvements

Table 2 depicts potential improvements currently being engineered and available for production or fielded tanks in 1978 or beyond.

By strengthening the current final drive components with additional support bearings, stronger gears, and improved shafts, a more reliable final drive completely interchangeable with the current *M-60* tank final drive can be produced. This improvement will at least double the reliability of the current final drive. Ten sets of the improved final drive will be tested starting in October 1977. If successful, this product improvement may preclude the need to retrofit the new *XM-1* planetary final drive I discussed earlier unless the uppower program is initiated.

A hydraulic quick disconnect between the transmission and master brake cylinder has been developed to facilitate powerpack removal and prevent brake bleeding requirements before replacement.

An improvement to the operation of the brake slave cylinder protects the surface from corrosion when the brake is not depressed, a major problem with the current system. Another quick disconnect separating the push-pull cable for the parking brake will prevent damage during removal. An enlarged slave cylinder to improve cooling, more brake bands, and a larger-diameter brake apply shaft are all being examined to improve the brakes. Each of these changes will be evaluated and incorporated into production after being validated.

Track adjustment is a tedious operation and track tension using the current method varies greatly. A new grease actuated compensating/adjusting idler link has been developed. This device uses hydraulic pressure provided by the current tank grease gun, reduces maintenance time, eliminates the special wrench, has a built-in relief valve which automatically sets track tension, and includes an improved attachment method making link removal easier. This device is currently undergoing evaluation at Fort Knox.

New, shorter hull ammo rack handles have been designed and tested to eliminate protrusion and contact with turret components during turret rotation. These will be incorporated into production tanks beginning later this year.

The gunner's protective guard provides a wire mesh screen shielding the gunner's legs from the hot turret hydraulic oil reservoir. The turret basket screen around the side of the turret basket prevents expended shell casings, helmets, and other equipment from falling between the turret basket and the hull. The user has also requested an additional external bracket for a five gallon can for water or oil stowage. The two guards and the bracket will be incorporated in production tanks early next year.

Both test results and field reports have stressed concern with the need for an emergency stabilization shut-off switch conveniently located for the loader to prevent injury during periods of firing on the move. This additional switch has been located near the loader's intercom box and will be in production tanks beginning in 1978.

Since the *T-142* track was introduced, we have continued to improve the track to make it more acceptable to the tanker. The track pad has been redesigned to make the rubber components last longer and to keep the bolts securing the pad to the track from loosening. Production deliveries of these new pads begin in June 1977. In addition to the track rubber problems, a full study has been initiated on metal components with army materiel research mechanics center from Watertown, Massachusetts and Chrysler. Induction hardened end connectors are now being installed at various test sites for evaluation.

Centerguides of a new design which should reduce misguiding and provide improved clamping are being procured for test later this summer, and improved track pins are under laboratory test to determine the value of proposed improvements.

Air cleaner blower motors are being compared in a durability test to develop a new source of motors qualified for improved durability. To date, no motor has passed the newly established 800-hour criteria. The motor presently used failed at 300 hours of testing, while one of the new

Table 2. FUTURE IMPROVEMENTS

- **IMPROVED FINAL DRIVE**
- **SERVICE BRAKES**
- **TRACK ADJUSTING LINK**
- **HULL AMMUNITION RACK HANDLES**
- **GUNNER'S PROTECTIVE GUARD**
- **TURRET BASKET SCREEN**
- **EXTERNAL 5-GALLON CAN BRACKET**
- **LOADER'S AOS SAFETY SWITCH**
- **TRACK PINS/CENTERGUIDES/END CONNECTOR/PADS**
- **AIR CLEANER BLOWER MOTORS**
- **TRAVERSING GEARBOX NO-BAK**

sources had a motor last beyond 600 hours. All failures were due to bearings and brushes. After beefing-up the bearings and brushes, three more motors have been received, inspected, and a second attempt is being made to qualify a motor at the 800-hour criteria.

The turret traversing gearbox no-bak can be improved by reducing the loads on the no-bak through a gearing change. This gearing change will fit into the same box and will allow the same traverse rate as the present system. This system has been tested, proven satisfactory, and will be included in the *M-60A3* tanks when produced.

This completes by briefing. I would be glad to answer any questions you may have. In the event you wish to contact me later, please send your queries to:

Project Manager
M-60 Tank Development
ATTN: DRCPM-M60TD
28150 Dequindre Road
Warren, MI 48092
Telephone: Autovon 273-2831 or
Commercial (313) 573-2831

ARMOR CONFERENCE

USAREUR Training: A Brigade Commander's Perspective

by Colonel Thomas E. Carpenter III, CO 3d Brigade, 3d Armored Division

I am pleased to be able to present some thoughts on training to this gathering of representatives of the armor community, many of whom are members of the Armor Association, an organization which has done so much for the U.S. Army.

My perspective of training is that of a brigade commander in the 3d Armored Division. I have on my kaserne at Ray Barracks, Friedberg, two tank battalions, one mechanized infantry battalion, and one artillery battalion.

Training can be defined simply as preparation for combat. Therefore, the driving factor in all of our training must be a consideration of how best to meet the enemy threat. In analyzing my training environment, I feel that those of us privileged to command in Europe have a singular advantage over our colleagues elsewhere—our enemy is neither notional nor separated by oceans. He's there! We know a lot about him and that knowledge is a key input to our training.

The theme that I would like to develop is how the readiness imperative provides focus and impetus to training within my brigade. As suggested earlier, we develop our training program by analyzing the Threat and then train to meet that Threat. Given the increasing sophistication of Soviet equipment, we are approaching the point, if we are not already there, when our qualitative equipment advantage cannot offset the enemy's quantities of equipment. A comparative advantage in training may well be our only means of maintaining a balance—that is why analysis and discussion of training is so urgent and timely.

In the time available, it is not possible to discuss all aspects of training. Therefore, I intend to develop the theme of "how readiness to fight our battle" drives training, by developing the following four points:

- The way we use local and major training area time to prepare for combat.
- Some comparative comments on how we cope with personnel turbulence in our training management.
- How the ground we plan to fight on influences our training.
- The role we expect noncommissioned officers (NCO's) to play in our battle and how that expectation influences our training.

Training Areas

Now let's talk about the utilization of local training areas and our training in major training areas. The battalions in my brigade go to a major training area, Grafenwoehr, Hohenfels, or Wildflecken, for tank gunnery and field exercises twice a year. There we can fire our organic weapons and evaluate the training status of our units. As most of you know, there has been a recent and important change in how we approach Grafenwoehr training. Some years ago, the emphasis was on the a tank crew's ability to follow prescribed procedures and to hit known single engagement panel-type targets. An assistant instructor rode on each tank and graded the crew with detailed checklists. The Armor units did their training; the Infantry trained on their own, usually at Hohenfels or Wildflecken; and the Artillery tended to shoot separately. The trouble with this type of training is that we aren't going to fight that way. We will fight as a combined-arms team, or we will be defeated.

Now we go to Grafenwoehr in *brigade packets*—packets containing, to the extent possible, the Infantry, Armor, Ar-

tillery, Engineers, Medics, Air-Defense Artillery, maintenance and supply personnel, and equipment that will be fighting together in the event of war. The standard is for combined-arms training to be the rule, rather than the exception. Tank platoon leaders guide their platoons through range firing with emphasis on swift acquisition and engagement of multiple, surprise targets.

We know that an *M-60A1* going against a *T-62* at a range of 1,000 meters has a 70-percent chance of winning the engagement, *if the M-60A1 fires first.* That's why swift target acquisition is critical and the battlesight engagement standard is to get a round off in 5 seconds. The key point to all this is that we are now deploying to major training areas in the same configuration in which we expect to fight and we are evaluating in the major training areas our ability to do those things which we believe we must do to win our battle. The decision as to what things we must be able to do is based on analysis of the Threat.

How do the local training areas fit in? We are blessed, in my brigade, with having a local 8,000-acre training area, only 8 kilometers from Ray Barracks Kaserne. Thus, a tank company can move to and from this training area for about 300 gallons of diesel; however, there are some restrictions that we must take into account in our planning—we cannot fire live ammunition, except for 14.5-mm. and LAW subcaliber firing on designated ranges, and armored vehicles must stay on designated roads, except in a 300-acre area called "the Bowling Alley."

The practical effect of the maneuver restrictions is that platoon battle drill, or tank-infantry section training, is the best we can do for mounted training. Nevertheless, we consider ourselves fortunate to have this training area and we are working to get the best training value possible from its utilization. We must bring our local training area into line with the new 3d Armored Division and Seventh Army Training Center training doctrine and practice, so that we practice at home station, and evaluate at Grafenwoehr, those things which we must perform in combat. Toward this end, we have proposed that the old Tank Crew Proficiency Course (TCPC) in the Friedberg Training Area be replaced with a combined-arms platoon reaction course. Thus, instead of an individual tank proceeding down a road to simulate engagement of known, static panels, a cross-attached tank or infantry platoon would move by bounds through the "Bowling Alley" and be presented with surprise, moving and multiple *T-62* and Aggressor infantry, targets.

Personnel Turbulence

Now let's discuss the turnover of personnel in units, often labelled "turbulence," its impact on training, and how we cope with this problem. Since I have tried to discuss training in the context of the other side's capabilities, you might be interested in the turbulence problem of the Soviet commander in East Germany. Each spring and fall, during a 4-to 6-week period, the Soviet commander loses 25 percent of his strength. The impact of this on readiness of units of the group of Soviet forces is severe. While it is true that this semi-annual loss can be anticipated and planned for, there is an unavoidable readiness degradation associated with this troop rotation. We often bemoan our personnel turbulence, but I assure you that I would rather have our problem than that of my Soviet counterpart.

Think of turbulence being the sum of arrivals and departures in a unit. In comparison to the Soviet unit, several points stand out:

- Our turbulence tends to be week by week and month by month, rather than in two big slugs, as on the other side.
- The turbulence in the highest turnover month was about 7 percent of the unit's assigned strength—a far more manageable figure than 25 percent.

Hence, by good training and personnel management, we should be able to avoid peaks and valleys in readiness. Sustained readiness is essential, unless there is someone who can tell us several months in advance when the enemy will attack so that we can peak up for the event. Our readiness curve, when superimposed on that of the enemy's, must, as a minimum, be higher at its lowest point than that of the enemy's at his peak.

How do we attempt to mitigate the adverse impact on readiness of personnel turbulence? One way is the speed and quality of our inprocessing—all those steps taken to issue a new arrival his equipment, and get him fully integrated into his unit. This is as much a psychological problem as it is a physical one, and streamlined, efficient, centralized inprocessing is an important part of this.

The second way is by requiring the development of written standard operating procedures (SOP's) to record—in the soldier's language—exactly how we do things, whether it be firing on a tank range at Grafenwoehr, or platoon SOP's on fire distribution. Thus, the new man does not waste valuable time learning how the unit does things.

Terrain

Next, let's focus on terrain and how that influences our training. The enemy will be attacking across varying terrain. He will outnumber us in troops and materiel. For example, even when covering force battle-attrition factors are considered, he will have an estimated 5 to 1 advantage in tanks. In addition, he will have the advantage of deciding when and where to attack and how to weight his effort.

One of the things that will help us overcome these considerable enemy advantages is knowledge of the terrain on which our battle will be fought.

The enemy will be attacking across *unfamiliar terrain*—terrain that my leaders and soldiers know intimately. Some indicators of this reasoning are:

- Nearly every soldier has been on this ground many times, and, in most cases, has participated in day and night training there. He knows where his primary, alternate, and supplementary positions are and understands all this in the context of his platoon, and perhaps even his company position.
- All my officers and noncommissioned officers have been on this ground many times, selecting firing positions, ranging to avenues of enemy approach, and physically checking the fordability of rivers and streams in their sectors. I recall recently monitoring a platoon radio net and hearing a platoon sergeant tell his platoon that one of his vehicles had "set up back by that old farm house where 25 set up the last time we were here."
- My company and battalion commanders have con-

ducted terrain walks with their brigade, division, and corps commanders on the ground to be defended.

We have initiated a program that has increased leader knowledge of terrain and underscored the priority of readiness. Within 72 hours of reporting for duty, all new officers and senior NCO's are given an escorted aerial reconnaissance of the general defense plan positions. Within their first week, they walk the ground over which they will fight. Finally, within 30 days of assignment, platoon leaders, (including sergeants serving as platoon leaders), must stand before their battalion commander, battalion S3, and company commander and explain from memory, on a sand table, how they will alert, deploy, and employ their platoon in war. This last idea came to me at Bitburg Air Force Base 2 years ago when I watched an *F4* pilot explain from memory, during a formal briefing, to his wing commander, vice-wing commander, and deputy for operations how he would attack his assigned enemy target from takeoff to landing.

Noncommissioned Officers

Finally, I want to discuss the role we expect noncommissioned officers to play in our battle and how that influences training. We have a distinct advantage over the enemy that, in my opinion, has not received the attention it deserves. The Soviets do not have a professional corps of noncommissioned officers capable of operating on their own initiative, as we do. Instead, they have an extremely centralized system requiring rigid adherence to detailed regulations and orders. There is a lively discussion in Soviet military publications about the absence of initiative on the part of leaders and what to do about it. There is a frank admission that this is a serious problem.

Soviet sergeants to not carry maps—maps are considered classified documents; they do not transmit on the radio—they are not permitted to do so. The Soviets select a certain number of 24-month draftees for 4 months of additional training. These draftees, with a few extra months of training, are the Soviet noncommissioned officer corps. Thus, when a Soviet sergeant reports to his unit to lead men who are essentially his contemporaries, he has about 18-months retainability and 0 months of prior experience in any unit.

By contrast, the development of noncommissioned officer professionalism is at the core of my battalion training programs. How are we working to enhance NCO professionalism? First, the experience profile of my NCO corps shows that my platoon sergeants have 16-20 years experience—quite a contrast to their Soviet counterparts, with 2 or less years of service.

We are now in the midst of an ambitious NCO training program, wherein the senior sergeants—command sergeants major, first sergeants, and master sergeants—instruct the junior NCO's on a variety of subjects designed to increase their confidence and competence. This training program was developed, in consultation with the battalion command sergeants major, by my brigade command sergeant major, CSM Benjamin E. Preacher, who has spent 13 of his 21 years of service in Europe. Before becoming brigade CSM, he was a tank company first sergeant and an artillery battalion CSM.

Noncommissioned officers are being given *increased* responsibilities. One example is Staff Sergeant Hood, a 30-year-old airborne-, ranger-, pathfinder-, jump master-qualified NCO, now assigned to my infantry battalion at Ray Barracks. He was selected by his battalion commander to attend a 3-week course at Fort Benning on the DRAGON, a new mid-range antitank weapon. Upon his return, SSG Hood developed, for his battalion commander's approval, the complete battalion DRAGON training program, selected an instructor cadre and trained DRAGON gunners for live firing at Grafenwoehr in just the three weeks time he had available between receipt of the weapon and scheduled firing.

The results of that firing were that the 1-36th Infantry achieved a hit performance rate of 73 percent after only 3 weeks of training that did not include missile firing. This achievement can be put in better perspective if we bear in mind that a TRADOC study shows that an expert gunner who has fired 5 live rounds has a 75-percent probability of hitting the target. The same study shows that an expert firing his first missile has a 50-percent hit probability.

On 13 April 1977, SSG Hood briefed the division and corps commanders on the results of his study on the factors considered important in DRAGON gunner selection, resulting in more than 17 factors being analyzed to determine the degree of statistical correleation between target hit or miss.

Next, we are working to *reinforce* the *chain of leadership* in our units. In my brigade, every soldier is inspected by a noncommissioned officer every duty day—and if the soldier doesn't know he has been inspected, he hasn't been. We have a vigorous physical training program underway; we attained General Blanchard's 2 miles in 17-minutes standard and noncommissioned officers led the way, improving discipline, physical conditioning, and *espirit.* We stress in our training, troop leading procedures; procedures that culminate in sergeants with maps briefing their crews on what is to occur.

Finally, consistent with the guidance from the corps and division commanders, our firstline supervisor sergeants have job books. These pocket-sized notebooks contain the specific tasks required of each soldier for success in combat. The sergeant teaches his men to perform these tasks and tests them to determine if they have learned. This is perhaps the most exciting step taken to enhance NCO professionalism. The dividends are already being realized and the long term payoff will be substantial.

Why is this contrast between the experience, leadership, and training of our sergeants and the sergeants on the other side important? We know from analyses of the Middle East War and from studying Soviet doctrine and deployments that we can expect half of our officers to be casualties in the first week of war. Our noncommissioned officers are prepared to step forward and lead, as they have always done in the past. One cannot precisely quantify this factor in force-ratio calculations, but it is there and it is significant.

In conclusion, I am totally confident that we are going to win that first battle. That confidence is derived, in part, from our training program, which is tailored to meet the enemy threat. I have highlighted the four aspects of our training program as:

- The way we plan for and utilize our local and major training area time to practice and evaluate the skills needed to win.
- The comparative personnel turbulence problem and how we cope with it.

•Our knowledge of the terrain on which we will fight.

•Our increasingly professional noncommissioned officer corps.

I have commanded a platoon in the United States, a company in Korea, a battalion in Vietnam, and a brigade in Europe—I can assure you that this is the most interesting, demanding, and challenging professional experience in my career.

ARMOR CONFERENCE 77

Tank Gunnery Training in the 49th Armored Division

by Major General Delmer Nichols, CG, 49th Armored Division

There are three facts relative to any future conflict between U.S. and Warsaw Pact forces.

- Long-range, high-velocity tank cannons, and longer range antitank guided missiles will dominate the battlefield.
- Enemy armor will be as good as ours and outnumber us several times to one; and
- Nearly always, the crew that fires first in a tank battle will win.

These facts set the stage and dictate our training priorities in the Active and Reserve Components alike. Apparently, the Commander of Forces Command (FORSCOM) also shares my views as evidenced by this guidance taken from his current regulation on reserve component training: "Tank crew qualification is the first training priority for Armor and Cavalry units."

Since the 49th is not a high-priority, early-deploying unit, the gunnery program prescribed for us is Tables I thru VII. Hopefully, sufficient ranges will become available at Fort Hood for us to be able to have each of our units fire through Table VIII during one of the 2 years when training centers around gunnery. Our mission is clear enough.

Training Areas

The 49th Armored Division includes six tank battalions and an armored cavalry squadron. When the division was reactivated in November 1973, the geographical location of these units was determined in large part by existing training facilities in Texas at Camp Maxey, Fort Wolters, Camp Bowie, Camp Bullis, and Fort Hood where tank gun subcaliber courses and platoon and company level tactical training can be accomplished. They have ranges for conducting tank Tables I, II, III. As soon as I can get the specifics relative to the new subcaliber Tables IV and V, we'll get busy constructing those ranges as well as our weekend sites.

Presently, the 6th Tank Battalion uses Camp Bullis', (an Active Component installation north of Fort Sam Houston) facilities for weekend training, but will shortly shift to use of Camp Swift near Austin where we will be able to provide a higher priority for their use of ranges and training areas.

Fort Hood, in the approximate center of the units, is the division's mobilization station and the site of our annual 2-week encampments.

The average distances between units and their weekend training site (WETS) and Fort Hood are shown below.

TRAVEL DISTANCES (MILES)

UNIT	WETS	FT HOOD
1-112 ARMOR	130	115
2-112 ARMOR	35	125
3-112 ARMOR	70	175
4-112 ARMOR	85	150
5-112 ARMOR	---	160
6-112 ARMOR	115	215
1-124 CAV	---	65

Almost all of these distances require more than 2 hours travel time—a point I'll return to in a moment. The National Guard Bureau prescribes that 23 of the 43 tanks authorized our battalions be placed in the mobilization and annual training equipment pool located at North Fort Hood.

The remaining 20 tanks per battalion are positioned for use at our weekend training sites. In the case of 5th Tank Battalion and the Cavalry Squadron, their allocations of home station tanks are placed in the annual training equipment pool because they conduct their weekend training at Fort Hood. This has been an adequate arrangement, if not a totally ideal one.

Ideally, we'd like our tanks at unit armories for crew and maintenance training and at the weekend training sites for tactical training. State laws require use of a commercial transporter having many more axles than our military transporters have to legally move tanks over Texas roads. I'm told transportation charges are roughly $2 per mile to move a tank from one location to another. There's no telling how many heart attacks the highway department would have

if we drove the tanks over the highways. My point is that we don't enjoy much flexibility in the area of locating and relocating tanks to meet training requirements.

Training Time Available

Another aspect impacting on training is the total time available to us. Forty-eight drills and one 2-week annual training period per year translates into 280 hours, less those lost through poor management and travel between armories and training sites. Not all of these hours are available for tank gunnery. There are a minimum of other subjects and other activities, Annual General Inspection for one example; and individual weapons qualification for another, which have to come out of this 280 hours as well as tank gunnery.

On a normal weekend a unit training at one of the weekend training sites or at Fort Hood will devote 6 to 8 hours to travel, 4 to 6 hours to maintenance, and 8 hours to tactical training, gunnery or gunnery-related subjects. This is accomplished by getting an early start and training through Saturday evening. Sunday is almost totally devoted to maintenance and travel.

Training efficiency and effectiveness is enhanced by the work of full-time technicians and unit volunteers in drawing and preparing equipment and facilities for immediate use on the unit's arrival. So the point here is that, generally speaking, a unit conducting tank gunnery training on their tanks, in their turrets, can expect a Multiple Unit Training Assembly-4 (MUTA-4) to provide about 8 hours of gunnery-related, hands-on training.

To reiterate, this means a tank company can plan on approximately 152 hours of training per year in this environment.

Personnel

Probably the area demanding the most attention and effort of our commanders is the one of people and crew integrity. Our commanders, unlike their Active Component counterparts, are responsible for recruiting the members of their unit, so they have a personal interest in their retention. In fact, this spring our strength fell to 88 percent and we suspended all activities, including training, during the month of May to devote all efforts to recruiting. During annual training and during each weekend assembly, commanders employ stay-behind unit level recruiters to recruit for their unit. Even after a person has enlisted in the unit, we are confronted with problems.

Some of the problems are:

- Civilian job change
- Attitude of employers
- Swing shift at the plant
- Farmers' planting or harvesting of crops
- Family problems
- Move from community or state

However, this is how we go about getting the job done.

Recently, my headquarters prepared a detailed post-mobilization training program as part of our participation in *MOBEX 76,* a mobilization exercise. That planning confirmed our opinion that a manner in which we could make the greatest reduction in post-mobilization training time was to have all personnel current in their individual and crew served weapons qualification.

We are now placing the greatest emphasis on weapons training during weekend training as well as annual training. The Armor team at Readiness Group VII Fort Sam Houston, has assisted us a great deal, especially in the development of the proficiency of our tank commanders.

Also, the support we receive from Fort Hood is outstanding. We have priority during annual training on all ranges and as much maneuver area as we need for tactical training. Hopefully, FORSCOM's current requirement for more-frequent tank gunnery in reserve components will be translated into the construction of more ranges. In fact, the completion of crew tank tables by six tank battalions and an armored cavalry squadron in 2-weeks annual training is impossible without more ranges. We schedule units on ranges in the most compact manner without much makeup time for unforeseen difficulties. There isn't a set-up day or a clean-up day. One unit follows another without interruption and tank ranges are active through the middle weekend. We do not have any formations larger than a battalion for ceremonies or other distractions from training. We do not have a parade or a review during annual training.

During the year, we schedule units for weekend firing a year in advance. For this to be successful, and it usually is, we must have coordination with Fort Hood for ranges and ammunition; with the weatherman for good weather and with the Annual Training Equipment Pool for equipment. December, January, February, and sometimes, March are not good outdoor training months in Texas. These are months during which we should stay at home and train, but we are not able to do this because of the locations of our equipment.

So many unforeseen things can happen on one particular weekend that we do not like to schedule crew tank Tables (VI thru VIII) on a weekend drill. Tables IV and V are difficult on a weekend if you fire them properly and reap the maximum training benefits.

The new gunnery courses I'm hearing about that are supposed to be coming out in the new FM 17-12 are probably a step in the right direction. They'll be less difficult for reserve units because they incorporate so much subcaliber firing in lieu of main-gun service ammunition with its attendant requirement for hauling and handling. However, that isn't enough. To improve tank gunnery and weapons proficiency to the state of readiness that is expected of the 49th Armored Division, we need a tank gunnery simulator at each armory.

Tank Gunnery Simulator

There are many, many varieties of games, machines, and other gadgets in arcades around the country. It seems to me that it would be feasible to develop an inexpensive tank turret with crew positions and a target screen for stationary and moving type targets. The targets could be fleeting, camouflaged, dug-in or attacking head-on, and could be in scale to distance from the simulator. They should be of threat-force design. Scoring should be by electronic means and based on proper performance of each crew member.

I think this type of simulator would benefit all tank gunnery in the National Guard as well as the Active Compo-

nents. A crew could practice on it for improving all phases of tank gunnery. I would visualize that some of our crews would spend more time at the local armory than the one weekend a month.

If it was designed in the manner that I am thinking, it would assist us to:

- Train crews and improve crew coordination in gunnery skills;
- Assist in teaching MOS tasks to nonarmor prior service personnel who enlist in our units;
- Assist the tank commander in training their crews before firing the crew tank tables; and
- Allow us to get more meaningful training out of training dollars and eliminate some lost training hours due to excessive travel.

In addition, tank gunnery training could be scheduled and programmed to get around the winter months of severe weather interference, thereby reducing maintenance, wear and tear on tanks, and fuel consumption.

My mission is to have the 49th Armored Division ready to go when needed. We must continue to improve in tank gunnery to get the first round hits that will be so necessary in any Warsaw Pact confrontation.

A simulator such as I so briefly described would help Army National Guard tankers improve their combat readiness and fewer training dollars would be lost dollars.

ARMOR CONFERENCE 77

Collective Training

by Major John R. Ridge, Chief of Ground Collective Training Branch, Directorate of Training Development

Some of the persistent problems a unit commander faces that limit his ability to train effectively are inadequacies of time, fuel and lubricants, ranges, ammunition, training devices and dollars; as well as a shortage of trained and experienced leaders and continuing personnel turbulence. They are highlighted in the conclusions of the Net Assessment Study of Armor Training and the Total Tank System Study. These problems make it difficult for our Armor leaders to live up to the familiar challenges of "come as you are;" "fight outnumbered and win;" and "fire fast, first."

We at the Armor School have not solved these problems of course, but we do propose a plan to help chip away at them. Some progress is already being made. Army training tests and subject schedules have been replaced by Army Training and Evaluation Programs (ARTEP's) and Soldiers' Manuals (SM's) based on critical missions and tasks with corresponding conditions and standards that units must meet year-round. Yet the realities of range availability, time, ammunition, and dollars still constrain us to cyclic participation and evaluation of main-gun firings and combined-arms tactical exercises. The result is the familiar sine curve of peaking for annual tank gunnery and tactical maneuver exercises then falling back to a lower readiness posture. At any time during the training year, the units of our tank force are distributed somewhere along the sine curve. Most of the time and emphasis in the unit today is being placed on training individuals and single crews, not collective training of platoons, companies and battalions.

The few training devices available today include a rudimentary burst-on-target (BOT) trainer, the *M-34* driver trainer, which is a mockup of the driver's compartment with appropriate controls, and the *M-55* laser, which shoots a small light beam instead of a subcaliber round. Most are designed for use at Fort Knox, while those in the field are largely the product of local innovation. In our tactical training, there have been similar shortcomings.

We maneuver as if immune to hostile fire, rehearsing our errors without penalty because there has been no timely and realistic casualty assessment system. Simulations and devices can help in this area too, beginning with the very simple REALTRAIN system which has now been fielded worldwide for tank and infantry units, and is being adapted for cavalry units. Using a simple system of number boards and telescopes, along with a lot of controllers and radio equipment, REALTRAIN has shown some very encouraging results.

The big payoff of REALTRAIN is in the after-action review, during which each soldier can see how he contributed to the battle and what mistakes he made. Interestingly enough, the controllers feel that they derive as much training value as the players. REALTRAIN is a good start, but a great deal more must be done in both tactical simulation and gunnery devices.

Devices must be available wherever the soldier or unit is located throughout the training spectrum, if we expect to keep our soldiers and units proficient on a year-round basis. We'd like to solve the whole training device shortage tomorrow, but the limitations of money and technology force us to take a more gradual approach.

The Armor School has, therefore, developed a three-phase strategy to upgrade our training proficiency and to cut down the resources a unit currently expends during tank gunnery qualification. The strategy is designed to shift the training emphasis and main-gun ammunition from individual and crew firing to platoon, company, and, perhaps, even battalion-level training.

Scaled Ranges and Subcaliber Devices

Phase 1 of our strategy begins with the publication and issue of the new FM 17-12 this month. This manual will prescribe a 40-percent reduction in unit main-gun ammunition for annual qualification made possible by the development of scaled ranges to be installed in local training areas. A small percentage of main-gun ammunition will be available for platoon battleruns, due to the development of these ranges and subcaliber training devices for use on Tables I through V. Most of these devices were developed by the Weapons Department of the Armor School. Pop-up target mechanisms and .22-caliber tracer ammunition will be concurrently developed to support these devices.

We have generated a requirement for a scaled-down optical rangefinder to allow the tank commander to derive the full benefit from the scaled ranges as well. As with several of our developmental devices, it is a black box, since we know what capabilities are required, but do not know which technological approach will be selected to meet the requirement.

For units without a scaled-range capability, and in particular for Reserve Component units, an indoor combat training theater will be tested in two configurations. The design is for a laser theater, which will use rear projection to present an image of terrain and moving targets to be engaged by the *M-55* laser device, and which will include an automatic scoring system. The other configuration is designed for subcaliber firing and will, therefore, use a front projection system to save wear and tear on the projector. Units in Europe are using these now. Continued testing should result in Army-wide proliferation.

A TV camera system for gunnery training, called the Tank-Appended, Crew-Evaluation Device (TACED) has been developed by the Armor and Engineer Board. You will see a prototype tomorrow, but the eventual product for Army-wide use will also record the range input by the tank commander and include a visual display of elapsed time for engagements.

A unit conduct-of-fire trainer (U-COFT) is under development to provide a garrison training capability for the gunner and tank commander (TC). This device will include all fire controls and sights for both crew stations and provide a realistic, high-resolution display of both moving and stationary targets which permits simulation of all weapons. It will be programmable and will provide for stabilized gunnery exercises as well.

A loader trainer will utilize a mockup of the loader's station and should simulate the stabilized motion of the whole station. Gun recoil and spent brass ejection will also be provided.

Engagement Simulation and Collective Gunnery Training

The second phase of our strategy will begin in 1980 with a second edition of FM 17-12. In addition, our SM's, Skill Qualification Tests (SQT's) and ARTEP's will be changed to reflect the increased training capabilities and training standards. Most of the ammunition in this phase will be allocated to platoon and company collective gunnery. We hope to simulate all individual and single-crew gunnery training through Table VII.

During this phase, we require a family of remotely controlled targets automatically scored, portable, popup and knockdown, stationary and free roving, all in great quantities. The remoted target system (RETS) should increase the effectiveness of main-gun firing by providing realistic target arrays; hostile fire indicators that make the targets appear to be shooting back; and automatic scoring. They should also be adaptable to simulated firing from a tank weapons gunnery-simulation system (TWGSS). This is designed to incorporate the major capabilities of the TV camera and U-COFT into a highly sophisticated device mounted on the tank. It will permit simulated fire of main gun and machineguns at remoted targets or internally-generated simulated targets.

Another part of Phase II development in 1980 is a second generation tactical system called multiple, integrated, laser-engagement simulation (MILES), which represents a substantial advance from REALTRAIN. Tanks and soldiers will be equipped with laser sensor belts which will detect eye-safe laser beams fired by opposing players. A weapon crew engages an opponent by firing the laser transmitter which emits two concentric beams: the narrow center beam indicates a kill when it strikes the sensor belt and the wider beam indicates a near miss when it strikes the sensor.

If the kill beam strikes the target, the sensor belt on the target tank will activate a shrill noise on the intercom which the crew will want to quickly shut off. In doing so, they will deactivate the tank's fire control system and be put out of action. A smoke grenade and electronic return will also indicate to the firing tank that it has registered a hit.

A near miss will sound a warning beep in the target tank, but provide no cue to the firing tank.

The shape and power of the laser beam is designed to duplicate the capability of the weapon it is simulating, and by coding the light pulses, a hierarchy of weapons effects is established so that an *M-16* rifle beam cannot kill a tank.

The air/ground engagement simulation (AGES) system will apply MILES technology to helicopters so they can be incorporated into tactical scenarios. The key feature of MILES and AGES is the automatic scoring in place of subjective controller judgment, as well as their suitability for company and battalion exercises.

Main-Gun Firing for Platoon and Company

Phase III is scheduled to begin in 1985 with a third edition of FM 17-12, SM's, and ARTEP. Our goal is to shift all unit main-gun firings to the platoon and company levels, where we feel the greatest training payoff is provided. Even with all the training devices in units to maintain proficiency, we will still require even more main-gun firing at Fort Knox to acquire that proficiency in our entry level Armor crewmen, tank commanders, and platoon leaders. To realize this goal of simulation through Table VIII will require a high threshold of sophistication in our training devices. We will have tested, for example, the prototype of a full-crew interaction simulator (FCIS) here at Fort Knox. If the concept is effective, such simulators could be refined and distributed to field units, providing the most realistic training possible short of actual combat, as well as usable year-round training in garrison.

For tactical simulation, we would still have the MILES laser system, but if the state of technology allows us to nar-

row the focus of the laser beam or to substitute another type of narrow beam, we plan to develop an advanced TWGSS to require precision gunnery techniques on the part of tank crews, in order to succeed in tactical exercises. This would merge, for the first time, our tactical and gunnery training, and would also be a giant step toward maintaining a high level of combat readiness.

Over the next 15 years, increased emphasis will be on the use of simulators for individual and crew gunnery training, the concentration of all live fire exercises into a variety of scored platoon, company, and battalion battleruns, and the ability to have realistic, force-on-force training exercises. The amount of unit main-gun ammunition does not decrease, but is shifted to collective training. We still would require main-gun firing in institutional training. The devices fielded in each phase will be carried over to the next phase and used with the new ones. Should any portion of this development program fail to be realized, however, the spectrum of devices provides a number of fallback positions.

The program is ambitious, but necessary. It represents a lot of investment in development and procurement cost, but a very low maintenance cost and a very high return in training value and combat readiness. The objective is not to save money, but to overcome a training and readiness deficiency at minimal additional cost. With these devices integrated into training programs, tank units will have the capability to sustain a high standard of readiness in all combat skills year-round despite limited training areas and ammunition. By using simulators and subcaliber firing for individual and crew training, we will get the best use out of the main-gun ammunition in the platoon and company battleruns. Standards will derive from training effectiveness analyses and be designed to maximize weapon system capabilities against the Threat. Through these battleruns and realistic tactical maneuvers, our tank units will be able, at any time, to distribute fast, accurate fire under varied conditions, ensuring our ability to defeat a larger maneuvering enemy force and win the first battle.

Training Literature

Our speed in realizing this strategy is governed by the Army's materiel development and acquisition procedures, but you have seen the broad milestones for training device development. As for training literature, three of the four Armor ARTEP's are now in print and the fourth, "Armored Cavalry Squadron," will be out this month. All seven of the "How-To-Fight Manuals" (HTFM's) will be in print by October. Additionally, we have published a draft TC on *M-60A1* crew drills, which should be in print by September. Revisions will be required, not only to introduce the training devices of each phase, but to incorporate organizational changes generated by the division restructuring study (DRS) and hardware development, such as the tank thermal sight (TTS), the improved TOW vehicle (ITV), and of course, the *XM-1*.

The next generation of ARTEP will include a module for evaluating the command group and battalion staff, as well as a revised "How-To-Train" chapter, based on the TC 21-5-7 model, and suggested techniques for both internal and external evaluation. Our major problem with ARTEP continues to be the deafening silence from the field: we need feedback from you to improve our products, we want your ideas about training devices and literature as well, because it is only through this exchange of ideas that we can deliver the best possible products to you.

ARMOR CONFERENCE 77

Individual Training and Development

by Lieutenant Colonel O. L. Brock, Individual Design and Development Division, Directorate of Training Developments

You have just been briefed on a portion of the training development mission—that of collective training. Now I will discuss several major programs on the individual training side of the house; specifically, improvements in resident training courses, the status of Soldier's Manuals (SM), extension training and the training extension program, Skill Qualification Tests, and armor vehicle recognition. Many of these initiatives are in response to the Tank Force Management Group (TFMG) proposals as presented earlier.

The Armor Officer Basic (AOB) course is being revised to correct training deficiencies perceived in current AOB graduates. Specifically, the new Lieutenant will be trained as a tank crewman and tank commander, as well as in the more familiar leadership and administrative skills.

The 4-week basic NCO course, now being taught at nine installations in the continental United States (CONUS) and Europe, is also being revised to provide more hands-on performance training. The revised course will include approx-

imately 80 additional training hours, making the course 6 weeks in duration. Most of this time will be devoted to gunnery training with Table VIII qualification a requirement for graduation. Here again, we hope to provide a better trained tank commander who will possess a greater degree of confidence from having been trained on the tasks that he will actually perform in his unit—in other words, a combat ready NCO.

The track vehicle mechanic (TVM) and the turret mechanic (TM) courses are also under revision. We are, first of all, working to self-pace those courses, not only to allow students with aptitude and motivations to finish sooner and go to units—but, we believe the student will be better trained since he will be required to demonstrate his proficiency by actually performing each of the tasks in the training modules. Other changes suggested by the TFMG, such as training our 63C TVM on a specific tank system only, are being studied for implementation.

Soldier's Manuals, TEC and SQT

The next three programs, Soldier's Manuals (SM's), training extension courses (TEC), and Skill Qualification Tests (SQT's) are closely related and are by now familiar to most of you. Taken in combination, they have greater impact on the individual soldier than anything else that affects his career. Collectively, they tell the soldier what he must do, how well he must do it, teach him how to do it, and then test his skills at doing it. The results of this process determine his assignments, promotion potential, and ultimately his retention in service.

Soldier's Manuals, TEC lessons, and SQT's are developed from the same critical task list. This list was prepared based on job and task analysis, field surveys in your units, interviews, and on-the-job observation and validation. It is simply a listing of tasks that are critical to proper job performance and survivability in combat and on which the soldier must be trained. Now let's see how the three fit together.

Step 1 is preparation of the Soldier's Manual which describes each critical task and tells the standards of time, completeness, or accuracy that the soldier must meet in doing the task; details the performance measures; and lists training references. These references may include training manual (TM) or field manual (FM) paragraphs, video tapes, How-to-Fight manuals, and TEC lessons. We recognize that our current 11D and 11E manuals are in need of refinement, and we are taking steps to make them better. We expect to completely rewrite the manuals in FY 78 to implement the TFMG proposals of the new career management field (CMF) 19. The training and evaluation outlines will be expanded and illustrations will be included where needed. Our goal is to make them a more self-contained training document *where possible.*

The preparation of training extension materials is step 2. To ensure that the soldier is provided assistance in learning the tasks and that he is trained to the desired level of proficiency, TEC lessons are prepared using the Soldier's Manual task list. These lessons are self-contained and usually require no monitor or instructor to administer them. They can be used by individuals or small groups and require small amounts of time to complete. Lessons have been or are being prepared on approximately 80 percent of the critical tasks for 11D/11E, levels 1 through 4. The reason for not doing 100 percent of the critical tasks is that some don't lend themselves to training through TEC.

Step 3 is evaluation. Up to now, we have told the soldier what we expect of him and have provided him training material to assist in acquiring the skills. It remains now to evaluate how well he has learned his job. The Skill Qualification Test (SQT), which again is based on the Soldier's Manual task list, completes the training cycle for individual skills. It uses written testing; hands-on performance exercises, and commander certification to test the soldier. This ensures not only that he knows what has to be done, but has the motor skills and reactions to actually accomplish the tasks required by his duty position.

As you know, these are not items of future impact. Some are in the field now and are being used to establish standards, and train and test today's soldiers. Others will be fielded in the near future.

MOS's 11D and 11E, levels 1 through 4 are in the field now. In final draft, 11E-5 will be fielded during second quarter FY 78. The 45-series for turret mechanics are also in final draft and are scheduled for the field during third quarter FY 78.

Extension Training

Two items in reference to the correspondence course program are significant:

- Administration of the program has been consolidated at the Training Support Center, Fort Eustis, VA, and
- We retain proponency for Armor lessons.

TEC Lessons

At this time 68 lessons, prepared by the Armor School, are in the field. Forty-eight of those are audio-visual, and 20 are audio-only. Another 50 lessons are within 6 months of fielding. Future plans call for production of another 150 lessons. This will give us the 80 percent coverage of tasks that I mentioned previously.

SQT distribution roughly parallels distribution of the Soldier's Manual—11D/11E 2 through 4 are in the field. 11E-5 is due out in second quarter FY 78. The 45N, P, and R should be ready for use in the first quarter of FY 79. Alternate versions of the SQT will be produced as well as revisions made to update and improve existing tests.

Testing

Testing for Active Army 11D & 11E10 through 40 began last month and will continue through September as well as later in units where SM distribution was delayed. Series 45 MOS's will be tested beginning in April 1979.

Reserve Components will begin testing next year, one year behind Active Component personnel. Once the program is underway, testing will be done annually, however individuals will be tested on a biannual basis. The exceptions to a 2-year testing cycle are that a soldier can specifically request to be tested to improve his score or if he fails the test he must be retested the next year. Repeated failures may preclude promotion and reenlistment, and may be cause for reclassification or administrative elimination.

As I said earlier, no existing program or combination of programs can have more impact on our soldiers. Their careers hinge on it and they are trained and tested by it. But, the soldier is not the only one affected. No longer can the firstline supervisor and the unit commander sit back and take little or no accountability for individual training. Under the Soldier's Manual concept, the firstline supervisor is responsible for training his subordinates on the critical tasks. A Commander's Manual is published for each MOS to assist the commander in integrating individual training into his unit training program and to assist him in recognizing his responsibility in providing time, reference materials, equipment, and other support to his soldiers. The 11E and 11D Commander's Manuals should be distributed in September-October 1977.

Job Books

To assist the firstline supervisor, we have prepared "job books" for skill levels 1 and 2 which will be published in October-November 1977. Job Books will be issued as follows: one to each soldier in the duty position and one for each soldier to his supervising NCO. The books contain the critical task lists, and tell the NCO what his training responsibilities are, how to execute these responsibilities, and how to use the book.

Each time a task is tested, the NCO enters a GO or NO-GO in the book along with the date tested. Job books allow the NCO to keep track of each soldier's progress. They are not to be inspected.

Platoon Profile

We are also developing a series of platoon profile charts to be used by firstline supervisors and commanders to keep a local record of each soldier's progress. They will be published as graphic training aids (GTA) and again, are not to be inspected, but are to serve as a management tool to indicate training strengths and weaknesses.

Finally, SQT results will assist in training. Within 30 days after completion of the test, each soldier will receive his individual report which tells him exactly which tasks he passed and which ones he failed. Additionally, commanders throughout the chain of command will receive summary reports for their units. These reports will show in black and white how well individual skills have been mastered and will give an indication of how well firstline supervisors and commanders have accomplished their training mission.

Vehicle Recognition

The last area to be covered in my briefing is armor vehicle recognition training (AVR). Several AVR-type projects have been undertaken by different organizations in the past few years. These vary from the use of scale models, to black and white photos and slides, to color shots of captured equipment, to pamphlets and books containing line drawings and photographs. In short, there was no real direction and guidance for the program. In September 1976, Headquarters TRADOC tasked the Armor School to be proponent for AVR training. To date, two short term goals have been met. The first is publication of GTA 17-2-8 which was distributed in April this year. It consists of a deck of flip cards covering 48 vehicles.

In addition, three audio-visual TEC lessons have been prepared and are in mass production at this time. All should be fielded within the next 3 months. The first two lessons cover 17 vehicles, both friendly and enemy, and describe the identifying characteristics of each. The third lesson places the same 17 vehicles in various terrain settings and requires the soldier to identify them. Another series of TEC lessons, covering 13 additional vehicles, will be produced in the future. While this will complete our common training requirements, it does not complete the total program. We are now looking for ways to improve training in this vital, but currently neglected, area. Some of the things under consideration area are TEC lessons showing tanks in various terrain settings as viewed through a sight reticle; the use of a wider variety of vehicles and other equipment; color photograph flip cards using pictures of the actual equipment where possible; wall posters, bulletin board materials, and models for use in unit training rooms; scaled terrain settings, audio tapes, 35-mm. sound/slide shows, video tapes, programmed texts, pin ball-type machines using vehicle silhouettes with aiming points depicted, and modification of playing cards to show vehicle silhouettes and identifying data.

ARMOR CONFERENCE 77

Division Restructuring Briefing

by Brigadier General James H. Patterson
Assistant Division Commander of the First Cavalry Division

Today I will address one of the Army's latest challenges; the restructured heavy division; the rationale behind its formation, its organization, and a summary of the tests and time phasing for this innovative restructure endeavor.

The 1st Cavalry Division has been selected by the Chief of

Staff to be the test division beginning in July of this year.

"Why reorganize the Division?" is a question many ask. There are many reasons, but I will highlight only the major ones.

First, the Army will be gaining a new family of equipment in the early 1980's that cut across the units of the division—the *XM-1* tank, mechanized infantry combat vehicle (MICV), improved TOW vehicle (ITV), advanced attack helicopter (AAH), new artillery munitions, a new air-defense system as well as new communications, electronic warfare systems, and many others. The units of the division have been organized to optimize the greatly improved potential of these weapons and munitions. This is a departure from infusing new weapons into old organizations, or making minor organizational adjustments, and a shift to consciously organizing around the weapons systems.

Second, the doctrine of FM 100-5, the threat tactics, and a requirement for support of the major weapons systems demands that organizations change to keep pace with doctrine and tactics.

Finally, the trends of fire power and manpower on the battlefield have changed over time. Looking at the division and these trends from the Civil War through the 1980's will highlight these changes.

To highlight this point, the 1983 division, in firepower alone, will have the capability of delivering over 5-million pounds of ordnance on the battlefield in just a 30-minute period. This is six times more firepower than in World War II and almost 80 times more than in the Civil War.

To parallel the advance in firepower over the last century, let us look at the changing nature of combat personnel on the battlefield. A typical Civil War division fielded 8,000 men, (nearly all fighters) and was given a battle sector of around 1 kilometer. In contrast, a mechanized infantry division in Europe today is twice the size of their Civil War predecessors and are assigned a frontage of 40 or more kilometers in width. Such broad frontages result in an average personnel density of 413 men per kilometer of front. The requirement for mobility to mass defenders or attackers at the breakthrough point is obvious.

The practical manifestation of these trends in greater firepower and mobility leads to the concept for the restructured division. The restructure of the division into more, smaller maneuver battalions with additional firepower integral to the division preserves the concept of the combined-arms team. This concept is essential to performing sustained combat.

Weapons systems and their best mode for employment are a driving rationale for the structure. Weapons will ideally be grouped in pure company organizations with battalions being smaller for tighter command and control. The more, smaller maneuver battalions are expected to be more agile, responsive, and generate a greater percentage of available combat power.

Divisional Headquarters

There have been minimal changes to the division headquarters, however. The highlights of the organizational changes are:

- A new position, that of Deputy Chief of Staff for Operations and Intelligence, has been created and the G-5 has been eliminated.
- The current brigade is a tactical headquarters that has *attached* to it any number of maneuver battalions—usually from two to five. This causes many problems in trying to size combat service support and combat support to the brigade level. Under the Division Restructuring Study (DRS), the brigade in the armored division will have five maneuver battalions *assigned* to it, but still retain the flexibility to attach or detach battalions as required, such as three tank battalions and two mechanized infantry battalions.
- The current brigade headquarters has the traditional commander, executive officer and staff: S1, S2, S3, and S4. The DRS brigade headquarters is structured differently as it has no executive officer and has two bifunctional staff officers. One is the Operations/Intelligence Officer, and the other is the Personnel/Logistics Officer.
- The other major difference is the addition of a scout platoon. The brigade scout element serves as a command and control leading element for the brigade commander and is not intended to be assigned a combat mission. The scout platoon is transported by five *M-113's* and two motorcycles.

Maneuver Battalions

Let us now take a look at the maneuver battalions. Both tank and mechanized infantry have a battalion headquarters and five companies; headquarters and headquarters company (HHC), A, B, C, and combat support company (CSC). The DRS maneuver battalion has a battalion headquarters and seven companies; HHC, A, B, C, TOW, combat service and support company (CSSC), and maintenance company.

The maneuver line companies will be leaner than they are now. The tank company will go from 98 officers and men to 51, and the mech infantry line company will be reduced from 171 to 103.

All men in the line companies will be strictly fighters. The administrative, supply, and maintenance requirements will be handled elsewhere in the battalions.

The primary combat vehicle for the Infantry will be the MICV. With the MICV, the infantry units will be more agile and responsive, and should generate a greater percentage of available firepower. The smaller tank battalion (36 tanks vs. 54) is designed to group the tank weapons system into a pure company mode of employment with tighter command and control.

All tanks are "fighting" tanks. The main purpose of the smaller organization—only more of them—is to be able to generate more combat power.

Last September, at Fort Hood, both the 1st Cavalry Division and the 2d Armored Division participated in a test of the five-tank platoon and the three-tank platoon. It was instrumented with the laser system and weapons effects simulation system (WESS), and it provided the theory that smaller organizations can generate a higher percentage of combat potential. As an example, the three-tank platoon had 92 percent of its tanks in the fight, the five tank platoon 67 percent. With the laser system identifying kills, the loss exchange ratio (that is, enemy tanks killed per friendly tanks killed) was 1.8 to 1 in favor of the three tank platoon.

Now this does not necessarily prove that the new organization is better, but it was a necessary step in continuing with the concept of greater command and control paying off on the battlefield. Consolidation of administration at bat-

talion level (CABL) allows the company commander to lead from his tank and the executive officer (XO) to fight from his tank as the company's second in command. The mission and area of responsibility changes between the HHC and CSSC.

In the DRS HHC, there will be the battalion commander, bifunctional staff officers, the mortar platoon and the commo section. In the CSSC will be the Personnel Administration Center (PAC) Supply Administration Center (SAC) and the support platoon. The current CSC company will lose its scouts, ground support radar (GSR) and *Redeyes.* The 4.2 mortars are eliminated from the tank and mech battalions, but six improved 81-mm. mortars are assigned to HHC. The battalion's Fire Support Team (FIST) provided by the direct support artillery battalion will function as forward observers for the mortars.

There are two new companies in the DRS tank and mech infantry battalions. The first is the antiarmor, or TOW company, which will have 12 TOW weapons systems each. The separate TOW company is structured to maximize the capability of the TOW for the longer range battle. The other new company is the maintenance company which will perform all of the required maintenance in the battalion above and beyond operator maintenance.

Now that we have taken a look at all the major changes in the maneuver battalions, let us turn our attention to what the other units in the first team will look like.

Division Artillery

The restructured division artillery will result in improved target acquisition, more responsive, and accurate and flexible fire support. It will also have increased weapons densities and improved survivability. Direct support battalions in each brigade will have four firing batteries (three for the DRS test), each consisting of eight firing sections in four gun platoons, a fire direction element and a small headquarters.

The restructured division artillery also incorporates the FIST concept. Each DS battalion will provide down to the maneuver company a fire support team from its organic headquarters and headquarters battery (HHB). The FIST team which supports the divisional armored cavalry squadron is located in HHB of the general support (GS) battalion.

Within the GS battalion there will be six batteries: HHB, A, B, C, service battery, and maintenance battery.

Division Air-Defense Artillery

The new division air-defense artillery organization represents a dramatic departure from the current ADA organizations. This new approach to division ADA organization optimizes future weapons capabilities and focuses on increased firepower and improved command and control. It provides division interface with the DS *Hawk* battalion, integration of the electronic warfare platoon operations, and the necessary division-level Air Force coordination. The gun battalion focuses on the main battle and covering force areas and has three *Vulcan* batteries (24 fire units) and one *Redeye* battery (36 teams). It is designed to facilitate habitual battery/brigade support relationships. The missile battalion focuses on the division rear area and includes two *Chaparral* batteries (24 fire units), one *Redeye* battery (24 teams), and four forward area alerting radars. Currently the weapons system is the *Chaparral.* In the future, it will be the *Stringer* and *Roland* weapon systems. Since the *Stringer* and *Roland* will not be available until after 1980, the test will address the organizational concepts using current weapons systems.

Division Support Command (DISCOM)

DISCOM will be weapons systems oriented and will concentrate on making repairs as far forward as possible. The major changes in the division support command are the restructuring of the medical battalion to a corps unit, and redesignating the Division Material Management Center (DMMC) as the Division Support Operations Center (DSOC) to clearly define its operating responsibilities. The maintenance battalion has been restructured within the existing companies and provide a workable mix of weapon system oriented, and more generalized, maintenance. The supply and transport battalion structure has been changed to support the arm-forward concept by adding ammunition transfer points and upgrading the tonnage of vehicles over the current organization.

Engineer Battalion

The Division Engineer Battalion will be restructured into three direct support companies, an HHC, and a maintenance company. The DS companies will have five platoons and will support the maneuver battalion of the division. The three DS companies will perform combat engineering tasks in the forward divisional combat area. These tasks could initially be the establishment of minefields and obstacles and assisting designated units in constructing or reinforcing strong points.

The driving forces in the revised concept are a more specific role in mobility and countermobility which lessens the role of generalized engineer tasks. The general engineer support and that support for the division behind the maneuver battalions will now come from the corps combat engineer units. The bridge company will be a corps unit.

Armored Cavalry Squadron

The key changes from the current TOE is the transfer of the air cavalry troop to the aviation battalion and the reorganization of the cavalry platoon. The air cavalry troop will continue, however, to operate closely with the ground cavalry squadron when required and can be attached as the mission requires.

The armored cavalry squadron is retained as an economy-of-force and security-mission element of the division. It is organized to conduct offensive and defensive combined-arms operations in order to perform as part of a larger force. The troops and their platoons place long-range missile and tank-gun fires on the enemy forces, slowing their movement, forcing early deployment and identification of the location and strength of the breakthrough attack. The key to the restructuring is the simplified platoon configuration. The current four-element (scouts, infantry, light armor, and mortar) platoon is reorganized into two elements: five MICV configured for the scout and four tanks.

Combat Aviation Battalion

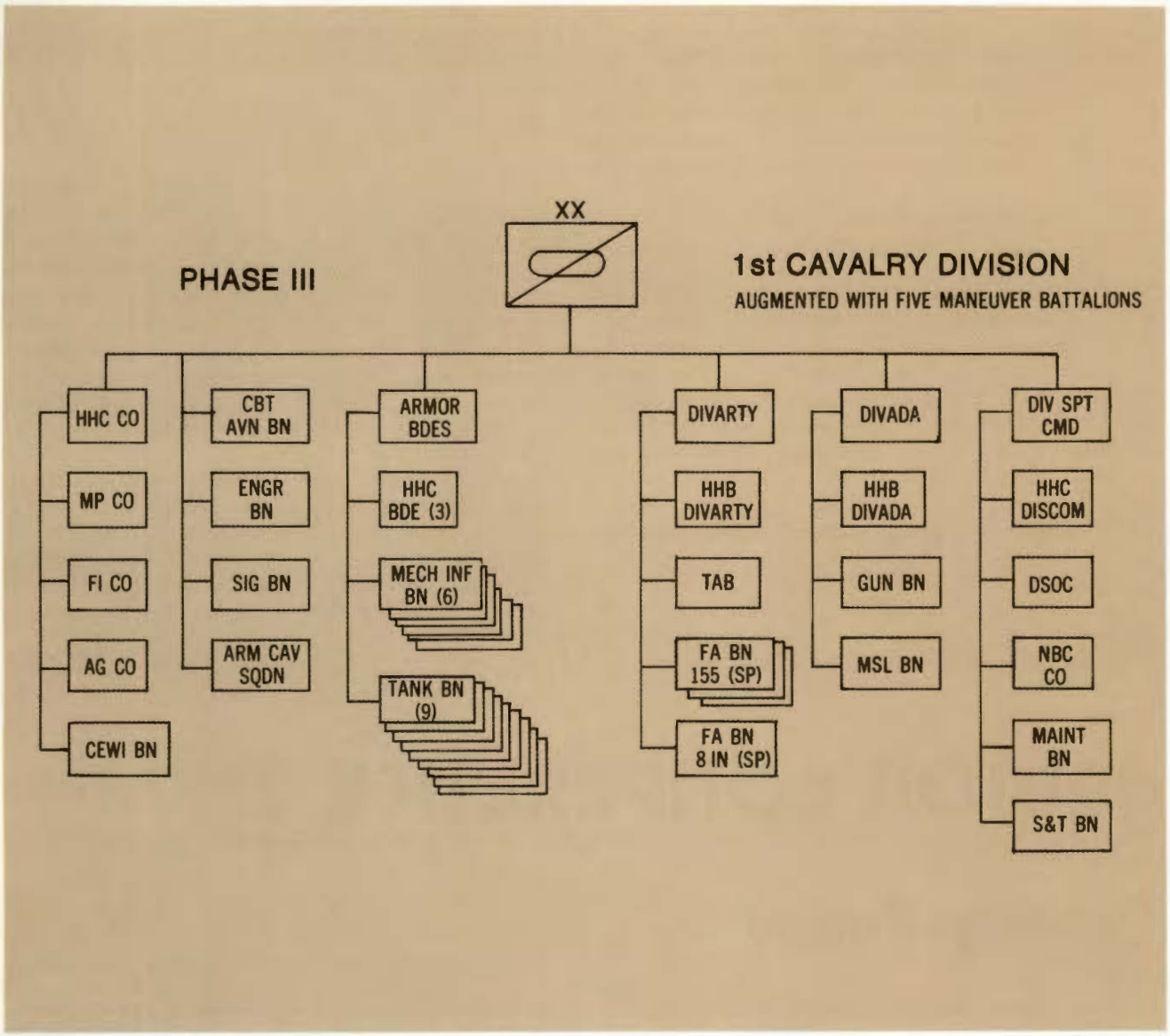
The DRS combat aviation battalion is a new innovative approach to the management and employment of division aviation assets. It brings the current aviation units (companies, platoons, sections) together in a more efficient and effective organization.

The aviation battalion can accept attachment of attack helicopter companies from corps or other divisions. The attack helicopter company represents the division commander's highly mobile reserve and is employed for decisive action. This company is not attached piecemeal to brigades or battalions on a daily basis.

The air cavalry troop may be employed on reconnaissance and screening missions. It can be attached to the divisional cavalry squadron when ground reconnaissance, surveillance and screening are also required. The air cavalry troop generally operates in the covering force area, the thinned-out sector of the main battle area (MBA), or in locating and fixing enemy elements that have bypassed or broken through friendly units. As an exception the air cavalry troop may also be employed at the decisive point in an antitank or air-defense suppression role.

The Signal Battalion

The division signal battalion will be formed into five companies: HHC, command operations company, forward communication company, signal support operations company, and maint company. The division signal battalion is a product of the integrated tactical communications system study (INTACS). Major advances in technology and improved tactical satellite communications terminals provide rapid and reliable, terrain-independent transmission links within the division and to the next higher command echelon.



Here is the total restructured division. This transition will occur in phases.

Military Police Company

The MP Company will have only minor modifications

which will include the addition of eight armored cars within the military police platoons. The armored cars are allocated on the basis of two per each forward support platoon and one per each general support platoon. These vehicles will provide an increased capability which can be exploited effectively in such activities as convoy escort and security of truck units, physical security, rear area protection, and other designated security operations.

Pay and Personnel Administration Company

The consolidation of pay and personnel (COPPER) is currently under test at Fort Bragg. The results of the COPPER test will be analyzed and may be the basis for a new conceptual organization, but at this time the 15th Adjutant General and 15th Finance Companies will not be restructured.

Nuclear, Biological, and Chemical (NBC) Defense Company

The NBC defense company is a new organization that is subdivided into a HQ section and three NBC defense platoons. This company has staff responsibility for the supervision, organization, training, and planning for all divisional NBC operations. Each NBC platoon will normally operate within a forward brigade area and provide material or terrain decontamination (fixed and mobile), reconnaissance, and bath and clothing exchange services.

191st Military Intelligence Co. and 371st Army Security Agency Co.

These units will be restructured into different intelligence units, but not as a formal part of the DRS study pending the outcome of the current combat electronic warfare and intelligence (CEWI) battalion test.

Summary

With the Chief of Staff's approval on 16 February 1977, the test is now underway, at least in the planning stages, and will run through the spring of 1979. The first phase is a battalion test period from July to December 1977.

The first battalions will physically begin restructuring on 21 June 1977 - 1 July 1977. In addition, other smaller units among the combat support and combat service support organizations will be restructured. The first units to restructure will take part in a field test exercise (FTX) of battalions in the fall of 1977.

For Phase II, starting in January, the remainder of the First Team will restructure with the exception of the *Brigade 75* units and AG and Finance companies.

In the fall of 1978, the division will conduct a major field test exercise. It is important to bring out at this point that even though the First Team will be the test unit, this will be far from a one-unit show. Every unit on Fort Hood will take part in this test in one way or the other under the direction of the test director and III Corps Commander, Lieutenant General Robert Shoemaker. The 2d Armored Division will have some of its units tested as a comparison along with our own during the first part of the test. They will also provide the Aggressor force each phase of the test. TCATA will administer the test.

I can honestly say that we of the First Team feel it is a privilege to be testing the division of the future. We have no preconceived ideas on the outcome of the tests. The new organizations will have to prove themselves in both recommendations during and after the test period on modifications necessary to provide the Army the best division it can field for the 1980's.

ARMOR CONFERENCE 7

Cavalry Today

by Colonel Crosbie E. Saint, Commander
11th Armored Cavalry Regiment

Today I will speak of the Cavalry as I see it. I speak on my subject based on my personal experiences and from a prejudiced viewpoint. Now, I did not travel all the way from Fulda to give you a lot of platitudes and generalities about how great the Cav is or to tell you that we are the solution to the world's problems. On the contrary, I bring just two messages for my Armor colleagues. One is for the field-grade decision makers; the other is for the company-grade, and below, implementers.

For the decision makers my message is this: the requirement for Cavalry has not gone from the battlefield, and this is very much proven by the mission of the 11th ACR in V Corps today. Unfortunately, there are many who do not know what the Cav is for and there are also those who believe the Cav can be replaced by straight tank and mechanized units. I do not agree, and I will address some facets of my beliefs.

Now, to the implementers I say this: the responsibility for insuring that the Cavalry actually trains and is capable of performing all those tasks it should falls on *your* and my shoulders. If you or I fail, there will soon be no Cavalry because we will lose the degree of professionalism and expertise we require to do our job. To both groups I say we

have to get our stuff together, or the Cavalry as an organization could become extinct. Then the question will rightly be asked: What do we need the Cav for?

Today I will also discuss some aspects of what I consider to be essential Cavalry training.

Cavalry Missions

A couple of years ago, several pretty smart men who happened to be in positions of influence within the Army sat down and developed some well-thought-out doctrine for conducting land combat operations. This action has had a significant and most beneficial impact on the United States Army. This new doctrine, incorporating the lessons from recent "modern" wars, has shifted attention to the European theater. But rather than discuss the entire spectrum of changes brought about, I want to discuss how FM 100-5 affects the Cavalry.

Unfortunately, FM 100-5 does not directly discuss the role of the Cavalry on the modern battlefield. There are a few references to Armored Cavalry's contribution to the active defense, but overall not too much is said. The new draft of FM 17-95 fills the gap somewhat, but that manual is preaching to the choir.

However, 100-5 does mention several fundamentals of both offensive and defensive operations that are particularly applicable to the Cavalry. Two of these are the need to "see the battlefield" and the requirement to concentrate firepower and forces for decisive results. Inherent in these two fundamentals are the requirements for reconnaissance, security, and economy-of-force. These factors are the business of the Cavalry.

To "see" the battlefield we must have accurate and timely information. There are a number of ways this information can be provided, including various sophisticated mechanical, electronic and optical means which have become quite popular and useful of late. There is also the old standby "the eyeball and weapon" of the soldier. The soldier can gain information in a number of ways: he can use stealth, and the information will be gained by such means as reconnaissance, patrols, and observation posts. The soldier should avoid enemy contact and should gain knowledge of the enemy without being detected. This method also allows the commander to find out where the enemy is not! Another way to provide information is by engaging the enemy in combat in order to develop the situation. We must remember that when you fight, you have to be able to force the enemy to show his strength and thus to unveil his weaknesses. What I've just said may sound sleepy and dull, but out in the field it's not that way. It has to be practiced.

Can we rely on our sophisticated reconnaissance means to provide all the necessary information to higher commanders for them to see the battlefield? Can these fancy assets develop the situation? Are we ready to turn in the soldier with his eyes and his array of weapons? I do not think so! We must commit some elements of our fighting forces to reconnaissance and development of the situation. Further, a unit that provides these "eyes" for a commander to see the battlefield must have the capability of being both sneaky and potent. This unit must be trained to sneak and peek, or fight, but, most of all—report. The objective is to look, not fight.

There is also a requirement for security. This prevents the opposing commander from seeing the battlefield and learning of our dispositions and actions. To do that a unit must operate on extended frontages. At the same time, it should be strong enough to defeat or turn back enemy efforts to penetrate the security force. This requires a mix of assets without sacrificing the main body's integrity or strength.

Another fundamental mentioned in our capstone field manual is the requirement to concentrate forces at critical points on the battlefield. Since it is nearly impossible to be strong at all places at all times, a commander is naturally forced to use economy-of-force at less critical points. While doing this he must attempt to deceive the enemy; and this element or unit must have a similar equipment mix and be able to conduct similar operations as main battle forces.

Economy-of-force also implies flexibility. Division and Corps commanders need a unit that is capable and mentally prepared to perform missions that arise suddenly. Some people say flexibility is an excuse for poor planning; but I submit that until we invent a true setpiece battle, we'd better be prepared to go in several directions at once. There will always be flanks to protect, rear areas to secure, and gaps that must be covered. These missions are over and above the ones conducted by the maneuver forces engaged at the critical points of the battlefield. To dissipate these forces for less critical missions would aggravate what may already be a marginally satisfactory force ratio.

I've listed some of the requirements and traditional missions of the Cavalry in Europe. I hope you have noticed I've listed many more tasks than killing the first wave of *T-62's* that appears on the horizon. This is because for me or you to do our job as cavalrymen, we must be much more versatile. Sometimes we need to use stealth, and sometimes we need to fight. At all times we need to be clever! Because Cavalry is subject to being employed anywhere in a division or corps sector, we need a variety of equipment, skills, and communications capabilities. We must be able to do damn near anything. We need armored reconnaissance specialists—scouts; we need tankers, and redlegs, aviators, communicators, and engineers. We need to be, and fortunately are, a combined-arms team. Without multiple capabilities we are not Cavalry.

How does today's Cavalry measure up to the requirements I've talked about? For the most part pretty well, but not as well as we are capable of doing.

Improvements

Because of the factors and fundamentals I've mentioned, the new conceptual armored cavalry platoon organization that is being introduced in Europe is a giant step in the right direction. What this generally entails is the substitution of four tanks for the six *Sheridans* and the return of four APC's (two with *Dragons* and two with TOW's) for the scouts; also another APC is added for the platoon leader.

An added benefit is the introduction of motorcycles in each Cavalry platoon. Initially, by the way, I personally didn't think much of adding the motorcycles. However, in the last 9 months I've seen many potential uses for them within the Regiment. They'll be a big help when we get them.

The main battle tanks and TOW's give us the ability to fight and survive at long and medium ranges. At the same

time, our ability to conduct reconnaissance and security operations is enhanced by the return of a *full* scout section and the addition of motorcycles. In Europe, one squadron, the 3-8th, has made this conversion, and we await the conversion of the 11th ACR in, I hope, the near future.

Though all this sounds very nice, I also see some deficiencies in both training and equipment in the Cavalry today. I believe these inadequacies fuel the idea that there is no need for Cavalry. But it's not that there is no need for us; it's that we have failed to maintain our capability to provide the corps and division commanders with what we should be able to do.

Cavalry Training

Let's talk about training first; here I emphasize that *I command a Cavalry regiment, not an antitank regiment.* We are highly proficient at killing tanks, but the 11th Cavalry has to be capable of much more, and the corps commander quite properly demands it. Of greater importance for the 11th ACR is contributing to the determination of where the enemy main attack is being directed within the V Corps sector. To do this, the troopers of the regiment must be proficient in bringing *all* fires to bear against the enemy. Though the tank and *Sheridan* are the most powerful members of the Cav team, we cannot forget or neglect the other members of the team. My point is this: if we're going to stay Cavalry and be capable of doing all our jobs, we've got to train all of our people to operate as a true combined-arms team.

Just what are the indicators of "bad" Cavalry training? Is it when the howitzer batteries always train by themselves or with some nearby artillery battalion? Do we have good Cavalry training when the scouts and mortar crews only pull details when their squadron goes to Grafenwohr for tank gunnery? What about the platoon leader who doesn't know how or when to displace his mortar because the troop commander *always* keeps the four-deuces in battery? Do you see scouts being used to call for and adjust artillery and mortar fires, or do the howitzer battery FO's always do it? Gentlemen, when you see those things, I say that atrophy has set in on a Cavalry training program. When we do this, we are taking the easy way out.

Cavalry Training Methods

The obvious question is: How should we train Cavalry units? There are numerous factors to consider; however, my purpose is to discuss some of the factors the Cavalry must take into account.

The first step is to realize the scope of the problem. A regimental armored cavalry squadron in Europe consists of 968 men with 37 MOS's (not including skill levels) and, to keep you busy in your spare time, 261 vehicles with 63 trailers! A Cavalry squadron is a complex affair.

Multiechelon training is the only way to beat the situation. Various levels of a squadron have to be trained simultaneously. You must do more than one thing at a time. Each leader, whether officer or enlisted, must do his job. Decentralization has got to be commonplace.

My building block for training is the platoon. This is where individual, crew, squad, and section training come together. The platoon leader and his noncommissioned officers talk to the fighers. They also are responsible for training them. The troop commander trains the leaders of his unit and integrates nonorganic assets. The squadron commander, with his staff, manages the training along with the other thousand and one requirements which he faces. Regiment allocates resources and, hopefully, provides sound guidance and establishes proper priorities. But again, the basic element is the platoon. There's where you first find an officer. There is where the fighters first come together as a team.

What do we train our troopers and units to do? It is true that there are common subjects among all soldiers and fighters, but there are also differences which must be addressed in order to keep all your capabilities. We cannot fail to address these differences, or we will lose our uniqueness.

The Scout

An area of very special importance is the training of the main man of the Cavalry—the scout. Without the scout there is no Cavalry. He must be able to employ all of the firepower available. He must be capable of finding the enemy and knowing what he sees. He should be able to go forward to find the enemy and have the firepower with and behind him to get out of trouble. Most of all he must be capable of semi-independent operations on the battlefield. He must be resourceful—he must be the most clever of all fellows. He takes individual actions that are not dictated by the actions that other squads or platoons are taking; no one is constantly looking over his shoulder. He controls that part of the battleground that he is seeing. His list of required skills can go on *ad infinitum.*

The ability to fight well should remain a constant capability; "peaks and valleys" have to be avoided. This phenomenon can turn combat readiness into an empty phrase, and in USAREUR we can't accept it. In our case the transition from peace to war may be just a matter of hours.

So where does all of this lead you? Yearly training cycles just don't cut it! The capability to perform in combat must be routine. The 11th ACR now goes to the woods more often but for shorter periods of time. This policy helps us to prevent the requirement of having a special program to bring our replacements up to speed. Our troops, companies, and batteries receive five to eight new men each month, and if you don't bring them on board right away you can find yourself way behind the power curve. To bring new soldiers into the fold, our platoons go to the field every 4 to 5 weeks; troops and squadrons at least once quarterly. The 11th Cavalry now goes to Grafenwohr once a year and Wildflecken two to three times a year to conduct combined-arms, live-fire exercises. We shoot less ammunition per trip, but we shoot more often. This applies not only to tanks and *Sheridans* but also to artillery, demolitions, and .50 caliber machineguns.

It is most important that these trips include all elements of the squadrons and regiment—the scouts, mortarmen, artillerymen, and attack helicopter crews must all go and continue to learn not only their own jobs, but they must also learn to work together as well. Platoon qualification with the use of supporting fires is the objective, rather than just the number of individual crews who qualify. We must remember that tank or *Sheridan,* while it may be the strongest member, is still only a part of the team.

Necessary Personnel and Equipment

That's my part of training. What do I want from you? First, Fort Knox has to keep sending me scouts, and they must not be the run-of-the-mill types. They are the heart and soul of the Cavalry: Train them in all their required skills, including *Dragon* gunnery. Most importantly, do not lower any standards! We in the Cavalry and the Army will pay the price at another time and another place if you do. Some people want to change these standards—but I say *watch out!*

Next, I need quality officers and noncommissioned officers. These people must know their jobs, want to work, and must most of all be reliable and able to train their people without undue supervision. They must be the leaders for some damn good troopers.

I also have a "want list" for the research and development (R & D) community: send me a real scout vehicle! Don't over-price it because we need four or five per platoon. It needs to be quiet and reliable; it needs firepower and must be easily dismounted. It should also be able to carry three to five men and a motorcycle. We need this new vehicle as soon as possible.

We also need our communications equipment to be more reliable and have a longer range. One of the reasons I like the motorcycle is that it's the one way I can be sure to get the word out—I need to be able to trust my radios as much.

We also need reliable and simple training devices in sufficient quantities so that it's not a hassle to use them. I've seen a lot of good stuff at TRAINCON and here at Fort Knox—but I need to see it in Fulda.

Our ability to conduct operations in a chemical environment is marginal. We need to improve our detection and protection equipment. This is essential.

Recently we in the Army have made great strides in improving our night-fighting capability. My message here is: don't let up—we must continue to get better.

Conclusion

What I have said these past few minutes is: the Cavalry today is alive and well; it remains "up front"; we are ready to fight the first battle of the next war; and we are prepared to be used in a variety of ways after the first battle. Above all, we must spend a lot of time being careful that we don't organize and train to fight the last battle of the last war. We remain capable of reconnaissance but can still punch somebody in the nose when called upon. We are not just an antitank unit; we are Cavalry. We train quite hard, and we train constantly. We have found that in training, sustainment is the key; the platoon is the basic element; and combined-arms employment must be the norm. Our troopers are eager; they joined the Army to be challenged, to mature, and to live the adventurous life of a soldier. I promise that in the Cavalry they're doing just that. They get plenty of opportunities to excel, and they seem to have a unique inability to fail!

I must caution however that the time to train as cavalrymen is now. To deserve the name Cavalry we have to be a true combined-arms outfit able to meet all challenges. If we fail short or fail to live up to our promises, obsolescence will result.

ARMOR CONFERENCE

Armor Combat Vehicle Technology Program

by Colonel Lawrence B. Fitzmorris,
Chief of the Combat Vehicle Technology Team,
U.S. Army Armor and Engineer Board

This briefing contains information from an article titled, "A Look to the Future," which was announced in the May-June issue as an upcoming feature in ARMOR. Ed.

Very often in the past there has been a communication problem between the user and the developer of armored combat vehicles. In simplest terms, what the user thought he said he wanted and what the developer or designer understood the user to say he wanted, often resulted in something neither one wanted.

It has become obvious that we, as users, must come up with a better way to state our requirements, to portray in a more definitive way what our materiel need is, so that we preclude such disasters as the *M-114* or the *Gamma Goat.*

To this end then, we are looking at a new approach, not an evolutionary approach but rather a revolutionary approach. We are going to look at the most advanced componentry and technology and we are going to do this under field conditions using a test-bed vehicle—a living, breathing, mobile laboratory. A laboratory so designed that we can, with relative ease, change componentry and analyze that componentry in the light of technical, tactical, and economic feasibility. Having then generated this data, we users can define requirements precisely; and we will have the data and expertise to enable us to knowledgeably work with the developer,

because we will have already tested the system and know what we want. It was in the spirit of this philosophy that this program came into being; and here are some of the questions for which we are seeking answers.

- Is there a payoff in survivability because of great speed and acceleration?
- If so, is it sufficiently high to warrant shedding of some of our heavy armor protection?
- Does the killing capability of a high-rate-of-fire weapon warrant the high rate of ammunition expenditures and degradation of accuracy associated with such a system?
- Do we need a complex, sophisticated, costly fire-control system with a burst-firing antiarmor cannon?

The program that is designed to provide answers to the foregoing questions consists of four separate, but interrelated, subprograms.

The first of the subprograms is called HIMAG, an acronym stemming from high mobility and agility. The HIMAG test-bed vehicle has been developed by National Waterlift Company, Kalamazoo, Michigan. This test rig will be used in a variety of tests in an attempt to determine the correlation between survivability of an armored combat vehicle and its ability to maneuver at extremely high speeds. The HIMAG chassis (less the turret) is due to arrive at Fort Knox for testing on or about 1 October 1977 for approximately 6 months of engineering and performance tests.

There have been several exploratory tests conducted to provide initial input into the HIMAG chassis test. One of the two most significant was the S-Tank Agility/Survivability test (STAGS) which taught us some valuable lessons, such as:

- Maneuvers must not reduce speed,
- But slow, less agile vehicles must reduce speed to maneuver, so their best course of action is to dash from cover to cover.
- If you are approaching a threat head-on it makes no difference if you are fast or slow, agile or cumbersome, you must maneuver or else you are dead.

In a second test conducted by Combat Development and Experimental command (CDEC) at Hunter-Ligget Military Reservation in California, a specially modified and instrumented pickup type truck was used to determine the effects of high speed and high agility on the gunner's ability to track a highly maneuverable threat vehicle. This truck was pitted against *M-60A1* tanks with add-on-stabilization and against TOW missiles. It attained speeds of up to 55 m.p.h. while exerting up to 7 g's in lateral acceleration. Results of these tests are still being analyzed and as stated earlier will provide us with valuable data in the conduct of the HIMAG test. The purpose of HIMAG programs is to design an experimental combat vehicle with performance variables and to test those variables under Field Conditions to determine their technical, tactical and economic feasibility.

Simply stated, our objectives are to determine what it will cost, how it will perform, and whether or not it is feasible.

Additionally, we are seeking to achieve the ability to insure the better design of armored vehicles of the future.

To accomplish these ambitious goals the following technologies have been developed:

- The HIMAG vehicle itself—the mobile laboratory.
- An automatic tank cannon that is unlike any we have looked at before.
- A Kinetic Energy (KE) round with a staballoy long-rod penetrator and a companion HEAT round.
- A turret which houses, in essence, a dial-a-fire control system ranging from a simplistic blade sight to a closed loop fire-control system.

We can change the various chassis parameters thus changing the level of performance of the test bed.

A 2-hour operation involving minor adjustments to the fuel pump can change horsepower through a spectrum of 1,000 to 1,500 h.p. Addition or deletion of ballast changes weight and thus horsepower-to-ton ratios, from a high of 60-1 to as low as 20-1.

Adjustment of suspension parameters (spring rate, jounce and damping) give us a range of high, medium, or low suspension performance, with the high equating to the latest in hydropneumatic suspension and the low simulating the present suspension system now found on the *M-60*, a number of other less dramatic, but important variables which affect mobility and agility are also available.

The HIMAG is a very large vehicle. It is approximately 6 inches wider and 12 inches longer than the *M-60*. There are two very cogent reasons for this. First, it had to be made large enough to accommodate the aforementioned variables and secondly it is a highly instrumented vehicle which will have approximately 550 pounds (250 kilos) of complex instrumention on-board. This serves to reinforce my point that this is *not* a prototype vehicle. It is a moving, rolling laboratory!

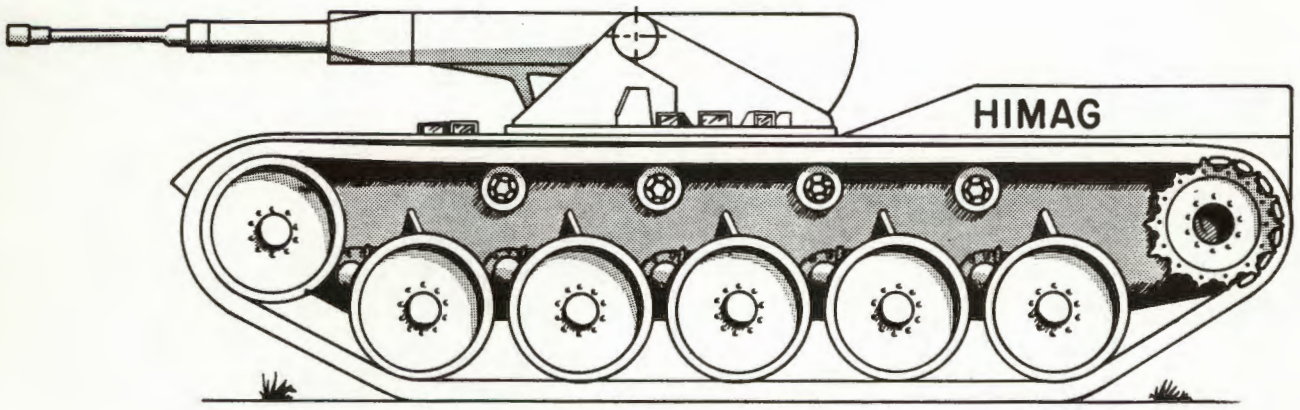
In addition to the on-board instrumentation there is a separate, highly-complex instrumentation package with the following components:

- *Target position location,* which gives the range to target.
- *Automatic video target tracker* for very accurate [±0.15 mil radian (mr)] tracking, in elevation and azimuth, for miss distance.
- *Single frame gun camera,* with a time code for giving us the position of a target relative to boresight, at instant of trigger pull and for giving us miss distance.
- *Pulsed movie camera* with a time code for a backup miss-distance system.
- *Through-the-sight TV camera and video tape recorder* to monitor gunner performance.
- *TOW data digitizer* to convert analog azimuth and elevation error signal to digital format for computer analysis.
- *Range timing system* to generate time to 0.01 second for each system.

The HIMAG will be up against the first team in the fire control arena.

It will have to run the gauntlet of the *M-60* with add-on-stabilization, tracking with and without lead, the *M-60A3*, the *XM-1*, the TOW and perhaps what is the most advanced guidance beam rider system in development today—the antitank assault, air-defense system (ATAADS). If the HIMAG proves itself successful against this impressive array, then we indeed will know there is a survivability payoff in mobility and agility.

The second element of our program is the 75-mm. gun being developed by ARES Corporation located in Port Clinton, Ohio. Aircraft Armament Industries Corporation of Baltimore, Maryland is developing the 75-mm. KE round for this gun. A comparison of the 75-mm. telescopic discarding sabot with the 105-mm. fin-stabilized, armor-piercing, dis-



carding-sabot (FSAPDS) round shows a difference in length of 24 inches—37 inches for the 105-mm., and only 13 inches for the 75-mm. This round warrants further study from a purely logistical standpoint alone. Additionally, after viewing the awesome effects of the round on a medium tank during preliminary tests, we visualize enormous potential for the system.

Testing of the entire HIMAG System (chassis and turret) is presently scheduled to commence at Ft. Knox in June 1978 and run through September of 1979, with follow-on air-defense firing at Fort Bliss, Texas.

The third element of the Armored Combat Vehicle Technology Program is the Armored Vehicle Seating Position Test. This test is in progress at Fort Knox and is designed to obtain data on relative performance capabilities of drivers and gunners while in the normal sitting position, the prone position, and the supine position.

The vehicle being used for the test was built by AAI Corporation. It is merely two old *M-113's* which have been cut and welded to provide us with a carrier having the appropriate configuration for testing the three seating positions.

The fourth subprogram is the high survivability test vehicle—lightweight (HSTV-L).

Objectives of the HSTV-L program are to look at innovative designs in a lightweight chassis and an elevating automatic cannon that fires KE ammunition.

The HSTV-L has generated a great deal of interest among a large number of customers, including the Infantry, Marines, and the Advanced Research Project of the Department of Defense (DOD). The HSTV-L means many things to many people and one of my missions is to insure that the vehicle selected for the tests will provide all interested parties with meaningful results.

During the HSTV-L program we want to look at:

- Another weight class
- The effect of different types of engines, such as the turbine, on vehicle performance.
- CBR Protection
- Swim Capability
- Air Transportability

Two contractors, Aircraft Armament Industries and Pacific Car and Foundry are currently under contract to develop concept proposals for the HSTV-L. Salient features to be emphasized by each contractor are:

AAI

Prone position
Very low silhouette
Elevation by 75-mm. gun of up to 60° for self-contained air-defense capability

PACAR

Standard seating
Turbine engine
Band track and pneumatic tires
Externally mounted gun
Bushmaster mounted for self-contained air defense

Both contractors have proposed some unique and innovative ideas. The winner of the contract will be chosen around 1 October 1977 with delivery of the selected test vehicle scheduled to arrive at Fort Knox in March of 1979.

This then is the Armored Combat Vehicle Technology Program—exciting, challenging, and interesting with tremendous potential for the Army and the defense of our country.

In addition to the briefings and activities described on preceding pages, conference attendees were given the chance to attend a briefing on the one-station-unit training (OSUT) concept as conducted by the 1st Training Brigade at Fort Knox (described in the May-June 1976 issue of *ARMOR*, p. 23). They were also given a walk-through tour of the Holder Complex which featured briefings on communications training and radio operation, a demonstration of the turret trainer for the *M-551* and *M-60A2*, an opportunity to track targets using the Wiley Burst-On-Target trainer, plus a demonstration of the *M-34* Driver Trainer.

Other activities included a walk-through tour of the Armor School Automotive Department, Marshall Hall, which featured a demonstration of the Simplified Test Equipment/Internal Combustion Engine, which is described on page 22 of this issue.

Due to space constraints, Armor Conference briefings and demonstrations not covered in this issue will be described in the September-October issue.

Remarks of the President of the U.S. Armor Association

by General (Retired) Bruce Palmer

I am challenged by this election, "democratic" or otherwise, and I am honored because, to my knowledge the only remaining truly professional association left in the U.S. Army is the United States Armor Association. And when I say professional, gentlemen, I don't mean merely military people who band together to belly up to the bar and I don't necessarily mean people who know their business, that is their military profession, but those who remember that really basic element of being a professional—following and living up to a code. I prize the code of a fighting man. Another word for it is integrity which is the heart and soul of any Army. The Armor Association in its objectives, goals, purposes, and aspirations embodies that one word "integrity."

General McEnery, I've been tremendously impressed with the program you personally pulled together with the outstanding presentations that I had the personal pleasure of listening to. I'm sorry I missed the Commander's presentations, I understand they were likewise outstanding. I have been particularly impressed with the men and women I've seen at Fort Knox, particularly those outstanding young sergeants of the Armor School and the Training Brigade. I have been impressed too, with the young officers I have seen here. I'm somewhat confused just exactly why our younger people do not join the Association and I hope that maybe the Association can find some answer to what appears to me to be somewhat of a paradox.

As for Armor itself, remember that despite all the talk we hear about the awesome power of strategic weapons, our people are faced almost daily and preoccupied with the strategic-arms limitation talks.

Remember this, the Soviets have played catch-up ball in that area and the two great super powers now literally cancel each other out in that arena and there just isn't going to be any nuclear war in my humble opinion. This means that more important than ever are the so-called conventional forces, the non-nuclear forces. They are really the only relevant power, military power, that can be exercised today. The history of the last 25 or so years since the advent of the nuclear weapon almost daily demonstrates that, so conventional power has become really the cutting edge of our defense posture. The Soviets likewise recognize this and this is why they have continued to build their conventional forces as well as their strategic nuclear forces.

No one knows really what the Soviets are up to. In my own view, they are simply out to extend their prestige and power globally. And there is only one country in the world that can stand up against them and that is the U.S. I am not one of these pessimists, however, who believes we are terribly outnumbered and can't stand up to them. On the contrary, the Soviet's system, including their military, has all kinds of weaknesses that we can exploit. Within our own conventional forces, again the cutting edge on the ground or in the land forces, is that so-called Armor branch. It really is not a branch, it's much broader than that. Because to me, it's like someone mentioned here earlier—it embodies all the people who have belonged to the branch of mounted warfare, if you want to call it that, and so it encompasses not only tankers but your cavalrymen, both ground and air, your mech infantry—panzer grenadiers if you will.

The Armor people have always had the vision, the courage, and the boldness to seize opportunities and do the right thing at the right time. So I'm very bullish about the future of Armor. I think it's not only the predominant force in the Army today, but will be that way for the foreseeable future. With that kind of bright future, it again puzzles me particularly why some of our younger people don't go all out in support of the one remaining professional association in the Army.

I want to thank my predecessor, General Boles. I know that he has held the Association together for several tough years. He's done it with a very fine staff here and with the help of people at Fort Hood. I am terribly impressed with the Armor Center and School, and with *ARMOR* Magazine—which incidentally rates number one of its kind anywhere and this reputation extends well into the civilian circles, not just professional military circles. And so I commend you, Jack, for a tremendous performance. You're a hard act to follow. I'll do my best to do equally well and to all of you, and you all look very young to me incidentally, to all of you—all ages, grades, and so on, I pledge my best and my full, faithful, loyal, and above all, friendly support. The last thing I want to do is to start a fight with Armor Community.

So, I wish you all the best of luck. I appreciate very much being here and I want to thank our host, General McEnery, and again commend all who put this very fine program together and executed it so well. Thank you very much. ▲

THE HELICOPTER AND COMBAT IN CITIES

Fighting in a combat-in-cities (CIC) environment brings up many questions and hurdles—especially concerning the helicopter's role.

Increased urbanization throughout the world and especially in Western Europe has greatly increased the probability of extensive combat operations in built-up areas, should a major conflict break out. Our Soviet counterparts share this view in their appraisal of the situation.

In modern war, should the imperialist unleash one, combat in cities would be inevitable.

This inevitability is significant to the U.S. Army and in particular to members of the Berlin Brigade.

Recently, the Berlin Brigade has been working on combat-in-cities techniques and helicopter operations have been a major portion of the project.

There are many techniques which can, if properly employed, greatly increase a unit's capability to successfully accomplish its mission. Concurrently, these techniques greatly increase the soldier's chances of survival during combat operations in built-up areas.

An offensive spirit is essential to all successful military operations. In 1971, Major General A. K. Shovkolovich of the Soviet Army wrote in "Combat Operations of the Motorized Rifle Battalion in the City,"

Combat-in-cities has an especially stubborn and fierce nature. Buildings or separate regions in a city may change hands several times. Aviation is adapted to the senior commander's plan; but infantry is the key to clearing buildings and fortifications. But in every case, every defended building must be a fortress inaccessible to the

enemy. The one who possesses the stronger moral qualities such as boldness, fortitude, endeavor and resourcefulness and knows procedures and methods for fighting in a city will be the victor.

It is the responsibility of all professionals within the U.S. Army to develop doctrine for fighting in cities which will ensure that the next victor is the American fighting soldier.

New doctrine for helicopter operations in built-up areas must take into consideration that:

•Since Vietnam the role of the helicopter has been in a quasi-twilight zone. Old doctrine is virtually useless because urban fighting and urban employment of helicopters were not used in Vietnam. A new approach is needed.

•There is no *viable* doctrine for helicopter operations in built-up areas.

Those of us who have flown and tried many of the techniques required in CIC fighting agree that safety and conservatism are obstacles and hurdles. However, as photographs accompanying this article indicate, the risks become normal and conservatism becomes realism.

As stated in FM 1-100, the mission of Army aviation is to augment the capability of the Army to conduct prompt and sustained combat operations on land. In the past (particularly in Vietnam) this meant high-flying command and control (C&C) ships, prepping landing zones, and flying above 1,500 feet in a "safe zone." We took air supremacy for granted. The helicopter meant mass formations and radio relay. This is not so today! None of the above apply to helicopter operations in built-up areas. The helicopter, although not born in Vietnam, matured in Vietnam—and to keep it from obsolescence a new prospective must be adopted.

What are the capabilities of the helicopter? There is no need to list them from the manual; suffice to say that reconnaissance and attack helicopters have a most definite role in a CIC environment. Lift ships have the standard delivery of troops and supplies. Of course, the delivery will never be routine due to the different shapes and sizes of the various rooftops.

There are limitations also—such as vulnerability on the ground to enemy actions (parking, refueling, and maintenance areas); vulnerability to enemy air-defense measures including enemy aircraft; high logistical support; and most of all, the effects of adverse weather and night operations.

Maybe I have temporarily lost the faith, but I cannot see such operations in a CIC environment due to confinements, buildings, and wire strikes.

Before discussing ongoing training within the Berlin Brigade, I would like to briefly address the attack helicopter role in CIC.

Attack helicopters should be attached down to the lowest possible level in most operations, even squad. Before everyone ponders too long on what I have just said, remember any method used will depend on the situation, with regard to tactics and techniques.

To reduce the vulnerability of the helicopter to small arms, antitank, and air-defense weapons will require the use of the relative inherent speed of each machine. Due to the *unique* situation in Berlin, attack helicopter techniques cannot be tested.

Current aviation doctrine recognizes the air-defense threat posed to Army aviation in a contemporary, conventional, mid-intensity (high threat) environment. For this reason, the concept of nap-of-the-earth (NOE) flying has been formulated. The question that surfaces is whether NOE is compatible with the CIC environment. To say the very least we have little experience in this area, certainly not in Vietnam, and it is shunned during peacetime in the United States and Europe.

Isn't it time we thought about helicopter operations in built-up areas? We will not be able to pass them or avoid them as old doctrine dictates. How do we answer the question, as to whether or not the helicopter has a role in combat-in-cities?

Condensed from an article by Major Alexander Woods, Jr. in the December 1976 issue of Aviation Digest. Photo furnished by Aviation Digest.

PETROLEUM'S ROLE IN NATIONAL SECURITY

Opinions expressed are those of the author and do not necessarily reflect official views or imply indorsement by the Department of Defense.

One can't deny that energy security is a central aspect of national security. Nor can one deny that the United States depends heavily on energy imports. Oil provides 46 percent of America's energy needs, and about 40 percent of this oil is now imported.

This energy dependence raises some key questions:

- How dependent is the national security of the United States on petroleum and petroleum imports?
- What possible scenarios face the United States if its offshore petroleum sources are interrupted?
- Will the United States and its allies have enough oil to successfully cope with threats or wars?
- The industrialized nations of the North Atlantic Treaty Organization (NATO) and Japan consume almost 70 percent of the world's energy. A major share of this consumption involves oil. In 1972, the European NATO countries used 14 percent of the world's oil without significant oil production. The United States consumed 32 percent while producing only 18 percent of the supply.

Of the countries with large reserves, only the United States is a net importer of oil. This is more striking

because U.S. oil production peaked in 1970 and has declined annually since. Even with production in Alaska and increased recovery from reserves through improved technology, the United States may have to import 53 percent of its oil needs by 1985.

The dependence of the European NATO countries is even greater. Italy, Great Britian, France, and the Federal Republic of Germany obtained respectively 78, 71, 68, and 57 percent of their 1973 oil needs from the Middle East. Great Britian is the only large European NATO country expected to become self-sufficient in oil. Only Norway is expected to become an oil exporter.

Several nations have large shares of the world's petroleum reserves. Saudi Arabia has about 25 percent. Kuwait has about 10.4 percent. Communist countries have a total of about 9.6 percent. Iran has about 9.4 percent. The United States has about 5.8 percent. Iraq has about 5.2 percent. In addition, several exporters have smaller shares that exceed their needs, such as Libya, Nigeria, and Venezuela.

Traditionally the United States has imported oil primarily from Western Hemisphere sources, mainly Canada and Venezuela, but new sources will be needed to meet increased demand. Although the United States received 75 percent of its important oil from Western Hemisphere sources in 1971, it is projected to obtain only 20 percent of its 1985 imports from these sources. Middle East sources are projected to supply 40 percent of U.S. oil imports in 1985, compared to 10 percent in 1971. Similarly, the United States is expected to increase oil receipts from African countries from 5 percent of 1971 imports to 21 percent in 1985.

Western Europe will depend even more on Middle East and African oil as consumption grows. Even with more North Sea production, about half of the energy needs of Western Europe will have to be imported in 1980.

Will exporters continue to supply the amount of oil needed? Obviously they recognize oil's potential as a political and economic weapon, and some are conserving their oil. Canada and Venezuela now limit exports, and Kuwait and Libya now restrict production. Sentiment for limiting production to the amount needed to produce required revenues has been noted in Saudi Arabia. Increased national control and reduced optimism for alternate energy sources are other factors encouraging exporters to conserve their oil. But exporters know that their new power and wealth are not enhanced in an economically depressed world or one on the brink of war over energy, so they probably will supply oil in the amounts needed by consumers. However, the economic and political costs of this oil will likely rise.

The Defense Department uses nearly 80 percent of the energy consumed by the U.S. Government, and oil provides 67 percent of the Department's energy needs. About 44 percent of the energy consumed by the Department is used in aircraft operations, and 40 percent is used by installations. In fiscal year 1976, the Air Force used 49 percent of the Department's consumption, the Navy used 29 percent, the Army used 19 percent, and the Marine Corps used 3 percent.

In World War II, the military used a third of the 5-million barrels of oil used daily by the United States, the oil provided about a third of U.S. energy needs. Petroleum products accounted for half of all supply shipments to U.S. forces. During the Korean War, U.S. oil consumption approached 8-million barrels daily, accounting for 42 percent of the Nation's energy. Military consumption during the Korean and Vietnam Wars averaged from 6 to 8 percent of the Nation's total.

Recent figures show that although the Defense Department's direct oil needs are now less than 3 percent of the Nation's consumption, oil is critically important to the Department, and the Department depends on foreign oil for its oversea requirements. Measures suggested to counter this include conservation and development of alternate energy sources. Also, recently enacted legislation directs production from the Naval Petroleum Reserves and authorizes the establishment of a strategic petroleum reserve to reduce the Nation's vulnerability of oil crises.

Since the Defense Department's petroleum requirements will depend on the threats with which it must deal, the petroleum needs may be estimated by considering possible oil supply interruption scenarios and corresponding Defense Department oil consumption rates.

Oil supply may be interrupted in peacetime or in wartime. Peacetime interruptions could result from labor strikes, earthquakes or other natural causes, loss at sea of supertankers, loss of ports or unloading facilities, and production limits or embargoes levied by exporters. Wartime interruptions could result from intraregional or interregional conflicts involving oil exporters and from interdictory actions by superpowers, other nations, or saboteurs to control or destroy oil production, storage, or shipping facilities. Nuclear or conventional warfare could be involved, and the conflicts could be of short or long duration.

The scenarios of a major nuclear war or a limited conventional war also merit little discussion in this context. A major nuclear war would be such a holocaust that a 1970 study concluded that the survivors would have enough oil resources and facilities left to sustain their crippled economy. Limited conventional conflicts similar to the Korean and Vietnam wars can be supported, as experience has shown. However, such conflicts may require either a fuel allocation program or production shifts to produce more jet fuel.

Although a complete cutoff of oil imports is improbable because of the diverse sources, and even though some shifting from petroleum to other fuels is possible, the vital role of oil in the economic and national security of the United States is emphasized by these projections. Further, if the United States aids its allies by sharing oil with them during a future crisis, then the extreme oil shortages projected could materialize.

Of the wartime scenarios, an intraregional or inter-

regional conflict wouldn't threaten the national security of the United States unless it became a party to the conflict. The diversity of sources, production facilities, and transportation links lowers the oil exporters' vulnerability to sabotage. Thus, regional disruptions would not reduce exports significantly. Oil-exporting parties to the conflict could stop exports, but they would then have to rely on financial reserves or on credit to support their military efforts. Since they are apt to be Third or Fourth World nations, this tactic seems improbable. Even if an Arab-Israeli war erupted, of the three probable combatants only the Palestinian irregulars would have a strong motive for stopping oil shipments by sabotage—to coerce Arab producers to take drastic measures against the United States or other allies of Israel. Barring the direct involvement of a superpower, regional conflicts are unlikely to substantially jeopardize oil exports.

If a superpower became directly involved in a Middle East war, regional interests would probably draw the opposition of the other superpower. A war between the NATO and Warsaw Pact countries would then be almost inevitable, with the focus shifting to Western Europe.

This scenario, of course, poses the greatest threat to the national security of the United States short of nuclear war. A recent study considers the demands of such a large-scale conventional war, global in scope but excluding attacks on the home territories of the United States and the Soviet Union. U.S. commitments are projected to reach 750,000 ground troops, 2,100 aircraft, and 550 ships, respectively requiring .125-, .35-, and .17-million barrels of petroleum per day. If other direct oil needs equaled present demand, about 1.3-million barrels would be needed daily for direct consumption by U.S. forces. Addition of indirect consumption raises the Defense Department's requirement to about 2-million barrels per day.

That figure equals 8.8 percent of the projected U.S. consumption rate in 1985, when imports may provide 53 percent of the Nation's oil needs. Middle East sources are predicted to supply 40 percent of this demand, while African sources are estimated to furnish 21 percent. These imports would be subject to interdiction by air and by sea, especially at choke points in sea lanes used by supertankers. However, if interruptions did not deny more than a third of these imports, then the interruptions would not severely impair the national security of the United States. Even with significant losses or denial of imported oil, the Nation's military forces could be supported. A recent evaluation of the risk to the national security of the United states because of wartime oil supply interruptions concluded that they would not endanger the functioning of the Nation's armed forces, although they could have a serious effect on the nation in general.

If significant NATO oil requirements were placed on the United States or if the scope of the conflict reached the U.S. mainland, then more severe problems would surface. NATO's oil needs would likely be from 10- to 13-million barrels per day during a war of the scale discussed. Measures required to compensate this demand might include rationing, which reduced U.S. gasoline consumption by 30 percent during World War II, the use of alternate fuels such as coal and nuclear energy, and the use of other energy sources that are now available but not economically feasible.

In summary, petroleum clearly plays a vital role in the national security of the United States. To protect itself from coercion by oil-exporting blocs, the United States should continue to seek self-sufficiency in energy and stockpile petroleum for use in emergencies. Further, the United States must maintain a strong military capability to protect its oil supply lines and to complement diplomatic efforts to maintain stability in the Middle East. Finally, conservation of energy should also be an element of a viable energy policy in the United States—a policy that promotes economic security and preserves national security.

Extracted from an article by Colonel Theodore G. Brna, USAR, in the January-February 1977 issue of Army Logistician.

MAINTAINABILITY OF THE XM-1

The overall combat effectiveness of a tank can be increased by making it easy to repair. A reduction in repair and maintenance downtime provides the equivalent of a larger force of tanks and gives the tank unit commander a higher proportion of available firepower than he would otherwise have.

Examined from the viewpoint of economics, those features that enhance battlefield effectiveness through the use of a larger portion of available equipment and crews also pay important dividends in peacetime life-cycle costs. The less time a tank must spend in the logistics pipeline (from organizational level through direct support and general support to depot level) for maintenance and repair the more available it is for operations and the less costly in time and dollars it is to maintain and repair.

The maintenance philosophy of the *XM-1* program has been to evaluate each operational requirement and design concept from the standpoint of organizational (including battlefield) repairability or replaceability. Emphasis has been placed on replaceability at the organizational level and repairability at the direct support level. The resulting system design provides a balanced response from all echelons of maintenance and incorporates many features that reduce maintenance time on the vehicle and improve bench repair capabilities at the direct support level.

The maintainability features include improved accessibility of major and minor components; improved fault isolation through built-in test equipment; modularization of electrical boxes by function; functional grouping of components and disconnects to facilitate removal and replacement; and standardization of fasteners, hydraulic fittings, and electrical connectors. Significant reductions in special tools and test equipment have also been achieved.

All engine compartment electrical, hydraulic, fuel, and mechanical interfaces are of the quick disconnect type and are grouped to reduce powerplant removal and replacement times. Engine- and transmission-mounted accessories and components; hydraulic pump; air, oil, and fuel filters; alternator; cooler fans and fan drive components; and most sensors and sending units have been located and mounted for easy replacement or service without powerplant removal. A trained crew has removed and replaced the powerplant of the *XM-1* prototype in only 12 minutes under ideal conditions using common handtools.

The *XM-1* AVCO Lycoming turbine engine powerplant, which is nearly 2,000 pounds lighter than a comparable diesel powerplant, can be removed or installed by a standard Army 5-ton wrecker without exceeding the wrecker's rated capacity. The final drives can also be replaced without powerplant removal.

Improved accessibility allows 65 percent of all engine compartment maintenance actions to be accomplished in 26 minutes on the *XM-1,* while a minimum of 4 hours is required for the *M-60A1-P1.*

Replacement of the main gun mount spring and piston is accomplished from inside the turret by using a special trolley-lifting mechanism that mounts on the inside turret roof. All parts can be removed through the loader's hatch, eliminating the need to remove the complete gun and mount from the turret. These features significantly reduce the repair time of the mount and recoil mechanism hardware. For example, replacement of a seal on the *XM-1* gun mount requires 5 hours compared to 16 hours for the *M-60A1-PI.*

The advanced torsion bar springs, developed from extensive experience with *M-60A1-PI* suspension systems, reduce suspension maintenance time because of the reduction in the number of components involved in disassembly and reassembly. In the event a bar is broken, it can be removed from either side of the vehicle. An aluminum tube seals the bar from exposure to the bilges, preventing the contamination that often hinders field replacement.

Built-in test equipment has been integrated into the operational hardware and software to monitor and report on the operational readiness of the *XM-1* from the start of a mission until its completion. Maintenance and diagnostic indicators, along with conventional instrumentation, provide the crew with continuous monitoring of the various systems. Early detection of a malfunction or the need for maintenance within a critical system is assured by means of warning lights placed so that they will be quickly noticed by the crewmember most associated with that function. The driver's maintenance monitor panel displays the condition of fluid levels, filters, batteries, electrical cable connectors, circuit breakers, and fire-extinguisher. This saves time before the engine is started. After engine start, the panel continuously monitors the status of the engine, transmission, fuel-water separator, air-cleaner filters, fuel pump operation, air induction system integrity, and other functions. The convenience of this panel arrangement offers greater assurance that these checks will be made and provides assistance in fault diagnosis of the powerplant and other automotive systems.

The main consideration in designing the fault-isolation features was to keep them as simple and foolproof as possible. This facilitates maintenance at the organizational support level. Diagnostic information required for fault isolation of malfunctioning electrical systems is provided through transducers or test points built into all panels and black boxes. Keyed electrical connectors are used to reduce the possibility of harness cross-connection. All electronic boxes are modularized by function and are rack-mounted. Front-mounted test connectors further reduce diagnostic, removal, and replacement time. The use of the front-mounted boxes and test connectors eliminates the need to disconnect the electronic box from the system to perform fault diagnosis.

Internal engine failures can be corrected by modular replacement. The turbine engine is composed of three replaceable modules—the forward, rear, and accessory gearbox—which can be replaced at direct support maintenance. An engine direct support test set has the capability of isolating the faulty module, which can then be replaced without exposing critical bearings or seals to contamination and without the need for critical realignments.

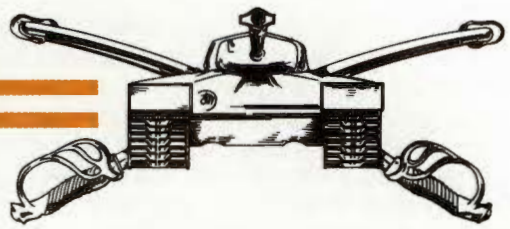
Improved transmission diagnosis allows fault isolation to valves and solenoids through transducers. These items typically constitute almost 50 percent of transmission failures and can be replaced on the *XM-1* without removing the transmission from the vehicle. The return of powerplants and transmissions to the depot for repair can be significantly reduced.

Standardization has played a key role in improving the maintainability of the *XM-1.* A thorough study was conducted to determine the minimum number of sizes and types of mechanical fasteners, hydraulic fittings, and electrical connectors that should be used in the *XM-1* design. As an example of the impact of this standardization program, only three different socket sizes are required perform maintenance on the total *XM-1* suspension system.

Standardization of fasteners, fittings, and connectors; fault isolation through built-in test equipment and carry-on equipment; modularization of electrical and fire control boxes; and engine repair by module replacement at the direct support level have all combined to reduce special tools and test equipment.

Condensed from an article by Robert M. Ament and Robert T. Lentz in the Army Logistician, March-April 1977.

OPMD - EPMD ARMOR



Officer Records Answering Service

Active duty commissioned and warrant officers who have questions about their official records at the Military Personnel Center's (MILPERCEN) Personnel Records Division may now call a central telephone exchange to obtain prompt responses to their questions. Types of questions anticipated are those relating to officer efficiency reports (OER), status of appeals, official photographs, awards and other documents (as authorized in AR 640-10) which are placed in officers' Official Military Personnel Files.

The system consists of recording equipment capable of receiving queries 24 hours a day, 7 days a week. The centralized system also will eliminate misdirected calls which slow the processing of requests.

Officers may call AUTOVON 221-8792 or commercial (202) 325-8792 to record their questions. To assist MILPERCEN in processing calls, officers are asked to call *only* this number with records-related questions. On a daily basis, calls are transferred to worksheets and distributed to appropriate action officers. This ensures a maximum number of questions being answered with a minimum number of delays and interruptions.

When a call is placed, a brief recorded statement announces that the Officer Personnel Records Telephone Inquiry/Answering Service has been reached. The caller then is asked to state his or her full name (last names also may be spelled phonetically), rank, Social Security number, military address and AUTOVON telephone number. The caller's question then should be asked. Questions should be clearly stated and kept as brief as possible. However, queries requesting only a return call will not be answered.

Exceptionally long or technically complex questions should be directed in writing to MILPERCEN. Correspondence should be addressed to Commander, U.S.A. MILPERCEN, ATTN: DAPC-PSR-R, 200 Stovall St., Alexandria, VA 22332.

Additionally, requests for documents or microfiche files should not be made telephonically. These requests must be in writing and a small reproduction fee will be charged. Microfiche copies cost $2 (5¢ for each additional copy). For paper copies, the charge is $2 for the first six pages; 5¢ for each additional page. Officers should not send money with their requests. MILPERCEN will include a bill for the necessary amount with the documents.

Other requests inappropriate for the system are those requesting service computations (officers should contact their servicing military personnel office [MILPO] in writing) or promotion reconsideration (written requests should be addressed to MILPERCEN, ATTN: DAPC-MSS-P).

Advance Notice for Records Review

As of 28 March 1977, warrant and commissioned officers planning to visit MILPERCEN to review their Official Military Personnel Files (OMPF's) must call for an appointment at least three working days before their visit. The change is a result of reduced personnel resources in MILPERCEN's Records Review Unit and an increased demand for OMPF's during the peak selection board season.

It is important to recognize that a request for a review does not ensure the availability of the officer's records. Therefore, it is important that the requesting officer leave a duty phone number with MILPERCEN at the time the appointment is made. If the records are not obtainable for the desired time, the officer will be contacted and a new appointment will be made.

To make appointments, contact the Record Review Union, AUTOVON 221-9618/9619, Commercial (202) 325-9618/9619.

PCS May Increase Service Obligation

Sometimes decisions are made and actions taken without an awareness of what an Army regulation may dictate on the matter. For example, many officers apparently do not realize that a permanent change of station (PCS) probably will increase their service obligation. The general rule is that a PCS move commits an officer to some extension of service.

Specifically, a PCS move to a CONUS location, other than for separation, carries an automatic one-year service obligation at the new duty station (paragraph 3-75a (2) (d), AR 635-100).

PCS to an overseas location incurs an obligation to complete the current prescribed tour for the area of assignment, unless the officer is released voluntarily from active duty or separated under policies prescribed in AR 635-100.

While a PCS move within or to CONUS does not affect retirement, service obligations stemming from an overseas PCS may. Officers on an unaccompanied overseas tour must serve 12 months before retirement. On an accompanied overseas tour, 5/6 of the prescribed tour length must be completed before retirement. However, these service obligations do not apply to non-Regular Army officers who apply for voluntary retirement in conjunction with release from active duty under the provisions of Chapter 3 of AR 635-100.

An officer who does not desire to accept a PCS-incurred service obligation has the option of exercising the right of separating from the service—if no other service obligations are in force at the time. To decline the PCS, the option to resign, retire or request release from active duty must be exercised in writing 30 days after receiving alert or assignment instructions. The assignment remains firm and compliance with orders is required if the 30-day limit is not met.

An officer who decides to exercise the option of separating from service rather than complying with a PCS move should, upon receipt of initial alert, immediately notify his or her specialty manager (assignment officer) at

MILPERCEN. The specialty manger can lend assistance in the preparation of required paper work and can notify the appropriate office which will receive the individual's request for separation.

It is important to remember that all applications for separation are considered on an individual basis before approval is granted. If dissapproved for any reason, such as an unfilled prior service obligation, compliance with orders will be required.

Officers unsure about any existing service obligations or obligations incurred as a result of PCS orders can get clarification from their specialty managers. Clarification of any current or future service obligations will give the individual officer the facts with which to make a sound decision.

Change of Commissioned Officer Year Group

Year group identities of some commissioned officers are being changed to align the identity with the new fiscal year (FY) definition. Until this year, the FY has been defined as the period from 1 July through 30 June. Changes to the budget cycle have prompted a change to the definition of the FY. The FY now is defined as that period beginning 1 October and terminating 30 September. (On 1 October 76, the Army entered into FY 77.) This change to the definition of the FY has prompted the change to the year group identities for certain officers.

The administrative change to officer year group identities has no impact on officers who entered on active duty (or who have a Regular Army adjusted date) during the period 1 October through 30 June of a year. For example, an officer who entered on active duty 5 October 60 has, and will continue to have, an administrative year group identity of 1961. However, officers with entry dates during the period 1 July through 30 September are now identified within a year group one year earlier. For example, an officer who entered on active duty 20 September 60 has had a year group identity of 1961. Effective with the redefinition of the FY, the officer's year group identity has been changed to 1960.

The administrative change to year group identities will have no impact on an officer's professional development, promotion eligiblity, or assignment considerations. The changes, which have been made to the Officer Master File and will appear on Officer Record Briefs printed on or after 1 October 76, are used for officer strength management.

EPMD

Long vs Short Oversea Tours

"I have just completed a 3 year tour in Europe, so I will not have to return to Europe again till I have served in a short tour area." This is the conception some service members in the field seem to have, but it is not true. Although this would be ideal for service members in planning for their future assignments, it is not often possible. Long tour areas (basically Europe) have a greater requirement for Armor personnel than do short tour areas (Korea). Therefore, Armor service members can expect more assignments in long tour areas. This, of course, is not the case in every situation. Assignments are made primarily on the Army's needs and priorities by grade and MOS, and, in some cases, special skill qualifications such as Drill Sergeants and Master Gunners. One of the most important factors when an assignment is made is that the person nominated for the assignment be available for reassignment in accordance with AR 614-200. Also, if the assignment requires special qualifications, the nominated service member must meet the qualifications or be able to obtain those qualifications in time to fill the requirement.

RECOGNITION QUIZ ANSWERS

Our thanks go to Captain Randy L. Everson, Captain John H. Merritt, Captain Michael D. Dickerson, Chief Warrant Officer 2 Richard K. Davey, First Lieutenant Norman G. Dean III, First Lieutenant Paul D. Peterson, Second Lieutenant Fred W. Burt, Staff Sergeant Donald Parker, Staff Sergeant Gary J. Post, and Civilian Armor Enthusiast Gary W. Brown, each of whom correctly identified picture number 4 in the March-April 1977 version of the Recognition Quiz (above). The tank is a Soviet *T-55* as stated in the quiz answers, but more accurately is a *modified T-55*. This tank has been modified by the Israelis by adding a 105-mm. main gun (note position of the bore evacuator), adding a .30 caliber Browning machinegun to the turret and the placement of the radio antenna on the turret rear. Also, the crewmen visible on the tank are wearing U.S. CVC helmets.

It is refreshing to note that such a serious interest is being taken in the vital area of vehicle recognition, and that *ARMOR* is helping to foster thought and study in this area.

We will be more attentive in the future as to what is really what!

—Editor

The answers to this month's quiz are:

1) **Soviet T-62**
2) **Soviet T-34**
3) **France AMX-13**
4) **U.S. M-60A2**
5) **Britian Centurion**
6) **Soviet ASU-85**

NOTES

U.S. ARMOR ASSOCIATION OFFICERS AND EXECUTIVE COUNCIL 1977-1978

The Officers and Executive Council elected at the Armor Association business meeting held 19 May 1977 were:

OFFICERS

President	Gen. Bruce Palmer, USA, Ret.
1st Vice Pres.	LTG Donald H. Cowles, USA, Ret.
2nd Vice Pres.	MG George S. Patton
3d Vice Pres.	MG John W. McEnery

EXECUTIVE COUNCIL

Gen. Officer	BG David K. Doyle (Ft. Knox)
1Fld. Grade	Col. Robert F. Molinelli (Pentagon)
2 Fld. Grade	Col. Thomas E. Williams (1st Bde. Ft. Knox)
3 Fld. Grade	Col. John L. Waldrip (49th AD, TX-ANG)
4 Fld. Grade	Col. Robert W. Fisher (Ft. Lee)
5 Fld. Grade	LTC W. Judson Walton (Ch. Armor Br.)
6 Fld. Grade	LTC Peter E. Genovese (50th AD, NJ-ANG)
7 Fld. Grade	Maj. Geoffrey S. Moakley (USMA)
1 Co. Grade	Cpt. Timothy J. Reischl (HQ Ft. Hood)
2 Co. Grade	Cpt. Herman G. Kafura (3d ACR-Ft. Bliss)
1 Sr. NCO	CSM William R. Price (Ft. Knox)
2 Sr. NCO	CSM Walter W. Krueger (1st Cav. Div. Ft. Hood)
Member-at-Large	LTC Clarence W. Pratt, USA, Ret.

DRAWING WINNERS

Winners of the drawing held as part of the Armor Conference in May were:

Grand Prize (Hawkins Rifle) .. LTC John K. Owens, Jr.
Second Prize (Dueling Pistol) .. LTC John D. Borgman
Third Prize (Needlepoint Tray) ..... CPT James Tutt
Fourth Prize (Buck Knife) ..... CPT C. A. Poveda
Fifth Prize (3-year *ARMOR* subscription and Association Plaque) ..... COL Robert E. Butler

DRAPER TROPHY

Production of copies of the Goodrich Riding Trophy, to be presented as the Draper Combat Leadership Award, is nearing completion. The artist expects to have the first set of ten bronze replicas on a white marble base available for delivery within 60 days. Plans still call for each Armored or Mechanized Infantry Division, Separate Armor/Mechanized Brigade, or Armored Cavalry Regiment, (active, reserve and National Guard) desiring to initiate Draper Competition to receive the trophies. The unit designation will be cast in raised bronze letters at the base of the trophy. The photograph shows two of the wax models which will be used to cast the first bronze replicas. During the production each trophy will require a separate wax model. The trophies are to be presented without charge to requesting units. Further information may be obtained by contacting the Custodian, Draper Combat Leadership Trust Fund, ATTN: ATSB-DS-MO, U.S. Army Armor School, Fort Knox, KY 40121.

NEW SOVIET TRANSPORT VEHICLE

A 3-ton, platform transport truck is the latest Soviet vehicle designed for navigation of Siberia's tundra and permafrost areas. The truck has two rows of seats for the crew and is equipped with a windproof, heated cab. The drive system consists of 8 wide, low-pressure air rollers made of rubber with an internal pressure of .5- to 1-pound per-square-inch. Each air roller has an individual motor, allowing the 20-horsepower-per-ton vehicle to travel 60 kilometers-per-hour (approximately 37 m.p.h.) on streets and roads, and 10 to 20 kilometers-per-hour (approximately 6 to 12 m.p.h.) on open terrain.—*Kampftruppen.* ▲

BOOKS

GRANT AND LEE: A Study in Personality and Leadership. by Major General J.F.C. Fuller. Bloomington, IN: Indiana University Press, 1975. 334 pages. $10.50.

Most book collectors enjoy returning to an old book, like an old friend, to renew acquaintance, to read again its particularly well-turned phrasing, and to relive a satisfying relationship. This is such a book. Written in 1957, it was republished as part of the Civil War Centennial Series. A fine choice, too, for this is not just another history book, not another dry listing of names and places and skirmishes. This is a broad but penetrating look at two men, a look at their leadership, and an objective comparison of their human characteristics.

Even at this time, it's hard for some Americans to be objective about the Civil War, not so much because of any personal ties but more because of the attitudes, folklore and beliefs born of legend and absorbed in our youth. It's hard to be objective about Grant and Lee. It's interesting, therefore, to learn that this inbred bias isn't limited to Americans; even this British author wrote: "Until a few years ago I accepted the conventional point of view that Grant was a butcher and Lee one of the greatest generals this world had ever seen. I accepted this because I had been taught that this was so."

Fuller is well known to most older military readers, but he may be less so or unknown to our young soldiers. Some of his work may be unstylish or outdated, but this book is enduring. It's simple, it's clear, it's direct. It's well worth the cost and time to read this fine characterization of two great American soldiers. It's also a useful guide for young aspiring leaders.

Fuller examines the personalities and generalship of the two commanders. The war, while ever present, serves only as a backdrop or a canvas on which the author sketches and highlights each facet. We sense the battles, the triumphs and defeats, but only as adjuncts to watching the strengths and weaknesses of the leaders evolve, take shape, and finally dominate the scene. It's a fine history lesson; we are reminded that many great events are greated and resolved not by some sort of mythical supermen, but by human beings, by people just like us or those we know, pretty ordinary people who rise up in times of stress to accomplish extraordinary things. This is a thoughtful, very well written book, and you'll enjoy it.

Colonel (Retired) John R. Byers

VOLUNTEERS, ONE AND ALL by Bruce Bliven, Jr. Reader's Digest Press. 1976. 170 pages. $7.95.

Volunteers, One and All is a civilian's view of the problems placed on the Department of Defense, and particularly the Army, when President Nixon did not ask for removal of the Selective Service Act.

Mr. Bruce Bliven leads the reader through the numbers game—1,000 volunteers a day, the quality problem—high school graduate or better, and then the social problems—drugs, race, and women in the Services. In spite of all the forecasts of gloom he is surprised to report that the Army and the other Services are succeeding with both the quantity of volunteers and in their quality. What's more important, he sees the Services satisfying an inner need demanded by these young men and women who are searching to better themselves and their lives. He is equally complimentary of the Army's efforts in equal opportunity for minorities and women.

The book is tightly and smoothly written in delightful *New Yorker* magazine style. The military reader will be upset with the license the author takes with time. He tends to bounce between the present and pre-draft.

The chapters, "What Are the Armed Forces For?" and "About How Much Do We Want to Spend?" are valuable and should help explain to the average American, in layman's terms, the realities of the military. Officers, especially those returning to troop duty, should read this book to discover the fine soldiers with whom they will serve—and how much more this soldier expects of his leaders.

Colonel C. A. Mitchell
C&S Dept, USAARMS

CUSTER IN TEXAS by John M. Carroll. Sol Lewis, New York. 1975. 228 pages. $15.00.

Custer in Texas is not a tale of war. Rather, the book relates the story of a 25 year old major general who, for five months, acted as a public administrator in occupied Texas. Custer's Cavalry division was composed of volunteers who had not served out their legal enlistments, but felt their obligation was complete. The young general not only had to discipline his own division, but he tried to establish some harmony between the returning Confederates, local citizens, and his command. After all, his orders were to treat the Confederates in a concilliatory manner and to insure strict discipline.

The book's theme is to clear up the controversial tales of Custer during this period. The author states in the beginning that he is pro-Custer, but he presents a logical defense by directing interest from the incident toward the basic causes and philosophies which prompted the incident. Mrs. George A. (Libbie) Custer's book, *Tenting on the Plains,* is used as a central narrative. This story is interrupted to insert documents, letters, or writings of others to refute or support her story. Included in these writings are three relatively unknown, but key writings; Dr. Charles H. Lothrop's, *History of the First Regiment of Iowa's Cavalry* (also an appendix), E. C. West's, *History of Second Wisconsin Cavalry,* and T. S. Cogley's, *History of Seventh Indiana Cavalry.* The appendix also provides the "Adjutant General's Report to the Governor of Iowa on the First Cavalry," and General Custer's Report to Committee on Reconstruction, U.S. Congress.

Overall, the various documents support General Custer's actions and reveal him to be a successful military leader and able public administrator who was respected by both sides. After all, Texas, just 10 years later, was the only state to pass a Resolution of Condolence after the Little Big Horn. As previously stated, the book is not of war, but the story and lessons of the book will be of interest to students of General Custer, the Cavalry, Reconstruction, and to some extent, the War of Rebellion.

The Late Colonel Carl M. Putnam

GENERAL CUSTER AND THE BATTLE OF THE LITTLE BIG HORN: THE FEDERAL VIEW Edited by John M. Carroll. The Gary Owen Press, New Jersey. 1976. 177 pages. $19.50 (Centennial Edition).

This is another of the very fine books by John Carroll in the Custeriana Series. It does not open any new corridors of investigation, nor does it pretend to, but it does provide a valuable service to the historian, Custer buff, and researcher by compiling the many official federal reports and commentaries in a single volume. These documents are presently located in various archives, libraries and collections spread across America, and only a few are readily available.

The papers start with Senate Executive Document No. 52, 44th Congress, transmitting to the Senate a letter from the Secretary of the Interior concerning recent disturbances in the Sioux reservation. The letter is dated 25 April 1876, predating the Little Big Horn battle by 2 months, and forwards official correspondence going back to November 1875. These letters clearly show the growing crisis and set the stage for the subsequent reports.

The book includes minutely detailed field reports of Engineer lieutenants accompanying various exploratory and surveying expeditions in the Dakotas (including Custer's), critiques by Generals Sheridan, Crook, Terry, and Sherman plus numerous other officers, and the battle reports of the Secretaries of War and Interior. An interesting part is the series of cost accounting reports and the letter from President Hayes on the overall cost of the "late Sioux war—" $2,312,531.24.

The great advantage of this book is the new access to unknown or unobtainable information. These documents have never before been published in a single reference, and many have never been reprinted since their initial appearance. The book also happens to be a very handsome one (typical of Carroll), well organized, easy to read, and includes some 25 sketches by new artists.

Colonel (Retired) John R. Byers

PRIVATE SOLDIER: Life In The Army 1943-1946. by Curtis W. Tarr. Carlton Press, Inc., 1976. 175 pages. $6.75.

Curtis W. Tarr, whose service to the country includes duty as Assistant Secretary of the Air Force, Manpower and Reserve Affairs; Director of the Selective Service System and Undersecretary of State for Security Assistance, looks back to April 1943 when he answered the familiar greeting and joined the largest armed force this nation has ever assembled. He has produced a unique book in charting his autobiography of 1943 through 1946.

While he warns the reader that his story is his own and he makes no effort to generalize, one cannot be but awed by the richness of a country that could field a force of 8-million men and women. It is uncontestable from his subsequent record that Mr. Tarr is a cut above the average. Nonetheless, his encounters depict the young American of the time and gives a balanced portrait of the time.

History buffs and contemporary artillerymen will be intrigued by his description of the 491st Armored Field Artillery Battalion, 11th Armored Division, as it trained, deployed and fought from the Bulge through Austria. The realism of the training and the rapid fire of the batteries serve us as examples.

His descriptions of lines, boredom and leaders—effective and ineffective—serve as a strong reminder to us that the soldier is a human being and his time is a precious commodity requiring constant attention.

Probably the most important message of this book is Mr. Tarr's comparison is how the crusade of World War II differs from the uncertain call that summons our youth today. Indeed, this requires high professionalism of all of us to insure that once summoned this soldier realizes his important in the nation's security and his contribution to the nation's vigilance without which there will be no nation.

Colonel C. A. Mitchell
USAARMS

THE JOINT CHIEFS OF STAFF—THE FIRST TWENTY-FIVE YEARS by Lawrence J. Korb. Indiana University Press. 1976. 210 pages. $10.95.

As a new administration takes over the rudder of the ship of state, Lawrence J. Korb, Professor of Management at the U.S. Naval War College, provides us with a detailed examination of the Joint Chiefs of Staff since their inception in 1947.

The first chapter is a general analysis of the JCS's place in the American Political System and outlining the functions and prerogatives of its members. Chapter 2 discusses the individual members of the JCS and gives their military background, including an appreciation of how they achieved their ultimate military success. In the next two chapters, Mr. Korb walks us through the past quarter century focusing on the role the JCS has played in the development of policy. The final chapter gives a prognosis of the future impact of this body.

The military reader will be shocked to see in hard print what little impact the JCS — the military — have had on national policy in the past. There can be little doubt that in our history, and in the foreseeable future, the military will be subordinate to the civilian administration in power, but the portrait of the Chiefs as a conservative group of parochialists will not be attractive. More unsettling will be the recognition that the JCS is a committee organized along federalist lines which has little hope of evolving into a strong union as has the nation. The author vividly brings this to light by examining the budget process and the crises and wars the nation has come through since the establishment of the JCS.

The book is an excellent primer for the officer being assigned to the Pentagon for the first time. It's great value is in the clear and simple description of the JCS process — all the flambets, buffs, and greens — and the true status of power in Washington.

Colonel C. A. Mitchell
C&S Dept., USAARMS

THE 7TH QUEEN'S OWN HUSSARS by J.M. Brereton. Edited by LTG Sir Brian Horrocks. (Famous Regiments Series). Leo Cooper, Ltd, London. 221 pages. $15.00.

This book dramatically portrays how the esprit de corps of a British Cavalry Regiment developed over a period of 270 years, during both peacetime and in war against the Sovereign's enemies. It is fascinating to read about the intrigues, squabbles, traditions, gallantry, and discipline which were necessary to insure the regiment's survival during two and three-quarter centuries.

Mr. Brereton captures the spicy flavor of the old cavalry, the intense "family" pride and loyalty to the Regiment, the selfless gallantry of officers and men and the innate sense of humor so precious to the British. It is not difficult to understand why the "Saucy Seventh" attracted "young fellows whose hearts beat high to tread the paths of glory..." A valuable book for the reader who wants to understand what lies behind traditions, and is indeed still very close to the surface of a modern British Cavalry Regiment.

Major J.A. Wright
MBE, BEO Fort Knox ▲

☆ U.S. GOVERNMENT PRINTING OFFICE: 1977—757-041/2

ARMOR the Magazine of Mobile Warfare

U.S. ARMY ARMOR SCHOOL ▲ ATSB-MAG, Fort Knox, Kentucky 40121

LETTER FROM THE EDITOR

Time passes and it's time for this Editor-in-Chief to move on to other things. The past 4 years have been a highlight of my eventful 25 years in Armor.

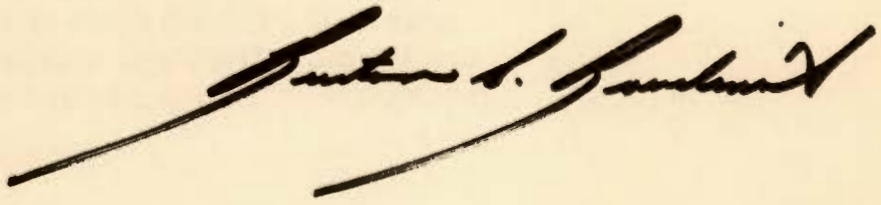
I love this old journal and I feel very privileged to have been its keeper and to have talked and corresponded with a great many fine people throughout the world. Such a relationship has been a valuable and coveted experience to me.

ARMOR is an important forum for the Armor community but it is more than that. It is the voice of the professional who is interested in mobile warfare and its many aspects. It is a vehicle to express ideas and views. So please read it, write to it, and for it. Keep it viable for another 90 years.

ARMOR's staff is well trained and dedicated to its purpose. I'm sure our new Editor-in-Chief will take our journal onward and upward just as each of us have tried to do since 1888--all 31 of us.

My thanks to so many of you for your unselfish support.

Faithfully,



Coming in ARMOR

"THE LEGION ETRANGERE"

In his article detailing the beginnings, traditions and exploits of the French Foreign Legion, Lieutenant Colonel Claude B. DeBisschop, French Liaison Officer to the U.S. Army Armor School, debunks some of the myths surrounding that famous organization.

"A CASE FOR BATTLEFIELD RECOVERY"

Major Dundas S. Orr, Jr. details the need for improved recovery techniques saying, "the outcome of the next war may hinge on our ability to regenerate combat power through replacement of weapons systems."

"COMBAT PISTOL"

Captain Lynn E. Lanzoni says that tankers need to improve their skills with the .45 caliber pistol and suggests new combat shooting techniques, qualifying courses, and training methods that should enable the tanker to remain "the quick and the alive."

"THE INDISPENSABLE SCOUT"

In an article which will be phased over several issues of ARMOR, BG Doyle looks at the demand to "see the battlefield" and addresses the role that both ground and air scouts play in accomplishing that mission.

ARMOR

september-october 1977

THE INDISPENSABLE SCOUT

US 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."

Cover

The role and duties of one of the vital members of the combined-arms team are discussed in the article, "The Indispensable Scout," by Brigadier General David K. Doyle, USAARMS Assistant Commandant, which begins on page 10.

September-October 1977
Vol. LXXXVI No. 5

ARMOR

the Magazine of Mobile Warfare

ARMOR Magazine is published bi-monthly by the U.S. Army Armor School at 4401 Vine Grove Road, Fort Knox, Kentucky 40121, to stimulate interest in, provoke thought on, and provide an open forum for decorous discussion of professional matters. Unless otherwise stated, material does not represent official policy, thinking or endorsement by any agency of the U.S. Army. Use of funds for the printing of this publication have been approved by the Department of the Army, 23 December 1975.

SUBSCRIPTION RATES: Individual subscriptions to ARMOR are available through the U.S. Armor Association, Post Office Box O, Fort Knox, Kentucky 40121. **Domestic:** $8.00 one year, $14.00 two years, $20.00 three years. **Foreign:** $10.00 one year, $18.00 two years, $26.00 three years. Single copies: $1.50.

CORRESPONDENCE: Address all correspondence to U.S. Army Armor School, ATTN: ATSB-MAG, Fort Knox, Kentucky 40121. (Telephone: Autovon 464-2249 or Commercial (502) 624-2249).

POSTMASTER: Controlled circulation postage paid at Louisville, Kentucky, Department of the Army, DOD 314.

ARMOR may be forwarded to military personnel whose change of address is caused by official orders (except to APO addresses) without payment of additional postage. The subscriber must notify the postmaster.

LETTERS

A Clarification

Dear Sir:

In my letter, "Tank Main Gun Weapons" (May-June 1977), I evidently didn't make two parts of the chart clear. In the *size* column, the first number is the bore size and the second number is the projectile size; both are in millimeters. In the *466-mm. (65)* column, the German 120 and U.S. *XM-735E2* have the range stated at which they penetrated the NATO triple heavy target, which is 466-mm. effective armor on a 65-degree angle. All other weapons have their maximum penetration, in millimeters, stated at 65 degrees, as they can't penetrate the NATO triple heavy target. New information has come in and the new UK 120-mm. gun has out-penetrated the German 120 and U.S. *XM-774* round, which still hasn't beaten the German 120. All efforts should be directed to using the UK 120-mm. now.

CHRISTOPHER F. SCHNEIDER
Sergeant, U.S. Army

Jolon, CA 93928

Ground Elements and NOE

Dear Sir:

The article, "Realism in Field Exercises," published in the May-June 1977 issue brought out several significant points concerning tank main-gun engagements and survivability on the battlefield. These areas, recently discovered in tests at Fort Hood, have already been addressed in another manner for attack helicopter employment. Since the 1973 October War, aviators have been made increasingly aware of the air-defense threat and specifically the *ZSU-23-4*. The Field Manual (FM) 1-1 "Terrain Flying" addresses that topic and Majors Blalock and Mullis amplify the point that nap-of-the-earth not only applies to aviation, but equally well to ground combat elements.

This interrelationship between air and ground tactical units in a training environment suggests a better understanding of their integration for wartime use. Perhaps the tank, cavalry and infantry platoon leader should read the pertinent parts of FM 1-1 to evaluate better his use of the terrain for battle drill. It is significant to note that not only in actual combat, but in training as well, attack helicopter and armored units have discovered similar problems and each is at a different stage in independently reaching a solution. It cannot be made too clear that there are important lessons to be learned by each from the publications of the other.

ROBERT HEFFRON
Captain, Armor

APO NY 09146

Fighter Helicopter

Dear Sir:

I have a rather heretical thought that I thought I might share with you. In any medium- to high-intensity war between NATO and Warsaw Pact forces, ground-support aircraft and attack helicopters are going to be more concerned with their opposite numbers than their "primary" task. *A-10's* will be shooting at *Fitters*, AAH's will be shooting at *Hinds*, and ground troops will have to support themselves. I realize that this thought will probably be poorly received by those whose task it is to delegate operational employment of support aircraft, but it should be considered.

On NATO's side, aircraft of any type will be in short supply indeed, and air commanders will look on ground force requests for *F-16s* to drive off *Hind* with extreme disfavor; "You have helicopters with guns, let them do it!"

We should, therefore, develop a "fighter" version of the Bahnsen light attack helicopter-experimental (LAHX) This would be a small, fast, maneuverable, single-seater helicopter armed with a 20-mm.-cannon (*Marquardt* or *Vulcan*), with as many *Sidewinder*-type antiaircraft missiles as can be hung on without seriously degrading performance.

The light fighter helicopter-experimental (LFHX) would be able to deal with *all* opposition helicopters and light attack fixed-wing aircraft. In addition, any "Threat," i.e. Soviet, high performance aircraft that leaves its own optimum performance envelope would also be vulnerable. Remember what happened to the *MIG 15* (Korea 1951) that tried to shoot down an *L-19?*

ROY L. WILSON

Harlem GA 30814

More on OER's

Dear Sir:

I have read, with great interest, Lieutenant Colonel Appel's, "Retention of Non-Water Walkers" (May-June 1977). I agree with him wholeheartedly. We have an urgent need for middle managers, and in that area, we are no different than private industry which has come to recognize that fact.

Captain Wesely hits another ridiculous game we play. The OER system is useless. Certainly numerical ratings based upon a requirement to meet or exceed a mean score have no validity. In fact, these scores do a serious injustice to those officers who are truly outstanding. The captain is right: until a better system is devised, let's admit the failure of this one and SCRAP IT!

ALBERT L. DUX
Lieutenant Colonel, FA, NYARNG

Bronx, NY 10468

Anatomy of a Battle

Dear Sir:

In the January-February edition, there appeared a book review of *BATTLE* by Major Kenneth Macksey, RTR (published apparently in the U.S.A. as *ANATOMY OF A BATTLE).* While not unfavorable, this review could be accused of indulging in the well known, damning-with-faint-praise ploy. The reviewer contended that there was little to offer by way of military education in this book. I beg to differ; in my view and that of other officers of the Australian Armoured Corps far better qualified than I, it is an excellent supplement to tactical training. In an army as small as ours, the opportunities for junior to field grade officers—lieutenants to majors—to take part or observe exercises at the battalion/squadron (U.S. troop) level are rather limited—hence the experience of the sort of battle procedure described in this book is small. Much time is spent on courses (such as TAC 3 or Corps 3 tactical courses for qualification to the rank of major) TEWTS (tactical exercises without troops) and CPX's describing battle procedure from warning orders through recces and planning to deployment, etc. As the battle procedure used by the Australian Army does not differ significantly from that of the British Army of 1944 as described in this book, a careful reading of it can make clear and *interesting,* a subject which is often dull as hell in lectures! Besides, it's a bloody good yarn!

LEWIS EVANS
Major, RAAC

Australia

Change for the ACR

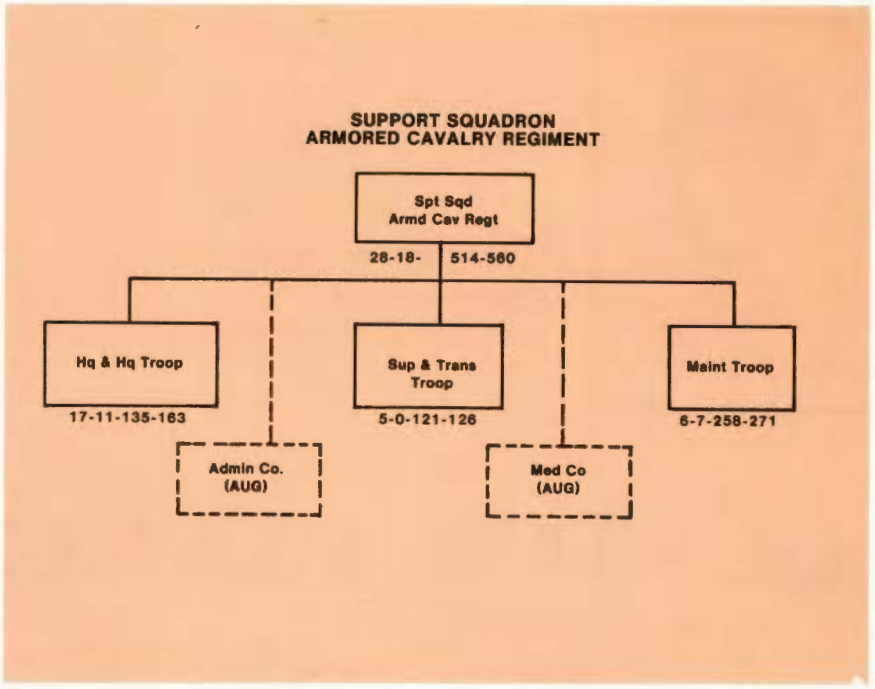
Dear Sir:

Sometime back, I wrote a small article, which you saw fit to publish, in which I described work being directed toward development of an organic combat service support element for the Armored Cavalry Regiment (ACR). I thought it might be of some interest to your readers to know that the entire package which includes the organizational structure and concept of operations for a support squadron has been forwarded to TRADOC for approval. The final organization only slightly resembles the original proposal as depicted in the article. What was submitted is a highly mobile support force of about 560 people which has the capability to move with the ACR and sustain its combat operations. The Cav types—"If you ain't Cav, you ain't"—insisted we call the element a squadron, so that's the way it is; a support squadron with a headquarters troop, a supply and transportation troop, and a maintenance troop. Under the recommended concept of logistics support, the supply and transportation (S&T) troop provides a combination of unit and supply point distribution to the ACR. A major change to current methods is that the combat squadrons will no longer have to go all the way back to the Corps ammunition supply point (ASP) for ammunition. The S&T troop is responsible for obtaining ammunition and providing a transfer point for the squadrons at the regimental trains area. What a savings in turn-around time for the guys putting ammo in the tanks! The maintenance troop operates a primary facility in the regimental trains area and provides dedicated forward support teams to each of the combat squadrons.

This organizational structure and concept of employment for the support squadron was evaluated, and although some changes were made, it confirmed the capability of the support squadron to provide effective and efficient direct support to the regiment. The proposed support squadron certainly represents a viable alternative to the combat service support (CSS) currently provided by Corps Support Command (COSCOM) units for an ACR. For the first time, the ACR commander has been given the capability to sustain the combat effectiveness of the regiment in much the same manner as currently enjoyed at the division and separate brigade level. Spaces have been identified within current COSCOM support units which probably will be used to staff the support squadron and work in this area is expected to be forthcoming. In the meantime—look for this important change to the ACR.

GEORGE R. ALBERT
Logistics Specialist

Fort Lee, VA 23801



Call a Spade a Spade

Dear Sir:

As an armored fighting vehicle (AFV) and military weapons enthusiast, I look forward to receiving each issue of *ARMOR*. I have noticed something that I'd like to bring to your attention. Why do some of your authors refer to the Russians as the "Threat?" Being brought up as an Army brat to call a spade a spade, this euphemism never fails to irritate me. From my point of view, it seems to be an attempt *not* to irritate our enemy. Who, other than the Russians, is a "Threat?" Anyway, why should we care if it does irritate the Russians?

Also, Captain John Lee's article, "Tank Evolution" (*ARMOR*, March-April 1977), presenting a two-man tankette gave me a good case of snickers. My Opel is a lot smaller, lighter, and handles better than a larger car, and takes just as much maintenance. How many men will it take to pull the bore brush through his "hypervelocity" gun? You might also mention that there is a difference between driving an automobile on a smooth highway and driving an AFV on various terrain, while trying to spot antitank weapons!

ROY L. WILSON

Harlem, GA 30814

More On Recognition Quiz

Dear Sir:

In the March-April 1977 edition of *ARMOR*, there was an error in the vehicle recognition quiz. Vehicle number 4 was identified as a Soviet *T-55* when in fact is an Israeli *T-55*.

During the 1967 Six Day War and again in the 1973 October War, Israeli forces captured large numbers of *T-55's* and used them in their own Armor units.

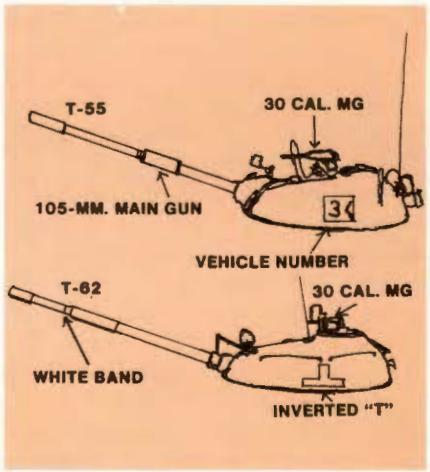
The *T-55* was up-gunned to 105 mm., and the Soviet antiaircraft machinegun was replaced with a .30 caliber machinegun. You can identify the Israeli *T-55* by the bore evacuator in the center of the main gun, the .30 caliber machinegun, and a square tarp with a white number and white "V" painted on it.

The Israeli-modified *T-62's* have a .30 caliber machinegun, a white band painted on the main gun just in front of the bore evacuator and an inverted "T" painted in white on the turrets.

A sharp eye and a working knowledge of friendly versus foe armor could keep an unwary crew from shooting the wrong target.

GARY J. ROST
Staff Sergeant

APO NY 09330



THE COMMANDER'S HATCH

MG JOHN W. McENERY
Commandant
U.S. Army Armor School

BETTER TANKERS ARE ON THE WAY!

In the last issue of *ARMOR* Magazine, General Kalergis reported to you on the efforts of his Tank Forces Management Group. He reported that the Chief of Staff had just approved the 83 recommendations that he had made in the areas of personnel, training, logistics, and development in order to improve our Armor forces worldwide. These recommendations come as the culmination of a 4-year effort to identify problem areas in the most critical element of ground combat. The sum total of these recommendations, when they are implemented, will have the most profound effect on Armor of anything that has occurred in our history. They will provide us a significant increase in performance and will go a long way toward making up for what we lack in quantity vis-a-vis the Threat.

The Armor Center was intimately involved in the efforts of General Kalergis and was the source of a number of the recommendations. I would like to single out for amplification a few of these recommendations.

First, in reviewing our initial-entry training, we found that because of our worldwide commitments, differing tour lengths, different types of tanks and the alleged inability of our personnel system to properly match a man with a specific type of tank, we had adopted the generalist approach in training. That is, we give our soldiers and officers a general education in Armor but do not train them for a specific job in a specific tank. Strangely enough, our Army is almost unique in this respect in that virtually all other armies train an individual for a specific job in a specific tank. We are going to do exactly that. A new career management field, CMF 19, is being created which will have different driver and gunner/loader MOS's for each type tank. Individuals will be able to stay in these jobs through the grade of sergeant (E5), thereby increasing stability. More importantly, here at the Armor Center we will qualify the individual as a driver or gunner/loader rather than make him an apprentice in all three positions as we do now.

Let's look at four of the primary courses we teach at the Armor Center.

BAT

Today the basic Armor trainee (BAT) is a licensed driver who is reasonably safe with a tank, but has had less than 2 hours of actual stick time. He can load fairly well and he is a familiarized gunner. He's not prepared to go down Table VIII nor go to war in any of these positions. He's an apprentice. He's an apprentice on the *M-60A1* primarily. We have follow-on additional skill identifier (ASI) courses for the *M-60A2* and for the *M-551.* These are also familiarization courses. This is extremely inefficient in that we have trained soldiers on two tanks—the *M-60A1* and the *M-60A2* or *M-551.* A further complication with the ASI training on the *M-551* and *M-60A2* is that ASI's generally don't process in our personnel computer system and despite a lot of manual management of records, the sending of rosters to gaining commands, and the placing of warning signs in records, these individuals tend to get lost and not arrive at *551* or *A2* units. The new system will provide units with a soldier who is ready to go down Tables VII and VIII or to war in the position of driver, gunner or loader on the tank to which he's assigned. We will provide the driver greatly increased training in driving and maintenance to include advanced combat-type driving, buttoned up day and night, and in a nuclear, biological and chemical (NBC) environment. We are designing difficult and challenging driving courses for this purpose.

The gunner/loader will be trained on a specific tank. He will be trained through Table VI, that is, prepared to go down Tables VII and VIII, the crew tables, when he arrives in his unit, or in an emergency, to go to war. Previously, the BAT course was 13 weeks long; it will now be 14 weeks with more time being spent in the field. Drivers drove about 15 miles previously and will now drive 75 miles, including advanced combat-type driving. Trainees previously fired 6 rounds, now gunner/loaders will fire 17 rounds.

BNCOC

The Basic Noncommissioned Officer Course (BNCOC) that trains 11E and 11D soldiers in grades E4 through E6 is now general in nature. It has a diagnostic phase where noncommissioned officers are tested on basic knowledge of Skill Level One and then provided time for self-study to bring themselves up to a minimum level of performance in these areas. They are then provided Skill Level Two and Three training, including some systems-specific training, and they are taught how to train. During the course, tank commanders fire five main gun rounds.

Under the revised program, the BNCOC will be increased from 4 weeks to 6 weeks. The nature of the course will change to that of a tank commander's course. At present, we have no course that really trains a soldier to be a tank commander in combat. We have unit courses around the world that do some of this, but none that specifically turns out a qualified tank commander. We hope to do that with our revised BNCOC course that will be taught at Ft. Knox and at Vilsek. The aspirant tank commander will fire 35 main gun rounds, including Table VIII, as well as participate in a fair amount of field training.

Mechanics

Today we turn out systems-specific mechanics only in the form of turret mechanics. That is, we have separate training and MOS's for the *M-60A1*-series tank, the *M-551*, and the *M-60A2*. This will continue although we hope to turn out a better product. The bulk of our mechanics are 63C track vehicle mechanics. These mechanics are trained on nine different types of track vehicles. Obviously there are inefficiencies in such a system in that none of these mechanics is going to see all nine types of vehicles and they cannot be trained in depth in any one particular system.

This will change. The final details haven't been worked out, but we will definitely train systems-specific mechanics who will have some training on some of the other vehicles that they might logically encounter in their specific jobs. For example, an *M-60A1* tank company mechanic will receive the bulk of his training on the *M-60A1* tank. He will also receive training on the *M-88* recovery vehicle and he may receive training on the 1/4-ton and *M-113* vehicle. We will institute a master mechanic program similar to the master gunner program. It hasn't been decided yet whether the master mechanic will be the company motor sergeant or whether he will be off-line. In any event, we will have a special training program for master mechanics to provide each unit at least one mechanic who has a high level of expertise and who can provide the follow-on training and skill needed to help new mechanics.

AOB

Our new lieutenant when he comes to you now has been familiarized in Armor, has had some training on the *M-60A1*, and at least knows how to recognize an *M-551* and an *M-60A2*. He receives no basic driving training although he does some driving during limited field training. He fires 16 service rounds and has but 1 week in the field. What we are sending to the field is a lieutenant going on his first duty assignment who doesn't have the basic knowledge and the confidence to immediately take hold of his platoon and start to train it, and is certainly not ready to go into combat.

Fortunately, this will also change. We will send you a lieutenant who has been trained on one of these types of tanks—your type. He will be a qualified driver, gunner, loader, tank commander, and platoon leader. He will have the confidence that he can train the individuals in his platoon and lead his platoon. He will have a leg up on being more proficient in these positions than most of his men. Specifically, in basic driving alone, he will drive about 15 miles. He'll drive more on the ranges and in field training exercises. He will personally fire 35 rounds of main-gun ammunition. In doing so, he will have been down Table VIII eight times—once in each of the four crew positions both day and night—and thus have participated in the firing of 140 rounds of ammunition. He will have fired Table IX, the platoon exercise, subcaliber, four times. The Cavalry lieutenant will have spent an additional week learning those weapons systems organic to a cavalry platoon, but not found in a tank platoon. Each lieutenant will have spent 2 weeks in the field on FTX's alone.

Summary

Many of you are saying, "This is great, but can the personnel system support it? Will we be able to accurately train and distribute people so that the right man gets to the right tank?" All of us—MILPERCEN and those of us that have been working in and with the Tank Force Management Group—think that we can and that it is the only sensible way to go. This will significantly improve our units' readiness to go to war tomorrow. When are we going to do this? Obviously, this won't be tomorrow. It takes time for the personnel system to function and for the Armor Center to gear up for this additional training which is a function of facilities, money, and people. We'll have our minimum facilities (i.e., new and modified ranges) completed this fall. In January 1978, we will start the new courses for your drivers, gunner/loaders, and platoon leaders. The other courses will start at the same time or shortly thereafter.

FORGING THE THUNDERBOLT

ARTEP and Training

During the past 2 years, the Armor School has devoted a great deal of time, effort, and resources to the development, validation, and fielding of the Army Training and Evaluation Program (ARTEP) manuals. Presently, there are four ARTEP's in the field for which the Armor School has proponency—71-2 (Combined Arms), 17-55 (Cavalry), 17-205 (Air Cavalry), and 17-385 (Attack Helicopter). In may instances, field units have done an excellent job in including innovative training in conduct of ARTEP's. Artillery live fire to support maneuver units, and efforts to produce realistic combined-arms play in a hostile electronic warfare—nuclear, biological, chemical (EW-NBC) environment are just a few that can be mentioned.

However, there still seems to be a great deal of consternation among field units over the purpose of the ARTEP and how it should be used. The ARTEP is a program which provides guidance for the training and evaluation of all elements of a unit. The ARTEP concept proposes a *complete program* which enables the commander to evaluate his unit, develop his training program and train to overcome weaknesses discovered in the evaluation, then conduct a reevaluation.

Through the use of ARTEP missions, the unit commander has the capability to determine training deficiencies and to tailor training programs to correct those deficiencies. The missions describe the standards which the unit should train to achieve. In effect, the Army has specified in *performance* terms the proficiency it desires and expects from its units. The tasks, the conditions under which the tasks are to be performed, and associated standards for training/evaluation are provided for each mission.

The result of a unit evaluation should equal the training needs for that unit. The unit leader should establish priorities for correcting identified deficiencies and gear his unit training program toward those requirements. The decentralized training philosophy of ARTEP encourages the simultaneous training of several echelons of a unit. Thus, leader, individual, and collective training occur simultaneously. Each element of a unit should not necessarily be required to conduct the same training. Each platoon in a company may require different types of training to reach the prescribed standards. Therefore, the lock-step requirement of the old Army Training Program (ATP) is replaced by a "train to correct deficiencies" at all echelons in the unit.

Each USAARMS' ARTEP contains guidance on how to use the ARTEP for evaluation. The commander can develop his own evaluation plan for his unit. Since ARTEP's are modularly constructed, the chief evaluator and commander can select the appropriate ARTEP training and evaluation outlines (T&E's), organize them into a logical sequence, and apply them to a tactical scenario. Each ARTEP prescribes the minimum requirements for a valid evaluation, the number and types of units to be evaluated and the resources required to conduct an evaluation. The ARTEP is not a test. It was never designed as a means for statistical comparison of units; no overall grade or rating should be awarded, and ARTEP levels are not meant to equate directly to readiness standards contained in AR 220-1.

During visits to the field by USAARMS' representatives, numerous problems have been identified in the interpretation and application of the ARTEP in training and evaluating field units. These problems are not limited to any theater or post, but have been noted worldwide. Some of the more notable problems are the following:

- Some senior field commanders are still not familiar with the purpose, concept, and format of the ARTEP. While USAARMS is making a dedicated effort to teach the ARTEP in the Basic and Advanced Officer Courses, once these officers reach the field they sometimes must contend with commanders who view the ARTEP as still one more yearly training requirement to be accomplished instead of a program to train and maintain proficiency in units.
- The ARTEP is used too much as a formal evaluation (test), and its primary diagnostic value is overlooked. There is entirely too much emphasis on the results of an ARTEP evaluation, with pass/fail or SAT/UNSAT grades. The ARTEP was never intended to be a test or to be used to place evaluative labels on units.
- Too many external and personal influences are involved in ARTEP evaluations. This defeats the intent and purpose of the ARTEP standards. Evaluators cannot allow their judgments to be influenced by personal friendships or unit allegiances, and must constantly be with the evaluated unit or section to make sound evaluative decisions.
- Threat portrayal is often not realistic, especially in the conduct of opposing forces ARTEP's. All training should be oriented on defeating the Threat, knowing his tactics and organization. This cannot be accomplished by using the divisional cavalry squadron (using U.S. organization and tactics) as the "Aggressor," or by allowing the opposing force battalion to polish its own tactics during the ARTEP.
- NBC, EW, and logistical play need more emphasis. These important areas have had only token inclusion in many observed ARTEP's.
- Evaluators must be trained prior to ARTEP's. Too many evaluators feel that, because of their past experience as ARTEP evaluators, they are fully trained and capable of doing the job. In too many cases they are merely repeating the mistakes learned during their first ARTEP experience. A formal training session is needed to prepare evaluators for their important ARTEP role.
- The obsolete ideas of the old Army Training Tests (ATT's) are difficult to discard. Too many commanders still feel a "test" is needed and don't realize the new performance-oriented training concept should be better. Some units have been observed conducting ARTEP's and utilizing the old ATT checklists instead of the ARTEP T&E's. A recent survey of NCO's indicates that the majority view the ARTEP

as nothing more than a replacement for the old ATT Operational Readiness Training Test (ORTT).

From the TRADOC side, perhaps the most disheartening problem with the ARTEP is the lack of field feedback. Numerous efforts have been made to solicit field comments on all aspects of the ARTEP: validity of tasks, conditions, standards; format; evaluation guidance; ammunition guidelines; value as a diagnostic tool; overall value to field units. Despite the inclusion of the feedback card in each ARTEP manual, USAARMS has not been inundated with replies. Any real meaningful changes to the ARTEP will occur as a result of feedback from the field. During the past 2 years field units have been unexpectedly quiet on providing input to the Armor School on how they view and use the ARTEP. The Directorate of Evaluation (DOE) at the Armor School would like to serve as a point of contact to receive comments and suggestions on the ARTEP from field units. No comment should be considered too insignificant to be contributed. Each comment or suggestion will receive personal attention by DOE personnel, and a personal reply will be sent if a return address is included. There has been reluctance in the past by units who do not wish to identify themselves, and indeed there is no need for this to be done. If you do so however, this information will be kept confidential by DOE.

All comments, suggestions, criticisms or questions on the ARTEP, its format, inclusive tasks, conditions and standards, should be addressed to U.S. Army Armor School, Directorate of Evaluation (ATSB-DE) Fort Knox, Kentucky 40121.

A further discussion of ARTEP is contained in the article "Put the 'T' back in ARTEP" by Major (P) Bosserman and Captain Schnabel, starting on page 16. —*ED.*

Armor Commanders' Refresher Course

Armor officers, who have been selected to command Armor battalions and brigades or Cavalry squadrons and regiments, will now attend a 3-week refresher course before joining their units. The course, which is oriented on *how to train, how to fight,* and *how to maintain,* includes 2 weeks of instruction at Fort Knox and 1 week at Fort Leavenworth.

The purpose of the course is to provide armor command designees with an update and refresher on the Threat, new tactics, fire support planning, training developments, training management, and weapons systems familiarization firing. Both the depth and direction of instruction will be tailored to meet the specific needs and desires of the individual.

Instruction for the first week of the course is presented by the academic departments of the U.S. Army Armor School at Fort Knox.

The Command and Staff Department's instruction will provide a review of the Threat, the conduct of battle on the modern battlefield, current U.S. tactical doctrine for the offense and defense, and combat support and combat service support available to maneuver battalions.

Weapons Department instruction will cover turret mounted weapons systems, vehicle familiarization, prepare-to-fire procedures for the new gunnery tables, and how to train for tank gunnery. The training will be oriented on the vehicle weapons systems characteristic of the unit to which the command designee is assigned.

The Leadership Department will provide the command designees with an overview and refresher training in the areas of training management, emphasizing ARTEP, soldiers manuals, and SQT. Instruction will also be given in the latest procedures in communications, operations in an electronic warfare environment; and the organization effectiveness program at the unit level.

Driver training will highlight the Automotive Department's segment of the first week of the refresher course. During this training, command designees will learn to drive the types of vehicles found in the unit to which they are assigned.

During the second week of the course, all of the designees will move to Fort Leavenworth where they will be given an update on the *how to fight* aspects of modern warfare through the use of engagement simulation. This week will emphasize U.S. and Threat tactics, using Dunn Kempf, CAMMS, and CATT's simulation games.

In the third week, the command designees, except aviators and those assigned to units in Europe, return to Fort Knox for a full week of *how-to-maintain* instruction. Those designees who are assigned to USAREUR will receive their *how-to-maintain* training in Europe.

Designees needing information about the course should contact the office of the Director of Training, U.S. Army Armor School, AUTOVON 464-5646.

Office of Armor Force Management, USAARMC

The Office of Armor Force Management (OAFM) was officially established as a permanent entity as of 6 July 1977. Its mission is to assist the USAARMC Commander in his role as Chief of Armor and TRADOC's executive agent for Armor-related actions. The role played by OAFM is to monitor, world-wide, all aspects of the Armor system including the personnel, training, hardware and logistics subsystems. Their responsibilities will be fulfilled, in part, by regular visits to the field to find out how well the system is working at the user's end. The feedback thus provided will then be used to furnish management data to the USAARMC Commander.

OAFM provides the necessary interface and coordination on a continuing basis with the Tank Forces Management Office, Office of the Chief of Staff, Army. This assures proper assessment of Army and DOD policies and procedures at the Army Staff level which affect the Army's ability to man, train, equip, field, and maintain an effective Armor Force. ▲

ADDITIONAL SKILL IDENTIFIER

Numerous callers ask the Master Gunners branch, "How do I get my ASI?" Well, as of April 1977, the answer was very difficult to explain due to a bottom-fed system of awarding the additional skill identifier (ASI). Bottom-fed means the unit had to request an ASI for the Master Gunner, send it through their personnel channels and wait a period of time (usually an extended one), until they received an answer before the ASI was finally awarded to the individual. Under the most ideal circumstances the system worked. In most cases however, the paperwork was lost or misplaced either in the unit, through the channels it had to go through, or due to an oversight on someone else's part, and the individual did not receive the ASI.

In a nutshell, AR 611-201 directs that qualified soldiers be awarded the additional skill identifier of C5, C6, or C7 by announcement in special orders in the same manner as the award of MOS. Accordingly, after returning to his unit, the Master Gunner graduate had to initiate a request for the award of the ASI. This procedure was found to be slow at the very best and to date has been extremely unreliable. For example, in January 1977, USAARMS requested that MILPERCEN provide a printout of Master Gunners by name and assignment, extracted from the enlisted master file. The resulting computer printout contained only 17 of 133 course graduates with designated ASI's. To express it another way, less than 15 percent of the NCO's trained as Master Gunners by USAARMS could be identified by MILPERCEN. To assist in solving the problem, USAARMS forwarded locally produced computer printouts to SIDPERS and MILPERCEN listing all graduates, their units, dates graduated, and other essential information. This action was taken to assure that the Department of the Army had a current list of graduates serving as Master Gunners in Armor or Cavalry units and those assigned elsewhere.

Another problem in the personnel management system is the malassignment of a number of Master Gunner graduates. Most seem to show the system's inability to identify Master Gunners and a lack of adequate control of assign-

ments. Some examples are: A Master Gunner receiving orders to Drill Sergeant School upon completion of the Master Gunners course at Fort Knox. Others have been assigned to nonarmor units. This situation was unsatisfactory and wasteful of talented, trained, highly skilled NCO's and a considerable expense to the Army.

The malassignments were corrected after USAARMS was alerted, but caused all the normal problems and excessive effort required to correct a situation that should not have occurred. Now, due to coordination between the Weapons Department of USAARMS and MILPERCEN, USAARMS is authorized to award the ASI to the graduating Master Gunner upon successful completion of the course. Additionally, graduates of all previous courses have been retroactively awarded the ASI by MILPERCEN in a special action. Beginning with Master Gunner class 5-77 of the *A1, A3* Master Gunner course, graduating on 22 August 1977, USAARMS will assume full responsibility for the awarding of the ASI and the procedure to insure that the ASI is posted to the personnel records of graduating Master Gunners.

ROBERT SLATER
Sergeant First Class
Noncommissioned Officer in Charge
Master Gunner Branch
Fort Knox, KY 40121

SCALED TARGETS

Since the inception of the Training Assistance Team (TAT) program, we here in the Master Gunner Branch have been flooded with requests of one type or another. Occasionally we receive requests that far exceed our capabilities, such as requests for training aids (some of which we have a hard time obtaining ourselves) or for publications and issue items.

One of the more frequent requests is for the scaled-down targets used in subcaliber firing. Many of the letters from the field state that the local Training Aids Support Office (TASO) does not possess the blueprints, dimensions, or the inclination required to produce these targets. Well, Master Gunners, let us remind you that "anyone can work under ideal conditions." It may well be that you may have to construct some of these scaled-down targets out of cardboard, asphalt tile, plywood, tin or some other easily worked material.

In order to construct scaled-down targets, you first need to determine the scale range limitations, as dictated by the size of the impact area available and the caliber of weapon you plan to use. To determine the size of the target all that must be done is to divide the actual dimensions of the target by the scale desired. Since we know that a *T-62,* for example, is 3.5 meters wide, 6.5 meters long and 2.4 meters high, simply dividing these dimensions by 1/20 scale gives us the width as 17.5 centimeters, the length as 32.5 centimeters and the height as 11 centimeters. If you haven't yet gotten the hang of the metric system, multiply centimeters by 2.54 to get the size in inches (6.66 in. wide X 12.48 in. long X 3.9 in. high).

By using these dimensions you can draw an approximation of a *T-62* and use it as a pattern to make other targets. They are not as elaborate as those that TASO cranks out, but they will get the job done. Not only that, you can make targets for any vehicle you want, not just those TASO is willing to make. It also is not necessary to have the pop-up mechanism to run a subcaliber range. There are times when you just have to make do with what you have or what you can make.

It may not be as "nice" as the "book" shows but even a target that you cut out of the cardboard packing that comes in a can of .50 caliber ammunition, is better than an excuse.

The following table shows the measurements for *T-62, BMP,* and *PT-76* when used on 1/60, 1/35, 1/20, and 1/2 scale ranges. Work a few of the problems as has been explained above and see if you can come out with the same measurements. Actual dimensions given in parentheses.

Scaled Targets Article Chart

SCALE	WIDTH	HEIGHT	LENGTH
	T-62 (350.0 x 230.0 x 650.0)		
1/60	5.80	4.0	11.8
1/35	10.0	6.8	18.5
1/20	17.5	11.0	32.5
1/2	175.0	115.0	325.0
	PT-76 (312.0 x 220.0 x 680.0)		
1/60	5.02	3.66	11.0
1/35	8.94	6.28	19.4
1/20	15.6	11.0	34.0
1/2	156.0	110.0	340.0
	BMP (300.0 x 200.0 x 650.0)		
1/60	5.01	3.33	10.8
1/35	8.60	5.71	19.5
1/20	15.0	10.0	32.0
1/2	150.0	100.0	325.0

All measurements are in centimeters; to convert to inches, multiply by 2.54.

BERNARD RESTREPO
Sergeant First Class
Master Gunner

THE INDISPENSABLE SCOUT

by Brigadier General David K. Doyle

Circle the wagons! The Scouts—an element of our force we have assumed as a given; one we have seen as expanding in significance under concepts such as the active defense—are under attack.

The attack comes from both inside and outside the Army and ranges from:

- Those who would eliminate the scouts at battalion level and substitute a smaller consolidated platoon at brigade level devoted primarily to traffic control duties.
- To those who would amalgamate the ground scouts with the infantry because they both ride to war in the same vehicle.
- To those analysts who challenge the necessity for establishing, maintaining or employing any ground or air scouts at any level.

Just as the attacks are varied, so are the bases of the attacks. They range from a simple force reduction exercise to a rationalization that the Threat will be of such magnitude that no one or no element must be specially dedicated to find them—they'll find us.

If you've been in the business of either fighting or figuring out how to fight an armored force, a first reaction to all of this is—bull! What makes the conditions of future battlefields so different or the requirements of the battle commander so different that he will need a lesser capability to see than his predecessors?

In 1974, the Cavalry Scout Ad hoc Committee (CSAC) at the Armor Center completed a study which looked at ground cavalry and formed the basis for standardizing the organization and equipment of the Armored Cavalry Platoon; significantly increased its combat power and the ability of the platoon to perform dismounted reconnaissance by increasing the size of the scout team from three to five. In arriving at its recommendations, which were subsequently approved for implementation, the study reviewed our reconnaissance and security needs and the organizational responses to those needs since World War II, looked to the future and concluded:

- If cavalry organizations were cut out of the Army's force structure, commanders would still be required to dedicate elements of their force to perform reconnaissance, security, and economy-of-force missions—which could cause a 1/3 reduction in the size of their combat power.
- There is an increasing need for men and units specially and uniquely trained, organized, and equipped to perform reconnaissance and security operations.

By all standards, we thought the mail was answered in 1974 in an objective, rational manner. This was complemented on the air side with the Aviation Requirements for the Combat Structure of the Army (ARCSA III) which was approved in February 1977 and layed out the mix of air cavalry and attack helicopters in our various organizations.

So why the fresh onslaught? Frankly, I don't think it has a thing to do with past study efforts—merely a new set of distractors in the transmit-only position. So we'll go back to the boards to address one more time:

- Do units on future battlefields need to conduct reconnaissance, security, and economy-of-force missions?
- If so, what should be the mix of air and ground cavalry units and do you best perform these missions with specially trained elements or, should we pull tank and infantry units from the main force on an ad hoc basis to accomplish the same thing?

With that as background, let's make sure we're all on the same frequency as to our needs and what we expect the heart of all cavalry units—the scout—to accomplish. In subsequent articles, we'll take on the air scouts and later examine the interface between air and ground scouts in various missions.

The Requirements

"The commander must be able to 'see' the battlefield... The first step in winning is seeing the battlefield." These statements from FM 100-5, *Operations,* are reinforced in both How-to-Fight manuals, 71-1, and 71-2, the bibles for team and task force tactics, and in statement after statement taken from commanders working the maneuver battlefield in preparation for future requirements. They speak an indisputable truth, a notion certainly not new! If the commander can't "see" the battlefield—before and during the


BOUDINOT

battle—the day, the battle, maybe even the war is lost.

Paramount among the commander's sources of "eyes and ears" today are air and ground cavalry organizations whose principle missions are reconnaissance, security, and employment in an economy-of-force role. In all cavalry units—the corps' armored cavalry regiment or air cavalry combat brigade, the division's armored cavalry squadron with its air cavalry troop, and the maneuver battalion's scout platoon—the SCOUT is the man who does the seeing. He is the number one source of *real-time,* 24-hours-a-day, any-weather, combat information. And *real-time* accurate information can't be overemphasized because that's what the commander must have so he can make timely, crucial, and correct decisions that spell the difference between winning and defeat.

The Mission

In each of the cavalry's missions, the men who man the organizations are required to operate over extended frontages and at relatively-extreme distances from the main force. In order to cover the area assigned, cavalry and scout platoons are habitually deployed as squads or even teams. In a screening mission, it is not uncommon for teams of a squad to be separated by considerable distances in order to perform their assigned tasks and report their findings. This situation, which is more the norm than the unusual, establishes a considerable degree of independence in operations. In turn, it necessitates that *all* scouts possess to a high degree the same requisite skills to accomplish the mission.

The SCOUT's mission is "to gather and report information on terrain features, enemy strength, and enemy disposition. . ." This mission statement fails, however, to fully describe what a scout does. He performs his duties mounted and dismounted, alone or with one or two other scouts. He must be a skilled observer who knows what he is looking for and how to find it. The scout must be expert at mounted and dismounted map reading and land navigation. He mans observation posts and conducts patrols. He's got to be especially skilled in the intricacies of communication, employing communications-electronics operation instructions (CEOI's) and operating all of the various organic communications equipment. The scout must conduct route reconnaissance, classify bridges, and evaluate potential fording sites. He must be able to calculate demolition charges needed to destroy bridges and other structures, place the charges, and detonate them. Scouts must be able to employ every reconnaissance technique, from stealth to "recon by fire"; and most importantly, he must also understand the relationship between the air scout and himself.

When performing any of his missions, the scout must be able to fight. We made our decision right after World War II that we would go for heavy vs. light snoop-and-poop reconnaissance elements not only to enable our reconnaissance forces to fight for information, but also to accomplish critical economy-of-force missions. In past years, the scout was given a .30- or .50-caliber machinegun. Today, the scout has been given a significant boost in capability with the addition of TOW and *Dragon* antiarmor weapons systems; and as we look toward future organization, he will have not only TOW, but also a highly-accurate, long-range, light cannon to accomplish his missions. With the introduction of these weapons, we have also made the scout's life more complex; therefore, we owe it to him to put his weapons into perspective as he seeks to employ them on his varied missions, and most importantly, we must insure that we train him up to the

weapons' capabilities.

The scout is also expected to work with, commit to action or control, a wide variety of assets available not only within his platoon and troop, but also to senior commanders—scout and attack helicopters, indirect artillery and mortar fires, scatterable mines, and tactical air support, to cite a few. The responsibility inherent in these performance requirements is heightened by the fact that the scout's mission is oriented on the battlefield needs of the larger force; corps, division, brigade, and battalion. This condition requires that scouts be sufficiently trained and skilled that commanders from lieutenant colonel to lieutenant general can be confident of the reliability and accuracy of their performance.

Now let's look at the issue of rolling scouts into the infantry, and detailing infantry to perform scouting missions. There is similarity in the tasks that each are expected to perform. At the basic soldier level, there is a 45 percent commonality of tasks taught. Taken to the extreme, a similar comparison of tasks can be made between the scout and the *Hawk*-missile crewman. But this type of comparison distorts the dissimilar emphasis placed in tasks considered essential for the accomplishment of the basic scout mission: reconnaissance, indirect fire, communications, vehicle operation and maintenance, demolitions, and land navigation. Commonality of tasks decreases and the difference in training emphasis continues as one follows the progression of the scout and infantryman up through the skill levels, which are nothing more than a reflection of the organizations to which they belong, and their missions and methods of operation. Scouts fight to see, while infantrymen see to fight.

Individual Characteristics

The SCOUT we've been describing is not a lieutenant; rather, he ranges from the old trooper, tactically-experienced noncommissioned officer (NCO) to the young PFC or Specialist Four. No matter what his age or experience, he must be "a man for all seasons."

So what kind of a man do we need for a SCOUT? First of all, understand that the average new recruit joining the 5th Cavalry Squadron at Fort Knox is between 18-19 years old, has a GT of 100+, and joined because he wanted adventure, likes the outdoors, or just plain wanted to respond to a John Wayne call of "Scouts Out."

Now here's what we're looking for: self-reliance, independence, boldness, and aggressiveness. He must have physical and mental stamina, exceptional initiative and inquisitiveness. The scout must be totally flexible in reaction to his environment and frequent, unexpected events. He must be trained to perform the high-risk mission as a routine requirement. He must feel at ease operating over extended distances, at a rapid pace, and be willing to, in fact, seek the kind of independent operations that will be expected of him by his unit. Although all of the foregoing are intangibles, they are nevertheless vitally important. And if the recruits don't have these characteristics when we get them, we must foster and build these characteristics in those men qualified to be trained as scouts.

We've talked about the scout, what we demand of him, how he must operate, what training he must have and what it is that makes him different. But here is one more important ingredient in making a scout—the intangible catalyst that binds it all together. That key element is the *elan* and *esprit* of cavalry. Some get squeamish because these cannot be quantified—but the great battle captains have never hesitated to capitalize on or exploit such intangibles. In fact, we would be professionally remiss if we did not nurture in the scout the special skill, loyalty, and dedication of the cavalry—because cavalry is a state of mind for all who serve, from the senior leaders to the most junior scouts.

Wrapping Up

Whether in the role of the commander who must fight the main battle, or the staffer trying to scope the needs of the battle force, we must insure that we collectively state our case; but more importantly prove our case through proper training and employment of the scout. Anyone that understands the principle of economy-of-force, our limited—by realistic necessity—resources, and the requirement to concentrate the combat power required to obtain the decision at the time and place must understand the need for a trained, dedicated scout. He doesn't cost us any more. By paycheck, he should, but he doesn't. There is no wasted combat power. In fact, cavalry gives us a lot for our money. In doing what it is supposed to do, it is much, much cheaper and will become more so than tank and mechanized task forces as the new cavalry organization is implemented. At the heart of it all is—the SCOUT.

BG DAVID K. DOYLE enlisted in the Army in 1951, rising to the rank of sergeant before attending Officer Candidate School at Fort Knox. Upon graduation from OCS in 1952, he was commissioned in Armor. Brigadier General Doyle has been a training officer, reconnaissance and tank platoon leader, company executive officer, battalion intelligence officer, company commander, assistant operations officer, and assistant G-3 plans officer. After attendance at the Command and General Staff College in 1965, Brigadier General Doyle commanded the 3d Squadron of the 11th Armored Cavalry Regiment in Vietnam. In 1971, he attended the National War College and later commanded the 3d Armored Cavalry Regiment in 1973. Brigadier General Doyle was assigned as the Deputy Commanding General of Fort Knox in 1976 and is presently the Assistant Commandant, USAARMS.

HEADQUARTERS COMBAT COMMAND "A"
4th ARMORED DIVISION
A.P.O. 254 U.S. ARMY

June 1944

MEMORANDUM:

TO: All Reconnaissance Agencies, Combat Command "A"

1. The reconnaissance agencies of a Combat Command are many. In this category are included commanders of all echelons, S-2's, Recon Platoons, Recon Troops, light tank companies, medium tank companies, Infantry scouts and patrols, Engineer units, Arty F.O.'s, and plane observers, etc. In fact, all personnel must constantly seek information in order to carry out their assigned tasks, and report it in order to benefit the command as a whole. Reconnaissance is not the exclusive function of any branch, unit or organization.

2. The decision which gives our combat command a mission is arrived at after due consideration of many factors. The advisability of the mission is not open to our question. Our job is to perform the mission.

3. To perform our missions we must always overcome obstacles. I consider anything which hinders us in performing our mission to be an obstacle--the enemy, artificial or natural barriers, poor roads, muddy terrain, etc. In order to overcome an obstacle we must know all we can about it. But more, we must know or find out the best approach or means of overcoming it. We must ever seek to find where the going is good or at least where it is the best if no good approach exists. Information as to how to overcome an obstacle is just as important as information about the obstacle. They go hand in hand.

4. In order to do successful reconnaissance or S-2 work, one must take a positive attitude by ever seeking information which will enable us to perform our mission rather than adopting the negative attitude of building up reasons why we will be unable to do so. I do not mean by this that we do not want to know about the obstacles because we want to know all about them and pass on to our men all we know, but we want to know also how we can overcome them and fulfill our mission. We can lick the enemy on any battlefield if we can get to him and close with him with our abundance of shock action and fire power. Reconnaissance and S-2 work is not done until we do close with him. Then it immediately starts again on the next phase.

BCC

BRUCE C. CLARKE
Colonel, Corps of Engineers
Commanding

Pages from the Past

HISTORY

Military history should be the parade ground of the intellect. As the soldier drills and drills until the movements started by a certain word of command become his second nature, so should the officer think and think. "To be able to think with vigor, with clearness, and with depth, in the recess of the cabinet, is a fine intellectual demonstration," says Disraeli, "but to think with equal vigor, clearness, and depth amidst bullets appears the loftiest exercise and the most complete triumph of the human faculties."

Military history also teaches us that "whatever men have done, men may do." "The heroic example of other days is in great part the source of courage in each generation, and men walk up composedly to the most perilous enterprises, beckoned onward by the shadow of the braves that were."

The Cavalry Journal
July 1910

CAVALRY RECRUITING

Cavalry is an expensive branch of our military establishment, and the very important nature and valuable character of the service it is required to perform makes it specially important, and in fact necessary to efficiency, that the best of material should be secured. For the proper discharge of the varied duties of good cavalry, great intelligence, keen perception, quick decision and individuality are most important, and the exercise of these faculties gives the chief value to cavalry. Every effort should be made in recruiting to secure a class of men combining the qualities above named, with physical strength, vigorous health, strong powers of endurance, sanguine temperament, and as far as possible every manly trait that can give grace and vigor to early manhood.

The Cavalry Journal
March 1888

ROLE OF THE AEROPLANE

The aeroplane is largely limited to the domain of tactics, and is especially suited for rapid, superficial reconnaissance and for use in the attack and defense of fortifications.

Besides reconnaissance and the service of security and information in general, these air-machines are particularly useful in reporting the effect of our fire on the enemy's troops or material, and may, in an emergency, serve to rapidly transport a few men or a small quantity of ammunition or provisions to points of great importance. Moreover, they will be most useful in keeping up communication between the separated parts of a modern field army. The opinion has sometimes been expressed that the dirigible balloon and aeroplane will greatly reduce the value of cavalry in war, but this is absolutely incorrect and untrue. Both methods and means of reconnaissance have their respective advantages and disadvantages, and our armies need both.

The Cavalry Journal
November 1910

WRITING

Regardless of rank or assignment, every officer in the Army is a writer. His ability to put together words, phrases, and clauses to convey an idea may range the entire spectrum of descriptive adjectives. Bad or good, indifferent or interested, dull or imaginative, he is still a writer; and he usually has a captive audience. The Army writer can do one of two things: provide clarity or produce confusion.

ARMOR
July-August, 1967

by Major Richard M. Bosserman and
Captain Andrew G. Schnabel

Put the T Back in ARTEP

Before you grab your binoculars and go rushing off to observe or evaluate training, take a few minutes to read this article. We're going to attempt to explain how to effectively use the Army Training and Evaluation Program (ARTEP) to help solve your training problems.

First, we'll review ARTEP philosophy. Then, we'll discuss how to use the ARTEP for training by using the training-in-units model. Finally, we'll conclude by emphasizing the commander's primary obligation to the Army, his unit, and his soldiers—to produce a unit ready to fight and win *now*.

ARTEP Philosophy

The adoption by the Army of performance-oriented training—the preparation for job performance through the explicit statement and mastery of training objectives—gave birth to ARTEP, which recognizes the constraints of the current training environment and provides the commander with the capability to tailor his training.

The missions in the ARTEP are described as precise terminal performances which the unit is expected to master and serve as a guide for training objectives. The tasks to be performed, the conditions under which the tasks are to be performed, and an associated training/evaluation standard are available for both training and evaluation. The ARTEP is a definitive training document because it prepares for performance. The vagueness of the old Annual Training Test (ATT) checklist is replaced by tasks, conditions, and standards known to all.

The ARTEP provides guidance for the training and evaluation of all elements of a unit from the lowest cohesive echelon (of squad or crew) to battalion or separate company. Priorities for training and evaluation are suggested by categorizing missions into Levels 1, 2, and 3. Level 1 is the minimum training proficiency required of a combat-ready unit. Levels 2 and 3 represent missions which are minimum performances of a lesser degree of difficulty, with the primary criterion for Level 3 being a realistically achievable goal for the Reserve Components (RC). Level 2 might be the performance of a not-yet combat-ready Active Army unit or a very proficient RC unit. The levels thus take into account the differences among similar units that recognize that different units have different training objectives.

Due to its design, the ARTEP offers commanders the capability to identify training deficiencies and to tailor training programs to correct shortcomings. The ARTEP follows the performance-oriented philosophy of *training objective = training = test = evaluation that is outlined in FM 21-6.*

The decentralized training philosophy of ARTEP encourages simultaneous training of all echelons of the battalion. In such a program, individual training for leaders may occur at the same time in different locations. Likewise, companies may conduct different types of training at the same time (e.g. one company does squad-level training while another performs company-level training). The lock-step requirement that everyone do the same training at the same time is replaced by a "train-to-correct-deficiencies" methodology at all echelons.

Using the ARTEP for Training

The ARTEP is designed as a commander's aid in training his unit for combat missions. Tasks that units must perform to ensure success in future combat missions are contained within each ARTEP. Proper execution of these tasks is critical if a unit is to achieve its training goal.

Developing Training Programs. The ARTEP is designed to provide the answers to three key questions that are required to conduct efficient and effective training:

- Where is the unit now? The commander must determine which ARTEP missions and tasks the unit and its subordinate elements can perform under the conditions and to the standards in the training and evaluation outlines (T&EO's). Personal observations and internal and external ARTEP evaluations (defined in the *Analyze* paragraph below) help the commander identify his unit's strengths and weaknesses.
- Where should the unit be? Determine the unit training goals. These goals are usually dictated by higher headquarters in the form of annual training objectives. However, commanders should have the latitude to specify additional goals. Unit goals

are normally expressed in terms such as "the battalion or squadron will achieve Level 2 proficiency, with troops or companies achieving Level 1." Unit goals are *not* assigned by equating readiness conditions (REDCON) ratings in AR 220-1 with ARTEP training levels.

- Given available resources, how can the unit bridge the gap between current and desired standards? The commander can bridge this gap by setting priorities for tasks that the unit is currently unable to perform satisfactorily, and then incorporating those tasks into a unit training program.

Training Circular (TC) 21-5-7, "Training Management in Battalions," has been written specifically to assist training managers and describes an approach to training in units that should be used in conjunction with the ARTEP.

Training in Units

Analyze. The commander and his staff analyze training by first determining what the unit's ARTEP training goal is—what level the higher headquarters commander has prescribed as the acceptable ARTEP level for the unit and at what level the commander and his staff think the unit is capable of performing. Then, missions identified as the critical unit missions for that level are extracted from the ARTEP. These missions, which go into the unit working file for the long-range plan, consist of those tasks that make up a major part of the unit's short-range plan. The commander's continual analysis of training includes the diagnosis of factors, such as resources of time, money, POL, etc. For ARTEP purposes, however, there are two important factors that help the commander make his analysis—internal and external evaluation results. It is critical at this point to define these two factors.

Internal evaluations are conducted in two ways:

- The commander's internal evaluation can be simply a mental analysis of his unit's training capabilities, based on his personal observations of training. This is the most common approach. Or,
- Evaluations can be based on actual data, recorded by the commander or his staff, using the tasks, conditions, and standards in the T&EO's of the ARTEP.

External evaluations are administered by a higher headquarters, and are normally conducted in accordance with a formal scenario. They provide detailed, written feedback to the commander to assist him in making his training analysis. Evaluation will be further addressed later.

Provide. The commander and his staff provide training support, i.e. training objectives and resources, to assist the unit to bridge the gap between current and desired standards. Training objectives are easily identified because they are contained in the T&EO's in the ARTEP as performance objectives—task, the conditions under which the task will be performed, and the standard(s) of performance that must be met.

The real test of a good manager is how well he can manage the available resources. Funds are one of the critical resources; funds purchase ammunition, POL, training aids, and other resources. Since funds are normally not directly managed at battalion or squadron, it is imperative that the battalion or squadron commander ensure that higher headquarters allocate enough funds to support the training outlined in the long-range plan. Unit schedules are published by battalion or squadron, normally reflecting at least the next 2 weeks' activities. The unit schedule shows when, what, and where, and should be put to the insititution, garrison, local training area, major training area (IGLM) test to ensure that maximum efficiency from the various training environments is attained.

Another important consideration in providing training support is the selection and notification of the trainers. Trainers should be alerted as far in advance of the training to be conducted as possible to permit them maximum time for adequate preparation. The commander will often find he has more training to conduct than he has resources available to support such training. In these cases, priorities must be established by selecting training that will contribute most to overall combat readiness.

Shortfalls in resources should be reported to the next higher headquarters. With the forecast, unit schedule, ARTEP T&EO's, and the battalion or squadron commander's guidance, the troop or company commanders are allocated the resources needed to implement effective ARTEP training.

Conduct. The unit must then conduct training based on the resources provided. Not only must the unit be trained, but the trainers frequently also need to be trained. This is an additional resource that the training manager provides; he ensures that the trainers know how to train using the techniques in FM 21-6. By coaching the small unit leaders in their development as trainers, the training manager generates training power in the unit.

When a unit is able to perform an assigned task or mission to the prescribed standard, that unit should progress to the next training mission, raise the standards, or call off training rather than go through meaningless motions to fill out scheduled time. On the other hand, if the unit cannot achieve the assigned performance standard, the training schedule must be flexible enough to allow trainers to continue remedial instruction until the unit is able to master the necessary skills. If elapsed training time, personnel turnover, or equipment changes cause loss of training proficiency or if a unit cannot sustain proficiency in various tasks or missions, then training must be rescheduled in order to regain proficiency according to the required standards for those tasks or missions. The end result of conducting training to ARTEP standards should be a trained unit. ARTEP oriented training should also help answer the key question of where the unit is now.

Evaluate. Accountability must exist at all echelons if the training management system is to work. This accountability is obtained through evaluation of the outcome of training, not on the form or process of training. Emphasis is on what the training has produced, *not on how the training was conducted.* If a unit can perform a mission under prescribed conditions and to prescribed standards, then how the unit was trained is not important.

The ARTEP evaluation, preferably an internal evaluation, begins the training cycle. This evaluation shows the training manager where his weaknesses are and directs him toward a problem-resolving training program. The evaluation is a multi-echelon evaluation and the corrective

training program occurs at all levels. At the completion of the corrective training, a reevaluation—internal or external—is conducted and the training cycle continues. A recommended method to conduct a valid evaluation that results in feedback is to make ARTEP A&EO's available to personnel observing or evaluating training. The unit's training section can prepare advance packets for commanders and staff officers who are scheduled to observe or evaluate training. These packets should, as a minimum, consist of the applicable outlines for the training being conducted and some sort of training evaluation report, such as the one shown in FM 21-6, appendix D. These aids help the observer evaluate training and, equally important, they are a good tool for providing feedback on the training. Unit training evaluation standard operating procedures (SOP's) should be reviewed in light of ARTEP, and the importance of identifying training tasks that the unit fails to satisfactorily complete, must be addressed. Evaluation assists in generating training power at each echelon. It is a continual requirement that results in some form of feedback.

Feedback. The immediate outcome of evaluation should be feedback in the form of a critique by the trainer. Immediately after or even during the exercise, the critique should address training weaknesses and the reasons why various missions or tasks were performed unsatisfactorily. The critique should also address training strength, thereby providing positive and reinforcing feedback to the unit. The result of this critique should be used by the unit commander to "drive" the training system. The training manager should react to deficiencies revealed through evaluation by adjusting the list of missions for training, the Forecast, and Unit Schedule, or the performance objectives themselves, as appropriate.

By identifying training tasks and objectives and organizing these tasks in a logical training sequence along with other unit commitments, the training officer can develop the required training program and adjust the Forecast and Unit Schedule. When crews or units cannot successfully perform an ARTEP training objective, it is necessary to identify the reasons for failure. Collective training objectives, such as those specified in the ARTEP, require successful performance of many critical tasks, including those performed by leaders, unit members and subunits.

The determination of the training needed must consider whether individual or subunit training is required before full performance of the collective objective is attempted. For example, a troop or company commander with a defend mission selects the terrain on which his unit will establish battle positions. If his decision is wrong (e.g. fails to orient on opposing force avenues of approach), the proficiency with which individual soldiers, crews, teams, or platoons occupy the battle position and perform their mission may be of little consequence to the outcome of the operation. In this case, the leader needs training, and such training should be tailored to his needs (e.g. terrain exercise conducted by the squadron or battalion commander for his troop or company commanders). Similarly, collective deficiencies will result if unit members cannot perform critical individual tasks. For example, a company team will not meet the standards of performance specified in the ARTEP unless each soldier can perform his critical duties.

"Collective training objectives...require successful performance of many critical tasks..."

The Soldier's Manuals, other training literature, Training Extension Course (TEC) materials, and on-the-job training will help prepare soldiers to perform critical individual tasks necessary to accomplish ARTEP objectives. It must also be understood that failure to achieve satisfactory results on an evaluation can be caused by unrealistic standards or inappropriate conditions. In such cases, commanders and training managers should take steps to ensure that the ARTEP is tailored to unit needs and conditions under which the unit must operate. It is important for the training manager to recognize and accept responsibility for improving T&EO's. This responsibility extends to notifying service schools that standards in a specific ARTEP are unrealistically low or high in light of the unit's experience in training.

Unit Training and Readiness

The success or failure of training depends on the imagination and audacity of the commander. Flexible, realistic training is essentail. Training should capitalize on training devices and simulators. It must correct unit weaknesses and develop proficiency at standards specified by the commander. As stated in FM 100-5, "Collective training in units should aim at maximum effectiveness with combined arms. Wherever possible, commanders should press beyond ARTEP standards. Consistent with a judicious regard for safety, training must simulate the modern battlefield. Training for battle demands forging effective combined-arms teamwork."

"The Army's need to prepare for battle overrides every other aspect of unit missions. This urgency derives from the danger present in the world scene, the lethality and complexity of modern war, and the ever-present possibility that a unit in training today may be in action tomorrow. The commander's first concern must be to order all the activities of his unit to meet his primary obligation to the Army, his unit, and his soldiers: produce a unit ready to fight and win now."

Remember, the ARTEP is not a "super test." Primary emphasis should be on the use of the ARTEP as a training diagnostic tool rather than merely as a means for commanders to gauge unit or leader efficiency. There is a need to develop a healthy atmosphere around the ARTEP concept so that leaders will be encouraged to identify the weaknesses of their unit without fear of relief or a bad efficiency report. This does not mean that continued unsatisfactory performance should be tolerated, but instead, a training environment should be established that is based on evaluations that identify unit training deficiencies and results in the development of a train-

ing program to correct those deficiencies.

So now, trainers and training managers, grab your ARTEP's and your binoculars and get out there and deemphasize the negative aspects of the E (Evaluation) in ARTEP, and concentrate your efforts on evaluation with the primary purpose of putting the "T" back in ARTEP as originally intended. Once this is done, we will have units trained to fight and win *now*.

MAJ(P) RICHARD M. BOSSERMAN, JR. was commissioned in Armor and is a graduate of the Command and General Staff College. He has commanded an armored cavalry troop and a tank company. Major(P) Bosserman served as an S-3 and executive officer of a tank battalion in Vietnam. He is presently assigned as Branch Chief, Directorate of Training Developments, USAARMS.

CPT ANDREW G. SCHNABEL was commissioned in Infantry upon graduation from the United States Military Academy in 1971. He is a graduate of the Infantry Officers Advanced Course and graduated from the Armor Officers Advanced Course by correspondence. He is presently commander of Company B, 4th Battalion, 54th Infantry, 194th Armored Brigade, Fort Knox, KY.

The following editorial, by Major William A. Cauthen, Jr., which presents an artilleryman's concern about the proper uses of ARTEP, is reprinted from the March-April 1977 issue of ***Field Artillery Journal.*** *—ED.*

There seems to be considerable consternation over the use of the current primary diagnostic training tool known as the ARTEP. Those five letters stand for Army Training and Evaluation Program.

The problem stems from two basically different views of what it is and how it is to be used. One view, held by Training and Doctrine Command (TRADOC) and the Army service schools is that the ARTEP is *only, strictly, exclusively, solely* — an aide to a unit commander for determining the state of training of his unit. The ARTEP's are intentionally written as a series of specific combat-critical tasks so the commander can pinpoint specific weaknesses and conduct definite remedial training. Note that there has been no mention of anyone other than the commander and his unit.

The other view is that the ARTEP is an evaluation (the E in ARTEP). A thesaurus lists "rate" and "assess" as synonyms for Evaluation. This emphasis leads to using the ARTEP as a test. The holders of this view are in the operational side of the Army, i.e., senior command headquarters that must report training readiness to Department of the Army. The ARTEP serves their purposes well. The problem introduced is that the chain of command enters the picture.

Sandwiched between the two views is the unit. The unit is told by its branch school to use the training tool to their (the unit's) best advantage. Use the ARTEP to train—any way *you* find best. *You* administer it. *You* evaluate the training level. If need be, *you* stop anywhere in the sequence of events to correct problems *you* find.

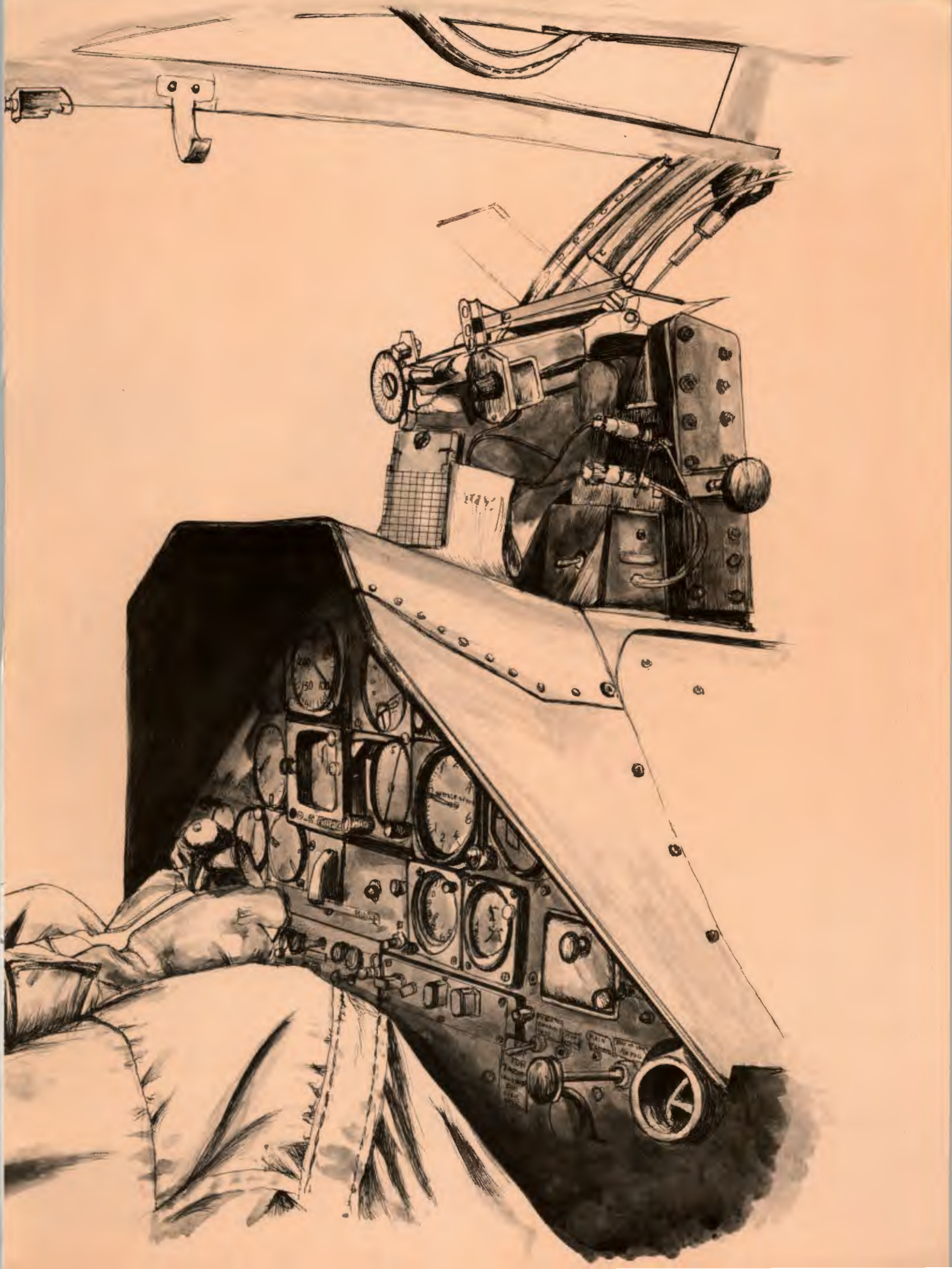
On the other hand, a unit, say a battalion, is told by division artillery or group that the unit *will be evaluated* on the ARTEP to determine the unit's readiness for reporting through command channels. Under this situation no one can blame the unit commander, certainly a career motivated officer, for "painting the rocks." The unit (and its commander) will be looked at very critically. No mistakes. The FO's must memorize the surveyed coordinates within the post impact area. FDO's must memorize the sequence of events and have their fire orders written down before leaving garrison. No short cuts allowed on the registration so we don't blow it.

The problem is bigger than the unit—bigger than the schools. Even bigger than TRADOC and FORSCOM. They both have understandable reasons for wanting to use such a functional tool as the ARTEP for their own requirements. DA will have to enter the net and solve the dilemma of the unit. The "operators" can use the ORTT or the EDRE to test training readiness if they must. It would certainly be a shame to lose the most valuable and most realistic training tool to come down the road in decades.

The Human Factor

by Major William C. Wood

The article in the January-February issue of *ARMOR* Magazine by Captain Donald B. Skipper is a much needed reemphasis of what all of us involved in Army aviation have seen to be true, that the human factor is all-important in effective employment of Army aviation. With this in mind, it seems worthwhile for me, the flight surgeon of the U.S. 1st Armored Division, to review for the readers of *ARMOR* my thoughts on crew rest and pilot stress.



Pilot Stress

Aviator fatigue was a major contributor to the majority of aviator deaths in World War I. Over 90 percent of aviator deaths in that war were due to noncombat causes, many of which were "pilot error." Aviators were often noted to become isolated mentally, lose interest in surrounding activities, then later develop difficulty with sleep. Many died in sometimes mysterious aircraft "accidents," that we today recognize as fatigue related. In World War I, crew rest policies were poor or nonexistent, and difficulty in mission accomplishment and the inevitable loss of life were the results.

World War II saw the United States implement much improved standards of mission limitation. Our armed forces used aviators who had become skilled in combat as instructors for our new pilots. However, fatigue remained a problem. Prolonged over-water flights, long-distance strategic bombing, and night air combat were large scale aviation activities in that war.

The U.S. Army experience in Vietnam reemphasized the fatiguing aspects of warfare in tropic climates. Studies performed during that period again pointed out that limitation of flying hours is not a panacea for flying fatigue. These studies showed the importance of "days off" as crucial to adequate crew rest. Yet, Army aviation demonstrated its tremendous ability to provide airmobility, fire support, rescue, and reconnaissance in varied terrain during combat.

Today in Europe we face a different threat, with increased antiaircraft armaments. Nap-of-the-earth (NOE) flying is essential to mission accomplishment. NOE techniques are more fatiguing, stressful, and require more training. Night low-level flying adds an additional element of difficulty to an already demanding and hazardous task.

Stresses acting on the aviator range from those intrinsic to his environment (vibration, cockpit characteristics, temperature extremes, aircraft handling and flight characteristics, NOE flying) to those related to ground responsibilities (command duties, psychological and family problems, inactivity). In many cases, each unit has a unique set of stresses, not shared by other units.

Even aircraft and their related stresses are different. The *OH-58* requires more physical effort to fly than does the *UH-1 Huey.* Rational crew-rest policies dictate that we distinguish the varying fatigue problems associated with different aircraft. The importance of hot meals, showers, and a current newspaper during nonflying periods for pilots flying dangerous missions cannot be overemphasized.

The potential for disaster lurks behind each aviation mission. We must do all we can to make flying safer. An aircraft accident results in human tragedy and needless aircraft loss. Adequate, readily available aviation medical support is absolutely essential to maintain aviator effectiveness. Knowledge of family and personal problems by commanders and aviation medical officers will do much to point out the aviator whose flying may become "below par" due to non-aviation-related stresses.

Particular attention must be paid to the problems of night flight. The aviator at night must deal with special problems of vision, fatigue, and vertigo. He must receive adequate and continuing training in visual techniques for night flight and learn to use off-center vision for target tracking, scanning techniques, and silhouette recognition. "Reversed cycle" training must consider whether aircrews actually rest while off-duty, in this case daytime periods, and must allow adequate pre-flight darkness adaptation. The establishment of training programs for NOE and night flying constitutes a valuable safety asset to all Army units. Night vision techniques would be a valuable asset to armor and mechanized units.

Aviator Fatigue

There is, at present, no useful measure of fatigue. Only by observing individual aviators for "performance decrement" can we begin to distinguish those who are fatigued. Some of the signs we teach our aviators to look for are overcontrolling, irritability, errors in timing, missing tasks which are part of a series, and less smooth aircraft handling.

The fatigued pilot is easily distracted, may develop target fixation, and neglects certain instruments and flight duties. Fatigued pilots are more susceptible to vertigo, an often lethal problem in flying. They have poor judgement, slowed reaction time, and are unable to recognize their growing performance deficiency. This last problem, that of inability to recognize their performance deficiency, is perhaps the most hazardous and dangerous element of flying fatigue. Like carbon-monoxide poisoning, as the situation becomes more and more dangerous, the individual becomes less and less capable of recognizing and dealing with the problem.

We are, at present, involved in a continuing effort in the 1st Armored Division to teach our aviators to recognize the signs and symptoms of fatigue and to alert commanders and the aviators themselves to look for fatigue in those individuals with whom they fly.

NOE flying multiplies many of the above stresses. In particular, control movements are increased, flying hazards and obstacles are much closer, and repeated changes in altitude, heading, and airspeed are necessary. Combat in the NOE environment will add even more hazards. Proper consideration of the previously listed signs of fatigue will allow the units themselves to recognize and manage effectively the fatigued aviator.

We teach our aviators to distinguish between acute skill fatigue, the first stage of fatigue, and chronic skill fatigue, a later, and perhaps more worrisome, form of this problem. Acute-skill fatigue is the term that refers to the many signs and symptoms of flying fatigue in their early stages.

In general, one or more of the listed indications of aviator performance decrement and fatigue will be present. The aviator is not as keen in performance as previously, may lose interest in flying, and may become complacent. He may overcontrol, be unusually irritable, or may overlook tasks in a series. The use of the checklist is particularly important in all aspects of flying because all aviators become fatigued at some time.

Acute-skill fatigue is effectively managed in the unit environment with rest and natural sleep. Aviator fatigue can be decreased or prevented by attention to work-rest cycles, limitation of flying hours, minimizing self-imposed stresses (diet, alcohol or drug misuse or abuse, smoking), improvement of crew living and working conditions. Most importantly, there should be a unit program that receives support from the commander on down and emphasizes flying fatigue as a safety hazard. The mission-oriented aviator who is fatigued is a hazard to himself and to all those with whom and above whom he flies.

Chronic-skill fatigue is a more advanced degree of fatigue in which insomnia, loss of appetite, severe signs and symptoms of fatigue, and growing performance decrement are evident. The aviator with this problem must receive a medical restriction from flying duty until adequate rest away from duty allows him to regain his flying ability. The unit flight surgeon and the informed commander must work together as a team to manage these individuals in order to allow for adequate rest.

Flying Hour Recommendations

With the knowledge that limitation of flying hours constitutes only one element of a program designed to reduce and recognize crew fatigue early, it would perhaps be helpful to review some of the current 1st Armored Division recommendations. The table below lists the current crew rest recommendations for maximum flying time limits for the listed period for non-NOE flight during noncombat periods.

Dual Pilot Aircraft (*UH-1*)		Single Pilot Aircraft (*OH-58*)	Combined Total Time
1 day	8 hours	6 hours	7 hours
7 days	30 hours	20 hours	30 hours
30 days	90 hours	70 hours	80 hours

The commander has the final decision as to whether aviators exceed these flying hour limits. This is as it should be, for commanders must weigh all factors bearing on mission accomplishment. However, it is the author's hope that commanders will consider all of the previously listed factors in reaching their decisions. In particular, involvement of the unit flight surgeon and the unit aviation safety officer as actual consultants in the decision making process as to flight hour limits is crucial. Aviator and nonaviator unit commanders should realize that these two individuals are able to help them with what otherwise is an even more difficult decision.

The personal opinion of the author is that the *AH-1 Cobra* should be considered a single pilot aircraft in terms of crew rest policies. The unit flight surgeon and aviation safety officer should be used to evaluate pilots individually when these pilots exceed the previous flying hour limits. With the concurrence of these two individuals (flight surgeon and aviation safety officer), additional flying time could be recommended at 2- to 3-hour intervals before reevaluation. The author believes that this technique could be effectively employed to ensure mission completion in a safe and effective manner.

Our current recommendation is that NOE flights not exceed 1 hour, 15 minutes. The total flight may well exceed this time, but the NOE component of the mission should not exceed the 75-minute time limit. A maximum of three flights per day with a 2- to 3-hour rest period between flights should be implemented for all aviators engaged in NOE missions. Rotation of mission types is strongly advised. A maximum crew duty-day should be 12 hours long, and crew members who perform such duties as officers of the day, staff duty officer, charge of quarters, or noncommissioned officer of the day, (or other duties which prevent a normal period of uninterrupted sleep) should receive a minimum of 8 hours off-duty time prior to performing flight duties. Eight hours of uninterrupted sleep is recommended prior to flight duties.

I strongly believe that only when flying hour limits are used as a part of an overall program to recognize stress and prevent fatigue will these limits be rationally applied. A unit program emphasizing all of the preceding points will do much to improve the ability of Army aviation units to perform at their best and safest level. The threat has never been greater, nor has the challenge been more important to overcome. Army aviators can and will meet these challenges and overcome them if they receive informed, timely support and understanding of the unique aspects of the aviation environment. Only then can Army aviation be optimally employed.

We do not wish to repeat the past, yet we must all learn and teach others these lessons to avoid or reduce stress and to prevent and recognize fatigue.

MAJ WILLIAM C. WOOD graduated from the University of Tennessee School of Medicine. He was the Distinguished Graduate of the September 1975 Aviation Medical Officer Course, U.S. Army Aeromedical Center, Fort Rucker, Alabama. Major Wood is currently a flight surgeon for the U.S. First Armored Division.

XR-311—

A Star Waits in the Wings

by Lieutenant Colonel (Retired) Burton S. Boudinot

The first *XR-311,* a modified Baja Peninsula racing vehicle, was built in August 1970. During the 7 years of development, a total of 15 vehicles have been built in three design generations, and subjected to over 180,000 very rough test miles. Ten *XR-311* vehicles were purchased in 1972 by the U.S. Army to establish the military potential of this highly mobile vehicle. Tests were conducted with these vehicles during 1972 at Fort Benning, Georgia, Fort Knox, Kentucky, and Fort Gordon, Georgia. Additional *XR-311* testing at Fort Hood, Texas, during 1973 confirmed the vehicle's military potential in various roles.

Among some of the design improvements between the first and second generations of the *XR-311* were a heavy-duty, rear-axle differential, improved transfer assembly, heavy-duty axle half-shafts, heavy-duty wheels, improved parking brake, improved fabric top and side curtains, and a heavy-duty 24-volt starter.

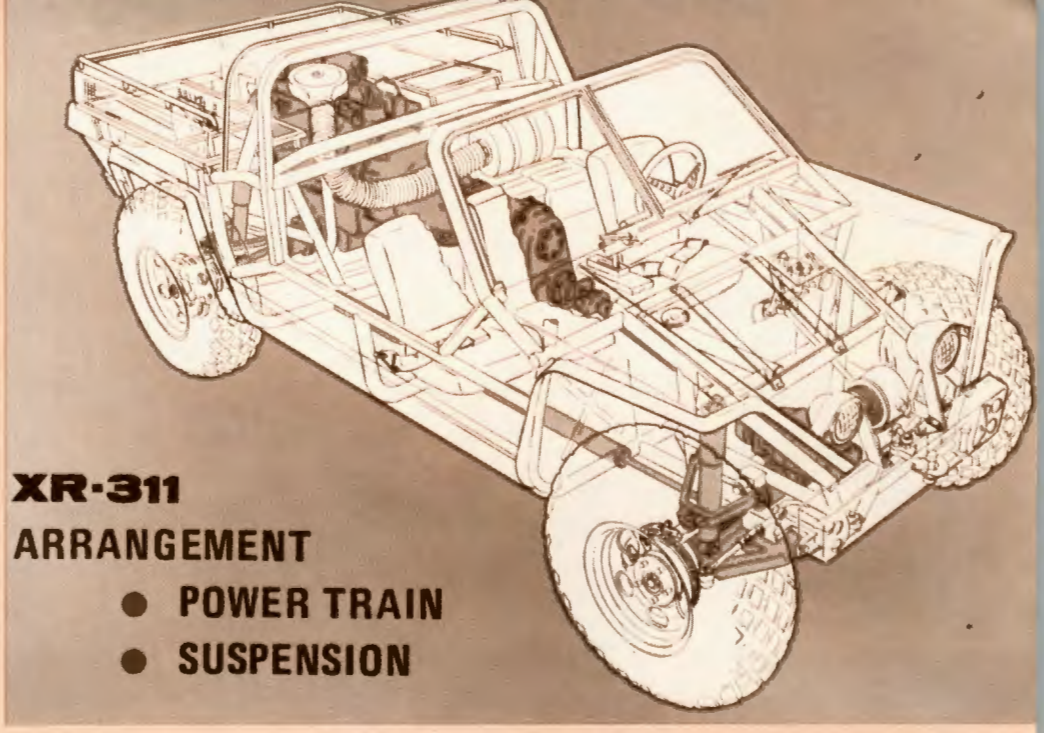
Between the second and third generations, even further improvements were made. Among them were a still heavier-duty rear-axle differential, open-joints in axle half-shafts, disc brakes, hydraulic, bump-stop type shock absorbers, the engine cover was changed to a full-width load-deck, a one-piece bumper, a transfer assembly adapted with a vacuum-powered lockup control, the front hood was lowered 9 inches and the headlights were remounted.

The *XR-311* has the ability to carry 2,000 pounds of men and material, and can traverse desert sands, snow up to 18 inches deep, and ford streams, without preparation, up to 30 inches deep. The vehicle can accelerate from 0 to 30 m.p.h. in 6 seconds, traverse 60 percent forward and reverse slopes, and 50 percent side slopes. The top speed of the vehicle is over 55 m.p.h. This highly mobile and agile vehicle can move rapidly in and out of defilade, which

increases its survivability as a weapons platform.

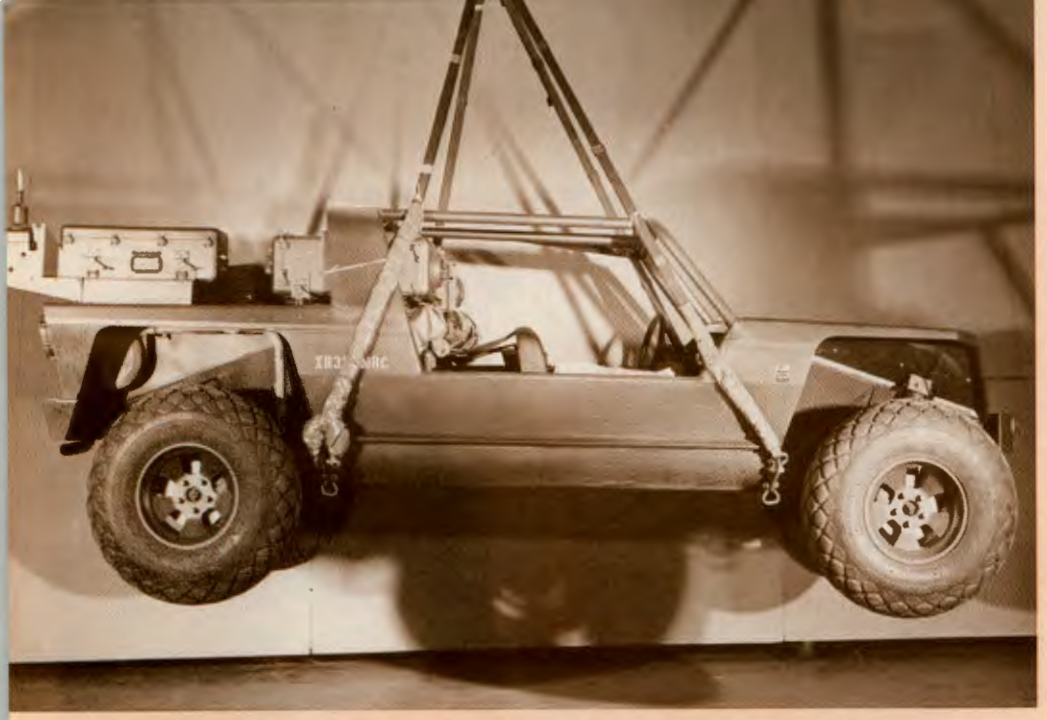
This tubular-framed vehicle is powered by a Chrysler 318-cubic-inch V8 engine and a Chrysler Torque Flight 3-speed automatic transmission. The power from the automatic transmission is converted through a transfer gear case which employs an inter-axle differential and lockup. The front and rear axles from the transfer gear case terminate with limited slip differential assemblies. These differentials assure that the vehicle's power is applied to the wheel that meets resistance. Each wheel of this full-time, 4-wheel-drive vehicle is independently suspended and employs a heavy-duty, double A-arm suspension with conventional torsion-bar springs and modified heavy-duty Delco shock absorbers. Power disc brakes on all four wheels and power steering assure quick stopping and easy handling. Over 60 percent of the *XR-311's* parts are standard in the Army's inventory.

The *XR-311's* tire is a major element in the vehicle's performance. The vehicle does not need a spare but has, in



The *XR-311* is powered by a 318-cubic-inch V8 engine and a 3-speed automatic transmission. The vehicle incorporates a full-time, 4-wheel drive system, with each wheel being independently suspended, and employs a double-A arm suspension.

A highly mobile vehicle, the *XR-311* can traverse desert sands, snow up to 18 inches deep, and ford streams up to 30 inches deep.



The *XR-311's* gross vehicle weight of 6,600 pounds is compatible with the lift capability of UTTAS, *CH-47* helicopters, and *C-130* or *C-141* aircraft.

effect, a spare in each tire. The inner and outer tire act as a compound spring which assists the suspension in absorbing energy. The low-pressure outer tire carries from 8 to 10 pounds per square inch (psi) and gives a unit ground pressure of 7.7 psi. This compares with *MICV's* ground pressure of 6.8 psi. The high-pressure inner tire, which acts as a spare, carries 50 psi and provides the vehicle with a get-home capability in the event of puncture of the outer tire. The inner tire can be foam-filled in the event of severe battle damage.

The cross-country mobility of the *XR-311* is a result of a combination of contributory effects of the 9-inch wheel travel permitted by the double A-arm suspension, the torsion bars, the heavy-duty shocks and the wide footprint of the tire. A total 15 inches of wheel travel and tire compression are possible at each wheel.

The *XR-311's* mobility makes it an effective configuration as a light scout vehicle and its ability to carry a 1-ton combat load makes it an excellent platform as a weapons carrier. The vehicle is particularly suitable as a *TOW*-missile carrier. In addition to carrying the basic ground *TOW* missile system with its night sight and batteries, the vehicle can carry a total of 6 *TOW* antitank missiles. A ring-mounted *TOW* system gives the gunner a maximum field of fire while providing him with some protection with a non-metallic armor blanket made from nylon or Kevlar.

The ring mount is also suitable for carrying the *Dragon* missile, .50 caliber machinegun, 40-mm. *MK-19* grenade launcher, and the ground laser locator designator (*GLLD*). The vehicle has also been outfitted with pintle mounts suitable for mounting the 7.62-mm. *M-60* machinegun and 40-mm. grenade launchers. The 106-mm. recoilless rifle has also been installed and successfully fired from this vehicle.

One *TOW* missile system, as presently employed, utilizes four men, two *M-151* 1/4-ton jeeps, and a trailer. One *XR-311* can carry 3 or 4 men and their equipment, the *TOW* missile system, 6 *TOW* missiles, a ballistic nylon or Kevlar armor shield, and a camouflage net.

The *XR-311,* at its gross vehicle weight (g.v.w.) of 6,600 pounds, can be airlifted by the utility tactical transport aircraft system (UTTAS), or can be transported in *CH-47* helicopters, *C-130* or *C-141* aircraft. This airlift capability gives the Army the ability to laterally deploy many vehicles in a given area in minimal amount of time.

The *XR-311* represents a significant breakthrough in wheeled mobility acting as a weapons platform. The versatility of the *XR-311* could add a new dimension to the combat-effectiveness of armor, infantry, airborne and air-mobile divisions in many diverse roles.

The photograph below shows the diversity of the *XR-311* as a weapons platform. From left to right, the vehicles are equipped with the *M-60* machinegun, *M-2* HB .50 caliber machinegun, and TOW.

COMBAT PISTOL

by Captain Lynn E. Lanzoni

From accounts of the October 1973 War, we know that in the next battle, a great many of the 3,000 tankers in an Armored Division who are armed with the .45 caliber pistol will be forced to defend their lives with the weapon. Yet, too many of these tankers do not have the confidence in this weapon nor the skill in using it to come out the winner in this self-defending combat.

Current training methods and techniques as written in FM 23-25, "Pistols and Revolvers," do not prepare the tanker to become the quick and the alive. What can be done to correct this lack of skill and resulting lack of confidence in combat pistol shooting? I suggest that new combat pistol shooting techniques, qualifying courses, and training methods be adopted.

Technique

First, the tanker must grip the .45 with a two-handed grip that improves quick, accurate pointing and gives greater control over the recoil, thereby making successive shots possible and accurate.

Start by closing your shooting hand around the pistol, aligning the pistol and forearm, and then raising your arm. Now, bring up your nonshooting hand for support and clasp the fist; the first finger of your support hand should now be holding much of the pistol's weight via the trigger guard. The hands cancel all movement through the opposing force principle because each one pushes or pulls slightly. Next, you form your arms into a vertical triangular formation which brings into use all the muscles of both arms and shoulders. Position your arms by bending the shooting arm ever so slightly and pointing your elbow to the ground. Bend the supporting arm sharply at the elbow and bring the elbow toward the belt buckle. No change to the natural stance is necessary. In fact, crouching is counter-productive in achieving speed and accuracy. Again, the effect is good pointability and good recoil control.

Pointing coordination is instinctive, but equal success will

Two-hand Grip

be achieved with aimed fire from any position. The technique is a combination of natural point and a verification of sight alignment and target. This verification can be done in as little as 1/100th of a second.

I do not believe firing will be done from the crouch position as shown by FM 23-35. The tanker using a .45 in self-defense most probably will be in the prone position and strain will be canceled because the head, arms, and body are supported naturally.

The kneeling supported position will be the next most used position. Why? This position gives you cover while providing a better field of vision for target acquisition. Assume a kneeling position by bending one leg at the knee until it is on the ground. Maintain your upper body in the same relative position to your hand and arm position, then merely rest the back of your supporting hand against the cover.

In some situations, the tanker may also find himself firing from an open hatch. Again the basic two-handed grip should be used, with the heels of the hands resting on the edge of the hatch. As in the other positions, the butt of the

Two-hand grip

Rapid reloading

pistol should not come in contact with the support.

Qualifying Course

Unfortunately, the capability for subjecting the tanker to the realism of acutal combat is limited on the qualifying course. Far from the ideal conditions usually enjoyed on the range, the tanker, when facing the enemy who intends to kill him, will find poor lighting and terrain. But most important, he will be forced to shoot while under severe emotional stress.

Products of this stress—rapid heartbeat, hurried and irregular breathing, and muscle tremors—make accurate shooting difficult.

The simulation of emotional stress is difficult. Physical stress, however, can be easily induced into qualifying courses. A combination of firing from a hatch; dismounting and firing from the cover of the tank hull or tracks; sprints; low crawl; and obstacle courses, depending upon the range situation, will produce physical stress. The stress may be added to all or part of the qualifying course.

Finally, the qualifying course should test firing from prone, kneeling, and other supported positions.

Training Methods and Aids

The first training requirement, physical training (PT), is the best remedy for physical stress from various positions or general combat. Even the eyeball muscles should be exercised for best shooting. A simple exercise is to rotate the eyeballs in a 360 degree circle, focusing them on the horizontal and vertical extremities.

A good grip developer is alternating between holding a weight at arm's length and squeezing an inverted spring grip with the trigger finger.

An inexpensive trigger squeeze training aid is a small stick of wood, the length of which approximates the distance between the trigger and backstrap of the pistol. One end of the stick of wood is inserted in the web of the shooting hand and the first joint of the trigger finger is placed on the far end. The shooter squeezes the stick as a trigger; movement straight back into the web is correct, but movement to either side is incorrect.

Finally, fast draw practice is not as necessary, but rapid reloading practice will be vital. Rapid reloading becomes automatic by drawing from your spare magazine carrier the same way all the time. The photograph better illustrates a method for speed and security using the issue carrier.

The issue .45 pistol is an effective man-stopper. Practice of these techniques and training methods gives the tanker the skill and confidence to defend himself when most vulnerable.

CPT LYNN E. LANZONI was commissioned in Infantry upon graduation from the University of Alabama in 1969 as a distinguished military graduate. After attending Infantry Officer Basic Course, he served as a platoon leader and company commander in the 82d and 101st Airborne Divisions. After completing AOAC, he was assigned to the Directorate of Training Development, USAARMS. Captain Lanzoni is now pursuing a doctorate degree at the University of Oregon.

The Last Word

by Lieutenant Colonel David C. (Doc) Holliday (USAR-Ret.)

The first prize for getting the "last word" must go to a Cavalry Captain whose name has been forgotten. Let's call him Captain Mike. Captain Mike was not your usual Cav officer. For a start he stood somewhere around six foot five and was built like a tight end in the NFL. His weight seldom fluctuated from a rock hard 225 pounds.

Now Captain Mike had been assigned to the division when it was filling up in preparation for gyroscope to Europe. As he processed in, the Headquarters Commandant saw his records and grabbed him off to command the division Headquarters Company, truly a terrible thing to do to a trooper. His pleas for reconsideration fell on deaf ears until at last the division G1 made a promise to assign him to command of a cavalry troop after he's had the headquarters job for 1 year. As the year progressed, the division staff found that to a man they liked and respected the young man. Commanding such a company is bad anytime but to move it from Fort Hood to Germany would try a saint. Worst of all, the division commander was one of those people who could eat a million calories a day and never gain a pound. Such people often look upon those heavier souls as misfits needing constant restraining. In the CG's mind, anyone weighing over 200 pounds was fat and he let them know it. Captain Mike became something of a favorite target.

At last the year was over and true to his word, the G1 came through with a set of orders sending the captain to the Division Recon Squadron where a Cavalry Troop awaited. Such was his popularity around the headquarters that a cocktail party was arranged on the eve of his departure.

The party was in full swing with almost the entire staff present when to the surprise of everyone, the division commander entered the room. His dislike of such affairs was as well known as was the fact that he never missed an opportunity to comment on Captain Mike's weight. A drink was, quickly handed to him and a sort of hush prevailed as he walked across the room to the honoree. The General's greeting was true to form.

"Well Captain, they tell me you're finally going to get your Cav Troop. I guess now you'll lose some weight so you can get in and out of your tank."

The Captain straightened to his full six foot five and looking straight down into the general's eyes, replied.

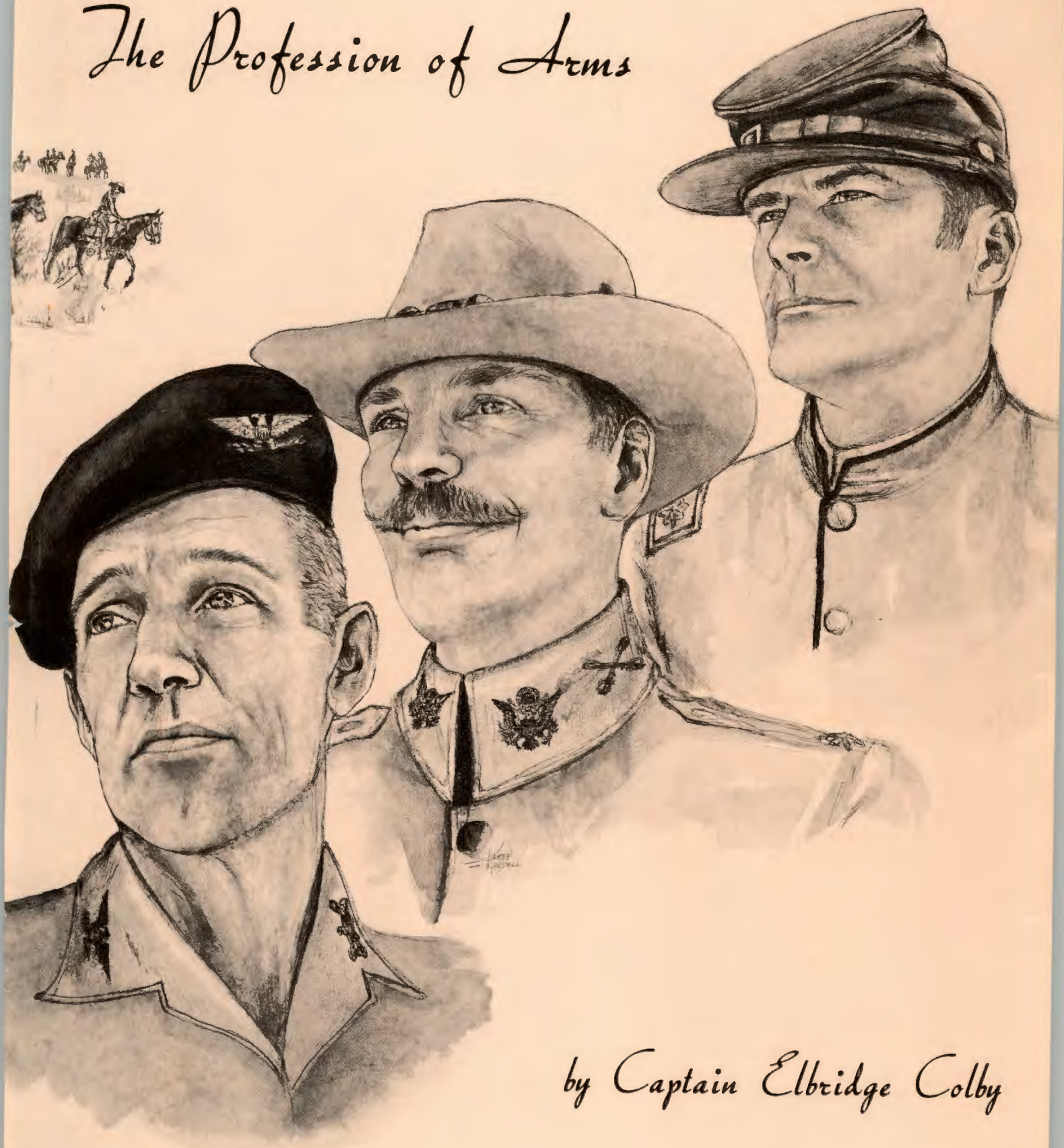
"Not really General, I don't plan to go in and out through the gun tube!"

It was one of the very rare times the general was known to have cracked a smile during his tenure of command. ▲

The following is another outstanding piece extracted from a volume of the Cavalry Journal. It was written in 1922 by Captain Colby, U.S. Cavalry. We have been unable to determine how long the author served his army or to what height he rose; but his message then, and for us today, is clear and meaningful. I hope it makes the professional soldier who reads it stand a little taller as he walks into work tomorrow. — *Ed.*

Who, whether praise of him
must walk the earth
Forever, and to noble deeds
give birth,
Or he must go to dust
without his fame,
And leave a dead,
unprofitable name,
Finds comfort in himself and
in his cause...
This is the Happy Warrior;
this is he
Whom every man in arms
should wish to be.—Wordsworth.

The Profession of Arms



by Captain Elbridge Colby

A young man entering upon a career in the Army must realize first, last, and all the time that he is embracing a serious profession and not merely taking a "job." There are many professions in this world—engineering, law, medicine, the ministry, teaching, and a host of others—and there are many "jobs," from that of the corner grocer to that of the department store owner. The person who holds a "job" works for money; he handles it as a part of his trade; he sets his prices so as to secure it; he dispenses eatables and garments, to be sure, but for money; he reckons his success in cash balances and the number of dollars and cents thereon, not in the number of hungry or ragged people he has fed or clothed.

The professional man has another point of view. He accomplishes the task which comes to his hands for the sake of the task. The engineer harnesses the forces of Nature and applies her laws to create a useful work. The lawyer, unless he is a "shyster" and therefore unprofessional, zealously upholds public order and public ordinances or honestly guards the just rights of his client, and wins his case for the joy of winning, not for the fees. The doctor solemnly takes the Hippocratic oath to serve mankind, and places his services always at the call of the sick, at any hour of the day or night. The teacher charged with the responsible duties of education and the most poorly paid public servant we have, teaches well for the love of the work. The minister hears his "call" and preaches the Word of God, not from a desire for money, but from a wish to do his duty according to his inspiration.

It is as impossible for an educated professional man to think chiefly of profit as it is for anyone but a glutton to think chiefly of his dinner. We all must eat to live, and we even enjoy eating. We must all receive salaries because without them we would cease to live; and we even enjoy receiving our salaries. But professional men do not think solely of their salaries, anymore than others think solely of their dinners. The love of the work overshadows the thought of the remuneration. This is the professional spirit. Our principal interest in life is in our work.

Yet the professional work of an Army officer has still less influence on his income than that of the engineer, the lawyer, the doctor, the teacher, and the minister. If one of these does his work exceptionally well and makes a reputation, he is straightaway given greater and greater responsibilities and his income increases commensurately, even though the monetary rewards may be simply some of those things that are added afterwards, even though the period of large returns may come late in life and be very short.

The Army officer, on the contrary, receives no reward, either in increased pay or in increased rank, for especially meritorious service. He must wait his turn for promotion under a strict rule of seniority. Of course, there have been a few exceptions. General Goethals and General Wood received special assignments from the President, proved their ability, and achieved worldwide fame. General Pershing was singled out and jumped from captain to brigadier. But these are rare cases. In general, the rule is that, regardless of ability, the Army officer is promoted only in accordance with his position on the list. When war comes, testing all by the truth of the sword and the equity of the rifle, temporary advancement may come with it; but it is only temporary, and at the end all revert to their former grades. Politics is barred, and properly so. The only incentive for the man in khaki is his love of his profession; his only reward his satisfaction and delight in his elected field.

Why, then, should any one adopt a career where the advancement is of a pedestrian character, step by step up the Army list? To this question there is but one answer: adopt this career only if you like it for itself alone.

"It must be dreadfully monotonous," I have heard folks say, and I always reply, "No more monotonous than running a subway express train from the Battery to Van Courtlandt a certain number of times a day; no more monotonous than correcting college examinations or pleading endless cases in court all your years."

In fact, Army life is far less monotonous than any of these. It has almost unlimited variety. The officer does not simply stand in front of a line of neatly clad men and shout commands which spin them here and there in pretty movements on parade. Amid the drums and tramplings of war, even, he does not simply shout, "Follow me!" and rush bravely forward mid shot and shell, while his noble soldiers take their cues in that "dreadful and impassioned drama." The Army officer's chief work is in the teaching and training of men—a varied and always interesting problem, and an enthralling one, too, for his results are reckoned in human lives.

To arrive at battle efficiency for his unit, he must concern himself with the details of hygiene and sanitation, with smoothness of administration, with questions of quarters and cooking, with finance and property accounts, with recreation and physical exercise, with education and behavior, with organization and *esprit de corps,* with loyalty and with punishments. He has more responsibility toward the men under his command than a father toward his children; more duties to perform than the mayor of a town. He controls his unit, whether a platoon or an army, in everything. He has to perform all the functions of government except those of legislation.

Then there are the fascinating personal elements—plenty of healthy outdoor life, a pleasant community spirit with comrades of the same temperament; the joy of developing and training men; the idealism of the service; the change of station from Manila to Alaska, from the Golden Gate to Texas, from Minnesota summers to Georgia winters; the boundless reaches of the West; the tropical breezes of the South; the hills and valleys of the

North; the interesting places and the charming people. The thoughts that come and the sights you see, even when inspecting the guard after midnight, occupy the mind and enrich the soul. Not the pomp and circumstance of war, not the sharp clash of bayonets or the roar of bursting shells, but the many-colored lights of life and the steady building of military character—his own and those of his men—these are the things in which the Army officer delights. He who can enjoy these simple, homely pleasures may well adopt the profession of arms.

There are many delightful elements in an officer's life. If he were not in uniform and not a part of the military establishment, he would never know them. They are, perhaps, too vague and indefinite for accurate description; yet they combine to create an almost unreasoning prejudice in favor of the Army.

I grant that there are disagreeable things about the career. You will serve at times in unpleasant stations, where the heat of summer is oppressive or where the cold of winter is almost unendurable. You go where you are sent and do what you are told, whatever your inclinations. You separate yourself from former friends and family, and are able to see them but rarely. You live often at an inconvenient distance from towns that are far from interesting when you do get to them. There is mud, rain, hard marches, and hot, dusty roads to travel. Yet what outdoorsman does not like to tell of his "experiences," and who would want to have missed the fun?

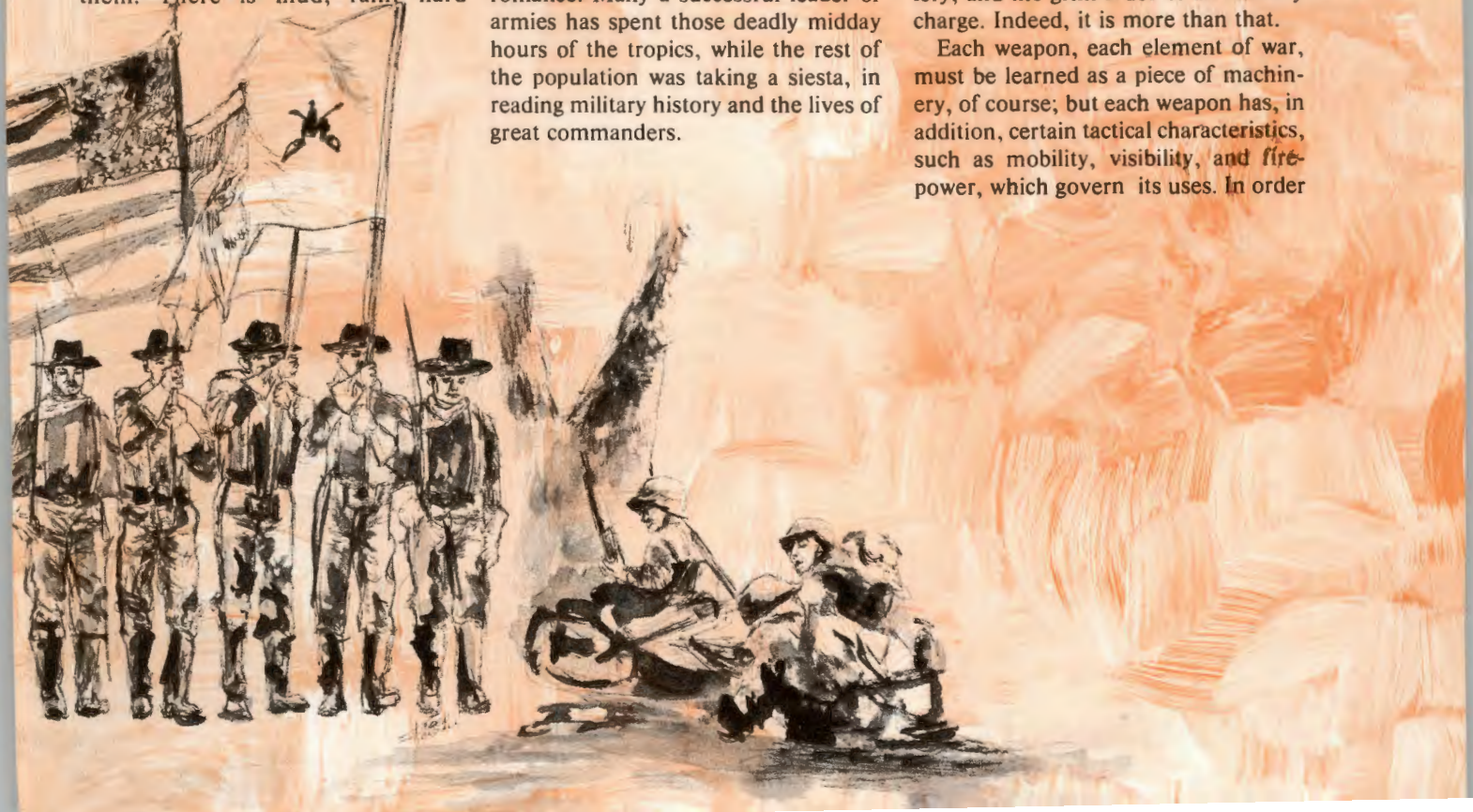
In addition to all this, there is something more important to be said of the career of an officer. The Army is now a learned profession. To plan and provide for the organization and training and mobilization of all our national manpower in such a manner that our armies—Regular, Guard, and Reserve—may take the field efficiently requires on the part of officers the serious study of the science and art of war. An "intense longing for active service" is not enough. A man must have made a deep study of his subject, of the immutable principles of war and of their many means of application with modern weapons, which are neither simple nor few. He must have stored up an inexhaustible amount of information.

Soldiers are trained for battle, not for theatrical drill-ground effects; and the officer must equip himself to lead them well under circumstances where every mistake means wasted lives, where ignorance is a crime. Many an officer has devoured every book on the theory and practice of war that he could beg, borrow, or afford to buy. Many a future general has worked with his maps and copied plans with as deep an interest as a woman reads light romance. Many a successful leader of armies has spent those deadly midday hours of the tropics, while the rest of the population was taking a siesta, in reading military history and the lives of great commanders.

The Army is always on the way toward the next war, and he who would succeed himself and play his part in a successful campaign must devote himself strenuously to the duties of his profession. It is not enough to have fought bravely and nobly led his men. He must have led them well. This can only be done by the man who has embarked on the career with the true professional spirit, striving always to improve his own mind and to develop his own abilities and aiming always to advance the interests of the Army as a whole.

There are commands and movements to be learned out of the drillbook. There are many weapons to be mastered, in their mechanical construction and in their operation. There are scientific facts to be assimilated—trajectories, vulnerability, velocity. There are practical matters to be mastered concerning transportation, and all the details of caring for a mass of men, from garbage collection to sewerage, water supplies, food supplies, housing, wireless telegraphy, and airplane photography. There is an almost encyclopedic amount of material to be studied and remembered. But to say that these things can all be thrown in the balance and war simmered down to an exact science is to betray as great an ignorance as that of the man who thinks that combat is merely a rush of cavalry, a roar of artillery, and the grim ardor of an infantry charge. Indeed, it is more than that.

Each weapon, each element of war, must be learned as a piece of machinery, of course; but each weapon has, in addition, certain tactical characteristics, such as mobility, visibility, and firepower, which govern its uses. In order



to employ it efficiently, sound thinking must exist—in the soldier who directs the piece as well as in the higher commander who orders it into position. Keenness of imagination, quickness of observation, rapidity of decision, and simplicity of action—these are the things, inculcated by experience and training, which make a good officer. These are human elements. Indeed, if war were purely an exact science, we could count bayonets and shells and not bother to fight. Yet so delicate are the distinctions that it is to be doubted if it is not superiority of spirit rather than superiority of fire, men and metal, that finally determines the victor.

War is an art, not a science or a trade. There are general principles to be learned, and then to be applied in a wide variety of cases. There are no inflexible rules and laws of battle. A scientific oneness of method, as the Germans found out to their cost, is out of place in action. Every company of men is different, in spite of the uniforms and in spite of uniformity of training. Every piece of terrain is different, as is every situation, and each requires a different estimate and a different handling.

The military man has his problems, his personnel, his weapons, his terrain, his means of concentration and supply. In his early training he learns these mechanically; later he becomes able to employ them with due regard to their characteristics, their capabilities and limitations—sagaciously, logically, instinctively, and decisively. This is the art of war, a high and peculiar art, using more and more of scientific appliances as the years go on, but not a science; essentially dependent upon its own fluctuating conditions of give and take, upon its own most important element, the art of commanding men.

Listen to the words of Carlyle:

The commander over men; he to whose will other wills are to be subordinated, and loyally surrender themselves, and find their welfare in so doing, may be reckoned the most important of great men.

The manner and the means of training troops and of waging war are ever changing. The "summer soldiers and sunshine patriots" under Washington handled weapons that seem as hopelessly primitive to us as our grenades and long-range artillery will to the embattled warrior of a hundred years hence. Times change, and the military mind must ever seek the best uses of the new arms and the new projectiles.

Simply because the regulations now say a thing is thus and so is no reason it should always remain thus and so. If a new idea is worthy, it will be properly tested and approved. There is plenty of room for initiative and ingenuity. The officer may conduct his own studies, may make his suggestions, through proper channels to higher authority, and may received intelligent criticism and adequate recognition. If his ideas receive favorable judgment, they are likely to be incorporated into the training regulations of the Army, and to supersede such portions of those regulations as they may contradict. Rewards may not always be prompt, but good work is always good work and eventually will accomplish its aims, the improvement of the service.

The officers of the Army work for the good of their profession. They do this without hope of tangible reward, and an officer's character and professional standing, as General Carter has said, are about all he has usually to represent his many years of service by flood and field. Even then acts of commission or omission may blight or terminate his career. As an Army officer, I am naturally loath to say nice things about Army officers, but prefer, and, may I hope, be allowed, to describe them in the words of Mr. Root, who remarked:

The officers of the Army conform in their character and conduct to the purpose for which the Army is maintained and the character of the people from which they come. I wish to say to you, not in the language of rhetoric, but as a sober statement of what I have found by observation, that they are free to a degree which I never dreamed of, until I commenced to know them, from the vices which have prevailed in most armies of the world during all history. They are a temperate set of men. They are freer of the vice of drinking to excess than almost any other class that I know of in this country. They are free from the vice of gambling. No such thing as duelling, which disgraces and deforms many military services, obtains in our Army. The man who is dissipated is out of favor, and the public sentiment of the officers of the Army is opposed to dissipation and excess. The man who does not pay his debts falls into disfavor, and it is an offense which is punishable in the Army.

(Mr. Elihu Root, the Secretary of War under President McKinley, established the General Staff System—Ed.)

For the inefficient or misplaced officer there are now provided special and easy means of elimination. There are efficiency reports, and periodical ratings, and probationary periods. Your worth is always plain and you go on to honor and distinction or else leave "for the good of the service."

The standards of the Army are high as regards character as well as regards training. Furthermore, you never bury your dead past. It may seem strange, but it is true. A seemingly slight affair may have stupendous results. Everything you do, good or bad, remains on your record and in the minds of your fellows. You never get away from yourself so long as you remain in the service. A man's reputation stays with him always, until he resigns or retires. It follows him up the Army list from grade to grade. It goes with him from regiment to regiment, from Coblenz to Luzon, from Devens to Del Rio. And this is justly so. He who leads must be fit to lead. Our Army is very proud of its good reputation and very careful of it. The Army insists on high ideals in personal conduct and on a thoroughly professional spirit. The Army knows what battle is, and strictly maintains that dissipation of idleness in peace and gross brutality in war are absolutely beyond the pale. Character counts. The Army knows this, and in all its earnest endeavors strives to make itself the best Army possible, so that when it meets the storm of battle in authentic form it can accomplish its duty thoroughly and well. The Army appreciates, as perhaps few others do, the truth of the words of Steinmetz: *When God holds his assizes and hurls the nations against one another in combat, there is no single element of physical, intellectual, or moral strength or weakness which does not weigh in the balance.* ▲

THE RATEL

by H.R. Heitman

The South African Army has recently put its new mechanized infantry combat vehicle (MICV), the *Ratel,* into service. Locally developed and produced, the *Ratel* (pronounced RAH-TEL) is optimized for local conditions (not the least of which is climatic), requirements, and capabilities (financial, industrial). The S.A. Army has long operated a large fleet of wheeled combat vehicles, gaining considerable experience in the process. Full use was made of this experience as well as of analyses of foreign developments and trends during the development phase.

The *Ratel* weighs about 16 tons and follows a 6 x 6 layout. It is fitted with a fully independent suspension system and run-flat tires. Power from its diesel engine is transmitted via an automatic gearbox. On roads, it attains a maximum speed of approximately 105 km.p.h. (65.2 m.p.h.) while its cross-country mobility is such that it is well able to keep pace with tracked vehicles.

The armament comprises a 20-mm. cannon and a coaxial 7.62-mm. machinegun in a turret with 360-degree traverse. An antiaircraft machinegun and smoke-grenade launchers are also fitted. Additionally, firing ports are provided for the 7-man infantry section. Protection is provided against small-arms fire and shell fragments with hinged armor flaps covering the driver's windows.

Apart from the infantry section, the crew comprises the team leader, gunner, and driver. The latter sits centrally in the front of the vehicle and is provided with both windows and periscopes. The commander is provided with a true cupola—a unique feature among MICV's currently in service. Another notable feature is the fitting of flat hub caps which prevent clogging and snagging. These represent a lesson learned the hard way by the Germans in Russia that has been ignored ever since.

The *Ratel* is an interesting combination of effectiveness and simplicity. As such, it might be of more than passing interest to other armies requiring something more than a *Saracen* or *M-113,* but not requiring, or able to afford, one of the more complex, tracked MICV's. The name of the vehicle is that of the Cape badger—a particularly stubborn and tough soul noted for getting his way. ▲

Why Isn't the Basic Trainee Better Trained?

by Sergeant First Class Fred E. Kirtchen

The answer is really quite simple and so is the solution to better training.

The answer is.....DRILL SERGEANTS' FRUSTRATION. The cause of the frustration is not so simple to explain. But through my own exposure to the drill sergeant program, the cause has become glaringly obvious.

There are three main factors that contribute to this frustration. They are:

- Drill Sergeant School (DSS) approach to learning.
- The drill sergeant-to-trainee ratio.
- "Foxhole Disassembly Syndrome."

The first factor, which I believe to be the DSS approach to learning, is currently being dealt with by a task force which has been formed to systems engineer the DSS program of instruction (POI). While systems engineering has been around for many years in one form or another, the application of it to institutionalized learning environments has been limited. Recently, however, two gentlemen, Messers. Mager and Pipe, collaborated and designed a more articulated form of systems engineering. This latest generation of systems engineering is a veritable panacea for that which ails institutionalized learning environments, and is called "Criterion Referenced Instruction " (CRI).

What CRI is and how it works is not really germane to the points I am trying to make, except that it is the tool which the aforementioned task force is going to use to deal with the DSS approach to learning. However, there are a few items of CRI philosophy that might be beneficial to the reader.

In CRI, you do not start force-feeding knowledge to students at 0700 hours and then cease at 1700 hours. One reason is because all students do not learn at the same rate. I know this is obvious to everyone, but why do we continue to demand the assimilation of knowledge predicated on an arbitrary time frame?! *It really is dumb.* (Incidentally, General William E. Depuy, in November of 1974, told us not to do dumb things. The quote I have heard is, "Don't do anything dumb.")

With the CRI approach, a student is given as much control over the curriculum as is feasible. The feasibility is obviously based on the judgement of the course administrator or manager and the CRI concept has "tools" to assist a manager in making this judgement. Some students will have more control than others simply because knowledge baselines differ from student to student. An example of this is that a student with an Infantry background will probably know more about the *M-16* rifle than a student with an Armor background. If the Infantry student exhibits competency in the *M-16* and the Armor student does not, why force both of them to be subjected to the same instruction?

That is unrealistic and is not cost effective. It also doesn't take the Infantryman long to become bored and fall asleep. Falling asleep in class in Drill Sergeant School is not a terribly clever thing to do because you will be assessed demerits. If you become bored often enough, you can be eliminated

from the school. When that happens, the likelihood of sewing another stripe on your uniform diminishes considerably. You lose, your unit loses you, the Army loses, and your family loses. All of this can be traced directly to a "lock step" approach to learning.

"Lock step" instruction is when the instructor and his manuals are the only sources of information available to the student body. However, in CRI, each student is a source of information in addition to the instructor and his manuals.

Whether or not one accepts the CRI approach to learning is a moot point because responsible agency commanders have already done so. At the risk of being out of line, I'm going to say I know they are right.

But no matter how well-schooled the drill sergeant (DS) is, some fundamental changes in the employment of that drill sergeant must be made or the Army will have well schooled, frustrated drill sergeants. The Army will *not* have highly motivated trainees who can salute and shoot. What I'm leading up to is the drill sergeant-to-trainee ratio; and I'm convinced that if this ratio is not changed, all of the work being done to remedy the DSS approach to learning will be for naught.

Currently, there are supposed to be three drill sergeants and 55 trainees per platoon in basic training units. The ratio is about 18 to 1, if you have all three drill sergeants. Most platoons never have the luxury of 3 "drills" per platoon. Ask any drill sergeant. Some drill sergeants have suffered through cycles with a 55 to 1 ratio, and as a result, the trainees in those platoons could not have learned as much as they needed to. At a 55 to 1 ratio, the performance of a drill sergeant really begins to falter. He can't possibly train the whole platoon properly while taking care of the individual needs of four or five men (or even one man). The time demanded of him to successfully discharge his duties as a DS leaves him no time for his family. If this doesn't frustrate the hell out of him, how about his wife who unwittingly lets him know that she is fast becoming disenchanted with military life? The havoc of a strained marriage tearing at a man while he is trying to do an impossible job is apparent.

A TOE infantry platoon allows for 13 noncommissioned officers (NCO's) and one commissioned officer to supervise 27 other men—about a 2 to 1 ratio. I ask you, does anyone really believe that one NCO can effectively train 55 raw recruits!!!? The concept is utterly ridiculous. Please bear in mind that I am talking about *effectively trained* troops. Anybody can ramrod a platoon through basic and graduate them; however, that is not a function of training them.

With two DS's, the ratio is 27 to 1 and the trainee gets better training. It affords twice as much efficiency as a 55 to 1 ratio, but it is still 50 percent short of what it could be. The worst part of this 27 to 1 ratio is that all of the DS's frustrations still remain if the two DS's don't ensure some effective training for the trainees by working as hard and as long as one DS does at a 55 to 1 ratio.

It bothers me to say that a 27 to 1 ratio is better than a 55 to 1 ratio because it implies that there is something right about a 27 to 1 ratio. That is just not the case. The trainee who has minimal problems concerning the mastery of BCT skills will graduate with those problems. He will do so because while one DS is working with the platoon as a whole, the other DS is working with the ever-present trainees who can't even hit a silhouette, much less hit one of four targets on it, or the trainee who isn't coordinated enough to walk and chew gum simultaneously. (Pardon my use of that well-worn drivel, but uncoordinated human beings do exist and apparently quite a few of them want to be in the Army.)

If the second DS can bring trainees who are having major difficulties up to where they are experiencing only minor difficulties, they can rejoin the platoon as it moves along in the training cycle. As the platoon moves into new areas of learning, the process is repeated. On graduation day, just about all of the trainees who make it know a little bit about some of the things they are supposed to know *all* about. The net result is poorly trained troops and frustrated drill sergeants who know it. The frustration comes from being professionals who really give a damn, but are powerless to do anything about it.

Through the gloom of this frustration, there are a few bright spots though. They are called cycle breaks. They can last from 1 week to more than 2 months.

On one of these long cycle breaks, my unit had to get ready for an annual general inspection (AGI). During this time frame, I became familiar with the "Foxhole Disassembly Syndrome."

Preceding the inspection, my company was set up to house four platoons of 55 men each in four 36-man bays and in the smaller one- and two-man rooms in the hallways. However to accommodate the 55 trainees, we had 40 men in each of the 36-man bays, two men in each one-man room and, of course, 4 men in the two-man rooms. Why this was done almost makes sense when one realizes we only had seven drill sergeants in the company. Of the seven, one had to pull charge of quarters (CQ) and was off the next day.

This company organization resulted in the problem of too many trainees and not enough drill sergeants per platoon.

But for the purpose of satisfying regulations and the Inspector General (IG), we set the bays and rooms up so that they reflected the number of bunks and wall lockers that was compatible with the number of men the rooms were designed to accommodate. All of the extra lockers and bunks were taken to the first floor where a fifth platoon was set up.

The frustrations involved in doing such a *stupid* thing are too numerous to elaborate on with any specificity, but the point is this: Instead of pursuing viable alternatives, we "Disassembled the Foxhole." If the billets are not designed to accommodate more than a certain number of men, why cram them in? If the TDA calls for a certain number of cadre, why not have them? If desired results are not being achieved, why not change the approach so that the desired results are achieved?

An average DS of an understaffed BCT unit will spend the first 15 days working from 0430 hours to 2100 hours, 7 days a week, with his troops. After the first 15 days, he will have to be there from 0530 to 1830, provided the company commander doesn't want to counsel any of the troops. It's not unusual for a DS to run a temperature and have a cold from being run down, yet have to continue working the long hours required of him. This is his duty 6 days a week until the cycle ends.

All of these factors cause frustrations that will cause the DS to violate, at some time during the cycle, every principle of leadership that has ever been articulated. He will know he is doing it, but is beyond caring and wants only to survive

each day, while trying to save his marriage and his career. This certainly isn't an efficient way to train raw recruits. They are only being exposed to inefficiency. A lot of fired-up kids who wanted to shoot well and salute properly get turned off by this initial exposure to Army life.

It is unwise to expect that stopgap measures will make the problems more tolerable when they can be so easily solved! For instance, when the drill sergeant-to-trainee ratio is changed, the "Foxhole Disassembly Syndrome" will disappear. To achieve the optimum ratio does not require an influx of hundreds of new drill sergeants. The TDA is adequate now. The problem is the inequitable distribution of DS's and the incredible waste of their productive capacity during 2-month cycle breaks. Graduating a cycle of troops one day and picking up another cycle the next day doesn't make sense when 1- or 2-month cycle breaks are happening.

I would like to propose the following as part of the solution to the problem. First, reduce the size of the platoons to 40 men, thus creating a 13 to 1 ratio. This would have some immediate benefits, the most important being a much better trained soldier and a more manageable platoon. We wouldn't have to put 40 men in a 36-man bay and two or three men in rooms designed to accommodate one. Nor would we have to put four men in a two-man room. It isn't even legal, according to the IG, to do it the way we are now. It's also *stupid.* (Check AR 40-5, para 5-17, subparagraph 2.)

How do we get three DS's per platoon? Consolidate all drill sergeants at brigade level. Run a duty roster so that the next 12 men in line (or 15 men if we go with 5 platoons per company and 200 men) pick up their 160 men at the reception station and then take them to a company in the brigade area. It doesn't matter which company or battalion. The company and battalion staffs would all be there just like they are now. There isn't any additional cost involved either.

The advantages of a system like this are as follows:

- A reduction of trainee abuse occurs when some of the frustration is eliminated.
- A drill sergeant who doesn't know who his two assistants are and how they feel about trainee abuse isn't very likely to abuse a trainee.
- 13 to 1 ratios will improve DS morale and efficiency.
- DS's will not be idle for a 2-month time period.
- Graduating platoons will be much closer to the original size they were at the reception station. Presently, we pick up 55 men and graduate approximately 40. I know of graduating platoons with a strength of 30.
- Attrition rates can be reduced from 30 or 40 percent to 5 or 10 percent.

The present system of employing DS assets is just not cost effective. We are, in effect, burning up a lot of assets and getting an inferior product for our efforts. Worse yet, the costs incurred in discharging the percentage of recruits who could and would be saved if there were fewer trainees and more DS's to help them are wasteful in both time and materiel.

I also think that the arguments for having a Senior Drill Instructor (SDI) in each company would collapse if all DS's were consolidated. A 13 to 1 ratio should preclude the necessity for an SDI.

Consolidation might even eliminate some of the nebulous "Honor Platoon" business. The argument for having Honor Platoon competition is that it fosters *espirit* and provides a goal. However, consider this: the Honor Platoon is proud and so is the platoon sergeant who got it there. But what about the 2d platoon? Do they have as much *espirit* as the first? I would agree that second place is better than not having a place, but I also believe that bad breath is better than no breath—but I'm not proud of bad breath. Do the third and fourth platoons exude this *espirit?* I doubt it. Being last is unacceptable and is not a source of pride. The net effect of Honor Platoon competition is to make 25 percent of the unit proud and the rest feeling remorseful.

The drill sergeants can always cut corners more in the next cycle and that should improve their respective platoon's overall scores. If he finds that he didn't crank in enough "fudge factors" at the end of this cycle, it frustrates the hell out of him. In the meantime, his trainees probably can't shoot very well, but they have certainly learned how to "blow smoke." Granted, there are some drill sergeants who are so good at training recruits that they don't have to be less than honest to garner end of cycle kudos. These men are the exception, though, and not the rule. Thus, elimination of Honor Platoon competition will help to eliminate some more of the frustration.

Consolidation has another advantage. How many times have you heard of or seen a unit in which a subordinate unit continually excels? I would venture to say that this is a frequently observable phenomenon. With consolidation, the "tricks of the trade" that are prevalent in the unit which excels would be spread around the entire brigade.

I would like to make one more comment about consolidation. To consolidate at brigade level is not the only solution. It has some drawbacks, but I proposed it because it seems to me that it would be more cost effective than leaving the companies as they are. If there are seven DS's in a company instead of the authorized number, then that company should only pick up two platoons of 40 each. Consolidation at battalion level is also viable.

The problems are not insurmountable, but they absolutely must be dealt with. If they are corrected, everybody wins; the trainee, the drill sergeant and his family, but most importantly, the Army.

SFC FRED E. KIRTCHEN enlisted in the U.S. Army in 1960. His service includes 3 years with the 13th Cavalry, USAREUR; 2 years in the Utah National Guard; special forces training, and 2 tours with Special Forces units in Vietnam. He then served at Fort Knox with an Infantry battalion, as a member of the Threat Team in Combat Developments Command, attended Drill Sergeant School, and was assigned to the 4th Training Brigade for one year. At the time this was written, Sergeant First Class Kirtchen was serving on a TRADOC task force engaged in systems engineering a Drill Sergeant Program of Instruction. He is currently assigned as Special Forces advisor to the ROTC unit at Niagara University, Niagara Falls, NY.

Let's Talk DRS

by Captain Anthony J. Geishauser

The most innovative and comprehensive reorganization tests in the history of the U.S. Army are underway at Fort Hood, Texas, where the 1st Cavalry Division and other Fort Hood units are testing the restructured division. The tests, which are the result of the U.S. Army Training and Doctrine Command's Division Restructuring Study (DRS), will be conducted in three phases, lasting through the spring of 1979.

The main objective of division restructuring is to prepare the U.S. Army to integrate into the force the new weapons systems of the early 1980's. The new family of weapons coming into the Army cuts across the entire division and represents the biggest infusion of weapons systems to enter the Army since, and probably including, World War II. One reason for this is that we are making up for the Vietnam gap, when essentially we had few improvements in the way of new equipment. The inventory of the 1980's will include the *XM-1* tank, the Infantry Fighting Vehicle, new helicopters, new engineer equipment, tactical fire direction system (TACFIRE), new artillery munitions, a new family of night sights, a whole new set of air defense weapons from the *Stinger* to the new air defense gun to the *Roland* missile. The list goes on and on.

The number of systems involved within the division and the number considered as we look to the organizations of the 1980's, exceed well over 100; all of which will have a major impact on the organizational structure. The Army will spend better than $60 billion on research, development and weapons acquisition through the 1990's. Because of this price tag and the increased effectiveness of the new systems, it makes good sense to reshape and examine the organization to fully optimize the new weapons systems.

In addition to how well a weapon system fits into a basic organization, there were certain concepts used to determine whether or not changes should be made to the existing structure. These concepts are:

- Integrate combined arms at battalion.
- Develop smaller, faster units—alacrity.
- Increase fire support.
- Improved mobility—countermobility.
- Move administration to battalion.
- Weapons-systems oriented logistics.
- Staff realignment
  - Operations/Intelligence
  - Personnel/Logistics.

Even though each concept is equally important, I want only to highlight the first one listed to give the reader an appreciation of the thought that went into these concepts.

Integrate Combined Arms at Battalion

Currently, the U.S. Army essentially integrates the combined arms at company level with the company team. The company commander has the task of integrating tanks, mech infantry, TOW's, field artillery, attack helicopters, and close air support. In addition, he has also been responsible for mess, maintenance, and administration; a tremendous job for any one man at that level. He must deal with a variety of weapons, with a variety of capabilities and ranges; from the indirect-fire field artillery weapons to the *M-16* rifle.

During the antiarmor systems program review, the Army looked specifically at the tasks of a tank company team commander and how many tasks he would have to perform during what is called the target servicing problem—the typical battle he would face in Europe. The scenario set the odds at about 4 to 1 with the Soviet Armed Force closing on him at a rate of approximately 3,000 meters per 15 minutes—which would be the length of the battle. During that 15-minute period, the company commander had 37 separate actions to perform.

Now jump into the 1980's, when there are scatterable mines shot by the artillery and the engineers; an improved *Hellfire,* precision guided munitions of the Air Force; the field artillery's Cannon Launched Guided Projectile (CLGP); and the extended range of the *XM-1* tank; all of which have now extended the size of the battlefield.

This was thought to be far too much for a company commander to control efficiently. To integrate combined arms at the battalion level, the company had to be made smaller so the battalion commander could overlook his battalion. Under DRS, it is now the task of the battalion commander, assisted by his staff, to integrate tanks, TOW's, mech infantry, field artillery, and close air support.

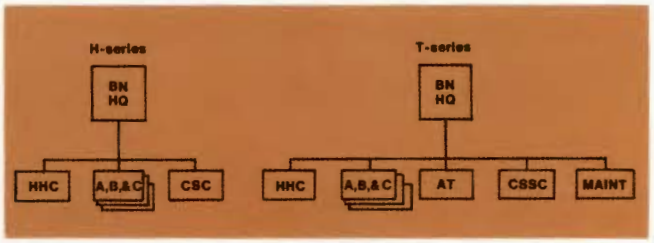
Now that the theory has been written and most of the planning done, it is time to see if the new division can function and meet expectations. In order to find out, the 1st Cavalry Division (First Team) was selected to test the Armored Division in both garrison and field operations.

The DRS test will run from the summer of 1977 to the spring of 1979. Physical restructuring will be conducted in two major phases and will involve three major field tests.

Five maneuver battalions (three tank and two mech infantry) and one artillery battalion physically restructured on 1 July 1977 along with a restructured portion of combat support and combat service support units. Also on 1 July, an entirely new company, the 68th Chemical Company (NBC Defense), was activated. This is the Army's first chemical company since World War II.

Of the three tank battalions restructured under Phase I, two were already on active duty with the 1st Cavalry Division, but the third [3d Bn 10th Cav (Armor)] was reactivated under the restructured configuration. Eighteen tanks from both the 2-8 Cav (Armor) and 1-7 Cav (Armor) were reassigned from those units to the 3-10 Cav. This left each battalion with the correct number of tanks (36) for a restructured tank battalion, without increasing the division's total number of tanks.

To refresh everyone's memory, it is important to highlight what the T-series TOE maneuver battalion looks like compared to the current H-series TOE battalion.



Basic Changes:	Current Bn.	DRS Bn.
Tank Bn. Strength	552	486
Personnel in Line Company	89	51
Tanks in Company	17	11
Tanks in Platoon	5	3
Mech Inf Bn. Strength	848	610
Personnel Carriers in Company	15	13
Personnel in Line Company	171	103
Personnel in Squad	11	9

Other significant changes for both type battalions:

- Battalion executive officer (XO) eliminated.
- Bi-functional staff added.
  Operations/Intelligence Officer
  Personnel/Logistics Officer.
- Two new companies added per battalion
  Antitank Company (12 TOW's)
  Maintenance Company.
- 4.2-in. mortars eliminated.
- 6 improved 81-mm. mortars added to HHC.
- Bn. *Redeyes* reassigned to ADA Bn.
- Bn. ground surveillance radars (GSR) reassigned to combat electronic warfare intelligence (*CEWI*) Bn.
- TOW's reassigned to Antitank Company.
- All maintenance activities now in Maint Company.

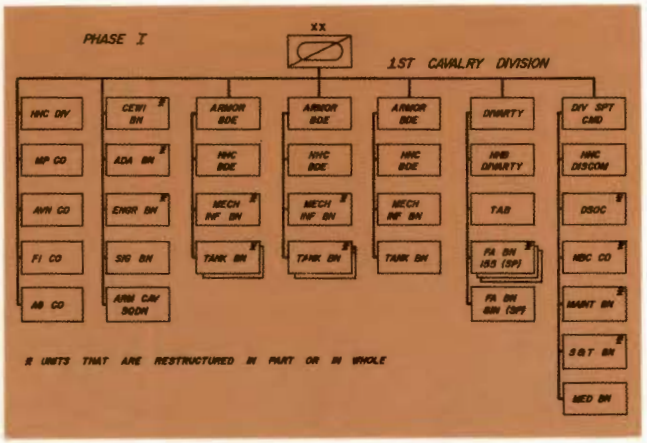
Battalion Scouts

The battalion scouts have become somewhat of an involved issue. There is a wide divergence of thought within the Army as to whether or not battalion scouts should be light (command and control) or heavy (armored reconnaissance) or whether or not scouts should be at battalion level at all.

Because of the divergence of thought about the scouts, there will be two different versions of battalion scouts tested in different battalions. One will be a light scout section consisting of nine men. This section will have three *M-151's* and three motorcycles dedicated to command and control. The second will be a heavy scout section with 12 men, three Improved TOW vehicles and three motorcycles dedicated to armored reconnaissance. Of the three tank battalions tested in the Maneuver Battalion Test, one will have the light scout section and one will have the heavy scout section. One of the mech infantry battalions will have a light scout section and one will have no scouts at all. These tests should assist in clarifying both the requirements for and the role of battalion scouts.

In the DRS brigade headquarters there is the introduction of a scout platoon consisting of one officer and 19 men that will have five *M-113's* and two motorcycles. This scout platoon will have many roles, but probably the most important will be to assist the brigade commander in moving battalions around the battlefield. Going to FM 100-5 and the active

defense, the division commander is going to have to shift battalions from one brigade to another because he has a breakthrough attack coming. The brigade scout platoon will be able to pick battalions up and move them into new battle positions directed by the brigade commander. The scout platoon also has some capability to assist in screening while units are reconnoitering new positions.



The Maneuver Battalion Test

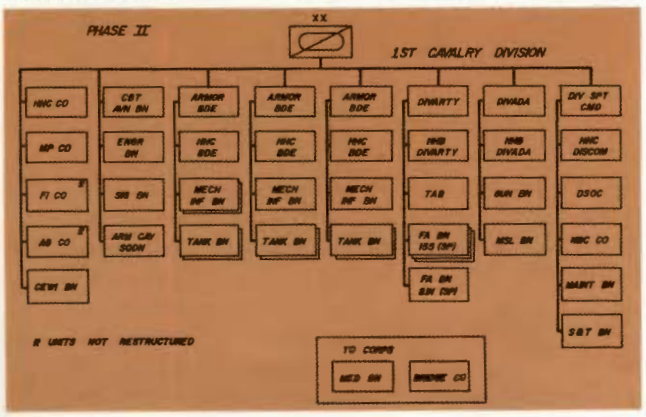
The field test of Phase I—the Maneuver Battalion Test—will be conducted in the fall of 1977. Currently planned is a comparison test of H-series MTOE and T-series MTOE (DRS) tank and mech infantry battalions. The 1st Cavalry Division will provide the restructured battalions and the 2d Armored Division will provide the H-series battalions.

The test plan calls for each battalion taking the test to go through an ARTEP scenario (active Defense-Attack).

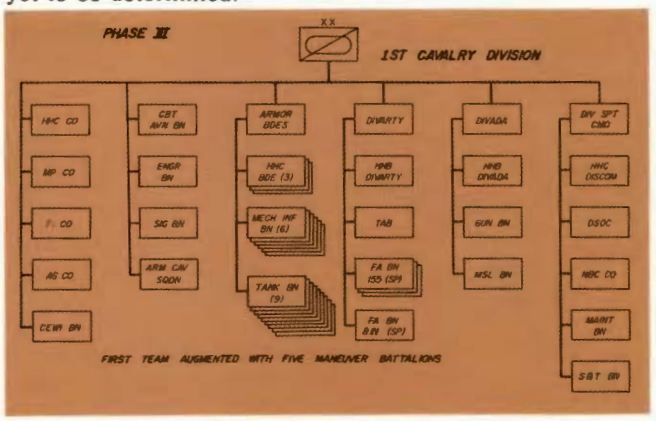
Major areas of examination will be the weapons systems positioning and effectiveness, command and control, organic combat service support capabilities and the ability of the organizations to generate combat power. All tanks and TOW's will be fully instrumented with the Weapons Engagement Scoring System (WESS). Other instrumentation will include the Position Reporting and Recording System (PRRS) and the Automatic Data Collection System (ADCS).

In Phase II, the remainder of the First Team will physically restructure with an effective date of 21 January 1978. Division artillery (DIVARTY) will restructure a little later due to the TACFIRE test.

In the fall of 1978 the Division (-) Test will be conducted. It will focus on the division internal combat and combat service support systems. Taking part will be one full five-battalion restructured brigade plus an appropriate slice of DIVARTY, division air defense artillery (DIVADA), division support command (DISCOM), division troops and the division headquarters. The remaining brigades and support units will be in a command post exercise (CPX) mode. Combat missions for this test will be active defense, attack, and retrograde. The opposing force (OPFOR) will be the 2d Armored Division (-).



In the spring of 1979, the First Team will be augmented with five more maneuver battalions (three tank and two mech infantry) from outside the division to assist in conducting the third and final field test—the Full Division Test. The five additional restructured battalions will bring the division up to 15 maneuver battalions. This test will focus on the ability of the DISCOM to support the full division, the interface with echelons above division, and the heavy communications requirements of the restructured division. OPFOR, location for the test, and the exact scenario have yet to be determined.



Preliminary Experience Under DRS

Officially the Phase I units physically restructured on 1 July; however, the 1st Battalion 5th Cavalry (Mech) Black Knights, commanded by Lieutenant Colonel Jack Griffith Jr., was given the green light to internally restructure early so that they could start their training cycle under the DRS configuration rather than having to restructure in the middle of it. The Black Knights were the first to train and take an ARTEP under the new restructured organization.

There are many questions being asked about the new type battalions. Listed below is a sampling of the questions and some very preliminary answers based on one battalion's limited experience.

Command and Control Communications

Q. Should the TOW platoon leader/sergeant have a separate vehicle for adequate command and control?

A. No. The platoon leader can control the platoon as configured. The additional vehicle would only increase the logistical maintenance burden.

Q. What are the advantages and disadvantages of the bifunctional staff for a maneuver battalion?

A. *Advantages*

- A field grade officer is responsible for and coordinates activities in each functional area.
- It eliminates conflicts between overlapping staff

areas, i.e. between a strong S2 Captain and a strong S3 Major when each are considered as equal staff members.

- It is much more responsive to the commander's desires.

Disadvantages

The battalion commander must coordinate the overall staff activities with two individuals instead of relying on a single XO. The magnitude of the problem is strictly a function of the caliber of the bi-functional staff officer.

Q. Where did the brigade/maneuver battalion personnel/logistics (Per/Log) officer operate?

A. The Per/Log officer moved between the combat and the field trains. It is imperative that the Per/Log officer move as needed. He also operated from the battalion sustaining CP and, on occasion, from the battalion CP.

Q. Are four-man TOW crews required for sustainability, survivability, and operational effectiveness?

A. Yes. This is particularly true when the AT Company is given a mission of general support and the TOW squads become responsible for their own security, etc.

Q. Can a TOW company effectively function without an XO?

A. Based on our early experience, our feeling is that an XO is required for the TOW company. Decentralized operations that force the platoons to be dispersed over large areas present unique logistical and maintenance problems that require dedicated attention. The company commander is not in a position to provide that attention.

Maneuver Operations

Q. What are the advantages and disadvantages of pure versus mixed companies in terms of repositioning?

A. *Advantages:* The pure unit can move quickly and thus is very responsive to a change in the tactical situation. The company commander does not need to worry about mortars, TOW's, etc. His only concern is moving his company from point A to point B. We have demonstrated the ability of a pure company to move quickly at night, reposition itself and accept a change of mission.

Disadvantages: Although it can reposition itself quickly, the rifle company arrives at the new location limited in support. The battalion commander must orchestrate the move, particularly if it involves a lateral shift, to insure that TOW's, mortars and combat service support are available to augment the limited firepower of the rifle company.

Q. What are the advantages and disadvantages of smaller platoons/companies/battalions in terms of repositioning?

A. *Advantages:* Generally speaking, the smaller the unit the more responsive it can be, particularly in light of the reduced span of control now present within the DRS rifle platoon and company. As such, the biggest advantage is mobility.

Disadvantages: The lack of firepower within the rifle company has already been discussed. A challenging situation confronts the battalion commander. The battalion is indeed smaller, but the span of control has increased considerably. Instead of five companies there are now seven. To that must be added the responsibility of placing all attachments (ADA, GSR, *Redeye*, etc.) into the scheme of maneuver. It is entirely too soon to determine whether or not this is a disadvantage. As has been pointed out, the rifle companies can move quickly. What remains to be seen is the ability of combat support and combat service support assets to match that mobility. As SOP's are developed and the capabilities of the bi-functional staff are exploited, the increase in span of control will be dealt with smoothly.

Q. Can maneuver battalion commanders normally integrate fire and maneuver at battalion level or must this function still be required at company level?

A. The integration of fire and maneuver can normally be accomplished by the battalion commander. Constraints of terrain may prevent the battalion commander from being in a position to accomplish this function. The function may have to be frequently conducted by the rifle company commander.

Q. In the absence of a maneuver battalion scout platoon, how are the traditional scout missions of reconnaissance and security operations best accomplished? With what assets?

A. The scout missions are accomplished by a rifle company or platoon augmented with mortars, TOW's, and if available and the situation requires it, tanks.

Q. If mechanized infantry or TOW platoons or companies are used, does this dissipate combat power?

A. There is a dissipation of combat power in that area occupied by the company that will be providing the assets. For example, a rifle company occupying a defensive position is tasked to provide a platoon to conduct a route reconnaissance in preparation for a lateral shift. The void created reduces the rifle company's potential to execute one of the major missions (attack, defend, delay) discussed in another question. The battalion commander must fill that void by shifting firepower accordingly, if required.

Combat Service Support

Q. Can a maneuver unit first sergeant (1SG) adequately assist the company commander in logistical matters?

A. Yes. Either the company 1SG or XO can perform logistical missions adequately, however, TOE vehicle limitations currently precludes them from doing it simultaneously.

Q. Is the supply team provided by the Combat Service Support Company (CSSC) able to supervise, distribute, and account for property and supplies for each maneuver company?

A. It was quickly found out that organizing the SAC (Supply Administration Center) into company teams resulted in duplication of effort and dilution of overall effectiveness. The SAC is now organized by functional areas of responsibility. This approach has proven highly effective both in garrison and field operations.

Training

Q. Is it easier for a company commander to train the soldiers and platoons of a pure company?

A. Yes. This is one area in which all company commanders are in virtual agreement. There is no longer a need for the line company commander to worry about the special training the weapons platoon requires because they are no longer in his company. He can now train all his platoons with the same type of instruction. With the new-found freedom of not having to divide his attention between different type

elements within his company, he is now able to spend more time with quality training.

Q. When you went on battalion training exercises, did you go pure because it made sense or because of the Restructured Division Operation Manuals (RDOM's)?

A. Initially we went pure because of the RDOM's, but we soon found out that it made good sense as well. The company commanders had an easier time operating their companies in a pure mode and we had little trouble with the transition. Of course, the battalion staff had a greater work load than normal because it now had to assist the battalion commander in coordinating all the efforts normally or previously handled by the company commander. There were times when we did have to deviate and go mixed, but overall, operating pure worked out very well.

The answers to the questions you have just read are by no means complete. The 1st Cavalry Division has just begun the long training required to test the concepts in very carefully controlled tests. Even though these answers are not definitive, they could enable the reader to see where some of the strengths and problem areas may lie.

Garrison Operations Under DRS

The restructured organizations are designed for combat; however, the test organizations will be in garrison much of the time during the test period. Concern has been expressed about the restructured unit's ability to function in a garrison environment, considering the increased number of companies and decreased number of personnel.

In an attempt to surface pertinent issues in this regard, First Team battalion commanders and command sergeants major are taking a hard look at garrison operations under DRS. In order to realize streamlined garrison operations, it is necessary for all to make certain mental transitions from the conventional ways of doing things to perhaps a better way. Much of the mental transition hurdles have already been jumped with the introduction of Consolidation of Administration at Battalion Level (CABL) at Fort Hood. With CABL a reality in all of the DRS units, there is only a small transition needed to further streamline operations.

Listed below are a few of the innovative ways the 1-5 Cav (Mech) is using to achieve increased efficiency.

- Orderly rooms are now shared between companies. Company commanders and first sergeants still have private areas to conduct counseling, etc; however, the common areas are shared to optimize space.
- Charge of Quarters (CQ) is currently shared at night. One CQ pulls duty in two or more companies due to the reduced strength of the companies. With the introduction of an intercom-like telephone network between battalion headquarters and each floor in the barracks, the need for CQ's will be further reduced to only one per battalion along with the battalion duty officer and duty NCO. Phone calls that come in to each company will go through the battalion switchboard after duty hours.
- The Maintenance Company has moved its orderly room to the motor pool where all its activities take place.
- Arms rooms are now being shared between companies due to the company's reduced size.
- Dayrooms, laundry rooms, vending machines, etc. are being shared with minimum problems.

Even though the 1st Cavalry Division is the test division, DRS is far from a one unit show. Every organization at Fort Hood is taking an active role in this dynamic test. The III Corps Commander is the Test Director and is in a unique position in that he not only reports to the FORSCOM Commander, but for purposes of this test, he also reports to the TRADOC Commander. The Corps Support Command has been responsible for receiving equipment for DRS from divisions throughout CONUS as well as supporting the new DRS division. The 2d Armored Division, the 1st Cavalry Division's sister division at Fort Hood, will have some of its units tested as a baseline for the current organization along with the 1st Cav in the first field test. They will also assist by being the OPFOR for the second field test. TRADOC's Combined Arms Testing Activity (TCATA) will administer all of the tests, both field and garrison.

There is an uncommon spirit of cooperation in the entire Fort Hood community over DRS. A recent arrival to Fort Hood is Colonel John Foss who is the former Chief of the Division Restructuring Study Group at TRADOC. He is currently the III Corps DRS Liaison Officer and is scheduled to command a restructured brigade in the 1st Cavalry Division. COL Foss is responsible for the majority of the background information in this article.

The First Team accepts the challenge to test the division of the future. The troops of the 1st Division fully recognize the serious importance of this test and their responsibility to the Army. They go into this test conscientiously, making no prejudgements on the test or any of the new organizations. However, personnel at all levels plan to make constructive comments during and after each phase of the test and in this way contribute to the development of the best armored division this country can possibly produce for the 1980's.

CPT ANTHONY J. GEISHAUSER received a direct commission in the Infantry as a first lieutenant after serving 5 years as a warrant officer aviator. In addition to several flying assignments in Vietnam, Korea, and CONUS, he has been an assistant brigade S3, assistant division G3 and a company commander. An IOAC graduate, Captain Geishauser is currently an action officer in the 1st Cavalry Division's DRS Liaison Office.

"MOUNTED COMBAT IN VIETNAM"

The monograph, "Mounted Combat in Vietnam" previously mentioned in the article "Reflections," by General Donn A. Starry, was not published in January 1977 as stated in the editor's note preceding the article. It will be released by the Army on 30 September 1977 for printing by the Government Printing Office. The GPO estimates that it will be 6 to 9 months before printing and distribution are completed.

—ED

The Legion Etrangere

by Lieutenant Colonel Claude deBisschop

The *Legion Etrangere* (French Foreign Legion) is one of the most universally known military organizations. Generally, people know it only by the name that has been spoiled by gossip and misused in literature under distasteful titles. These are only the stories concerning fallen princes, unfrocked priests, unlucky or inconstant husbands and runaways; but, reality is much more precise and simple.

The *Legion Etrangere* is an all-volunteer organization that masters the technique of modern warfare, large-scale engineering projects, and civic action programs. It gains its effectiveness from an incomparable cohesion that, at first glance, could look like inconsistency in an international recruiting system. Backed up by a very strong cult of tradition, an outstanding *espirit de corps,* and a large sense of solidarity, its homogeneity is ensured by tough training.

Today, the *Legion Etrangere* has a strength of about 8,000, of which 1,200 are noncommissioned officers (NCO's) and 250 are officers. Meeting all the requirements of a modern army, the *Legion Etrangere* has continued to uphold its traditional missions of immediate readiness for combat, guarding overseas boarders, and the completion of large construction projects.

Before discussing the details of the *Legion's* organization, deployment, traditions, and uniforms, let us look at its history and talk about its glorious past.

Mercenaries in Old Europe

For many centuries, every significant state relied upon mercenaries to build up their own armies. The word, "mercenaries," was not a disparaging term at all in the times when the concept of fatherland was very vague. In those days, the noble way to earn one's life was by risking it. The sense of honor and faithfulness was sufficient to create a bond between employee and employer.

At birth, the *Legion Etrangere* served under the kings of France during the revolutionary era and the expansion of the Empire. During the Restoration, Louis-Philippe signed a Royal Ordnance, dated 10 March 1831, authorizing, yet not really creating, a foreign legion that retained all of the privileges of former foreign regiments; such as the grouping of the people according to their nationality, the principle of the right of refuge and thus of anonymity, and assimilation into the infantry. The only major difference from the former legions was that the new legion had to serve outside the continental territory of the French Kingdom. However,

this limitation was effective for only 39 years.

As soon as it was organized, the *Legion* took part in the conquest of Algeria. Later, in 1835, it was given to Spain and fought in the Pyrenees Mountains for 4 years. From a total of 5,000 men, only 500 came back to France in 1839.

The Major Feats of Arms

Between 1835 and 1839, a new *Legion* was created and has served France as the *Legion Etrangere* without interruption. The Imperial Wars lead it out of North Africa to the Crimea in 1856 and Italy in 1859. However, it was in Mexico from 1863 to 1867 that the *Legion* earned its most glorious fame.

There on 30 April 1863 at the Camerone hacienda, 3 officers and 62 legionnaires held out against a force of 2,000 Mexicans for a full day. At twilight, the last 5 survivors died when they charged with fixed bayonets. This feat of arms, the name of which is now written on all the standards of the *Legion,* is the symbol of total sacrifice and completion of a given mission. Its anniversary is celebrated festively and religiously.

With the slow penetration of France in south Oranie (western Algeria) and the pacification of Morocco, colonial campaigns led to deployment of units of the *Legion* to places such as Tonkin, Madagascar, Taiwan, Dehomey, and Sudan. The French colonial empire grew and prospered as the *Legion* in conjunction with the French colonial infantry fought successful campaigns.

The legionnaires built posts, roads, and trails; using their tools to bring civilization and peace as soon as combat ceased. In Algeria, they founded and completely built their home city, Sidi-bel-Abbes. At the same time, Tonkin slowly became their particular sphere and on the island of Madagascar, *Legion* officers, NCO's, and even privates governed large areas.

Contemporary Events

At the outbreak of World War I, four regiments were formed with foreigners volunteering for as long as the war should last. These regiments were reinforced by soldiers and cadre of the *Legion* coming from North Africa. After sustaining heavy losses, the remnants of the regiments were consolidated to form the famous RMLE (*Regiment de Marche de la Legion Etrangere*) which became the first of all the French formations to be awarded with the *Medaille Militaire.*

At the end of World War I, the *Legion* returned to Morocco where the tradition of wearing the *kepi blanc* originated.

World War II brought the *Legion* back to its parent country where two infantry regiments and a divisional reconnaissance group were created. They were later joined by three provisional regiments (*regiment de marche*) of foreign volunteers who were motivated by the same ideals as those of their predecessors in 1914.

During the tragical first hours of combat, all these formations stood their ground against the German assault. Many were killed on the spot, while others burned their brand new standards to prevent them from falling into the hands of the enemy. This gloomy epic, similar to that of the invasion of France by Germany in 1870, is rarely remembered.

Meanwhile, half a brigade had been organized from units stationed in Morocco and Algeria. This large unit was originally designated to go to Finland, but was eventually sent to Bjervik and Narvik, Norway, where the demi-brigade attained its victories during this period. The northern campaign was, in fact, the early beginning of a very long journey that the 13th *Demi-Brigade de Legion Etrangere* (D.B.L.E.) conducted around Africa, in Erythrea, Syria, Lybia, and Tunisia, where it met with the other *Legion* units training for the reconquest of France. Italy was the final trip of this long tour before the D.B.L.E. joined the campaign for the liberation of France.

World War II was not the end for the legionnaires. They had just returned to their second mother country, Algeria, when they departed for Indochina. The 5th Regiment Etranger, called *Regiment du Tonkin,* had maintained, by itself, the French presence in that area during the entire war. Just after it became the major victim of the March 1945 Japanese treachery, the elements that had escaped from atrocious butchery, after a heroical stand, fled to the jungle and were harassed until they reached China.

On 6 February 1946, the 2nd *Regiment Etranger* arrived in Indochina, followed by the 13th D.B.L.E., the 3d *Regiment Etranger-d'Infanterie* (R.E.I.). The legionnaires lived in the area where their forerunners won fame. Once again, Lang-Son, Son-Try, Tuyen-Quang welcomed them, as well as a great number of other, more specialized units, such as paratroopers, transportation, ordnance, and engineer. The *Legion* was overworked because it had problems of too little strength and too many missions, and it had to adapt itself to many jobs to replace the too-few specialists of the other branches. For example, cavalry units turned amphibious because of the terrain, with drivers taking the controls of boats and landing ships.

In 1954, in the battle of Dien Bien Phu Basin, all the regiments of the *Legion Etrangere* were represented. All decided to fight a new Camerone; but just as at Camerone, they were overwhelmed by a numerically superior force.

Upon their return to North Africa from the Far East, the units of the *Legion* were reorganized into more traditional formations and engaged immediately in counterinsurgency operations from 1955 to 1962.

Strength and Deployment Today

In the Royal Ordinance of 10 March 1831 in which Louis-Philippe created the *Legion Etrangere,* the intent to have the organization to serve abroad was clearly stated. However, the wars of 1870-1871, 1914-1918, 1939-1945 were used as opportunities to temporarily suspend this stipulation.

Today, circumstances are very different. One of the major features about the *Legion* is precisely that it is now stationed mainly in France, with the 1st *Regiment Etranger,* the 1st *Regiment Etranger de Cavalerie* and the 61st *Battalion Mixte de Genie* in the southern part, and the 2d *Regiment Etranger* and the 2d *Regiment Etranger de Parachutistes* in Corsica.

Through a periodical, centralized rotation system, the units stationed in France maintain four other regiments overseas. Today, legionnaires can serve in countries that were left long ago by their predecessors, as well as in some the *Legion* had never been to; such as French Guyana with the 3d *Regiment Etranger d'Infanterie,* the French Territory

of Afars and Issas with the 13th D.B.L.E., and Archipelago of Comores with the 5th *Regiment du Pacifique.* Thus, splitting his career between France and overseas garrisons in the period of 2 years, the legionnaire will not spend a long time in unseasonable climates, nor live under extreme living conditions that are either too hard or too mild.

Adopting a "new form" is indeed not exceptional for the *Legion.* Attached to infantry since its beginning, it has demonstrated its ability continually in its history to organize cavalry, engineer, transportation, ordnance corps, and even artillery units. This ability is now officially recognized, not only in the existence of infantry, cavalry and engineer units, but also in the combined-arms organization of these units which is sometimes very diversified.

The Legionnaire

One must never ask a legionnaire why he joined the *Legion* or what his actual identity is. So immediately people think about law offenders, or others, and believe legionnaires are scum of the earth.

The epic of the *Legion* cannot be based upon blacksheep, worthless, or depraved people. In fact, various incentives induce these men to leave their country to serve a foreign one. Very often, it is a matter of personal or family crisis in the social or political events of their fatherland. The important enlistments of Alsatians after 1871, of Spaniards in 1939, and of east Europeans after 1945 demonstrate this fact. Others, unable to adjust themselves to a common life, look for adventure. Volunteers are very strictly screened; even if they are not always saints, they are never murderers.

A common bond unites the legionnaires: the denial of mediocrity. It is not an easy way to cut oneself from one's past and family. Thus, total availability gives the legionnaires a high degree of cohesion which is cemented by discipline, solidarity, and the respect for tradition.

An outstanding corp of NCO's allows reciprocal understanding and trust. Coming from the rank and file, NCO's are perfectly aware of the soldiers' feelings and worries. These human experiences and a very high level of proficiency give them prestige and authority. The effectiveness of the *Legion* comes, for a major part, from the superior quality of the NCO's.

Deference and admiration, deep and sincere affection for their superiors, create tight bonds between the soldiers and their leaders. They form a large family that replaces the abandoned social and family environment. These men identify with the *Legion* as a new home representing their fatherland. This is why the front of the *Legion Etrangere* museum bears the words: *LEGIO PATRIA NOSTRA,* meaning *"The Legion Is Our Fatherland."*

Traditions

Espirit de Corps gives the *Legion* a moral strength that cannot be drawn from such classical sources as patriotism, and the traditions that contribute so much to the unit's high morale and operational effectiveness are based on the following major ideas:

- will of perfect service;
- faithfulness to the word;
- high sense of discipline and honor;
- devotion to duty; and
- respect for tradition.

Some of the traditional *Legion* holidays are:

Camerone. The anniversary of the battle of Camerone on 30 April 1863 is celebrated in a sparkling way anywhere a legionnaire or ex-legionnaire lives. On the eve of the celebration, the legionnaires participate in a devotional vigil known as the *"Veille d'Armes."* The following morning, an account of the fighting at Camerone is read before a parade formation. Then an afternoon picnic brings the officers, NCO's, legionnaires and their guests together for food, refreshments, and games.

Christmas is truly a family celebration for which everyone tries to add to the ceremonies by worshipping, giving presents, constructing a nativity scene, caroling, and reading the Christmas story.

1st of January. Seasons greetings are presented to the officers by the noncommissioned officers at the NCO club. On 12 January, the officers invite the NCO's to the officers' club.

Another tradition is the distinct uniform of the *Legion Etrangere.*

During its early years members of the *Legion* wore a khaki linen scarf attached to the back of their caps to protect their necks from the desert sun. In time, this scarf turned almost white and became a sign of seniority. From this, the *"kepi blanc"* evolved and came to be synonymous with the *Legion* throughout the world.

Green and red shoulder straps date from 1868 and are worn only on parade days.

Beards and leather aprons of the pioneers are a legacy of the *Imperial Grande Arme'e* where pioneers used such aprons as coveralls.

Green and red, the colors of the *Legion,* are an inheritance from the Swiss regiment serving France; and the *large blue belt* is another distinctive sign of the *Legion.*

March and parade step. Legion units march in step at 88 steps per minute (once it was 60) to the tempo of the "Boudin," which traces back to 1870. The word, "boudin," probably came from the rolled blanket that was worn across the shoulders.

As can be seen from this short article, the *Legion Etrangere* is made up of dedicated, professional officers, NCO's and men; not the misfits and dregs of society, as is so commonly believed.

LTC CLAUDE deBISSCHOP was commissioned in Armor in 1953 after his graduation from the French Military Academy of Saint-Cyr. A graduate of the Ecole Superieure de Guerre (French War College), he has served in various command positions. Colonel deBisschop has served with the West German Army as a student and exchange officer and liaison officer with the U.S. Army at the U.S. Army Armor School. He now commands the 3d Hussards Reg. at Pforsheim, Germany.

Recognition Quiz

This Armored Vehicle Recognition Quiz is designed to enable the reader to test his ability to identify the armored vehicles of armored 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 armored fighting vehicles. 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 appearing in the picture should also be provided. Suggestions for improving or expanding this feature are welcome. — ED.

(Answers on page 60)

BATTLEFIELD RECOVERY

by Major Dundas S. Orr

The outcome of the next war may hinge on our ability to regenerate combat power through replacements of weapons systems. An effective battlefield recovery program can provide that capability and, if optimized, provide the die from which victory will be struck.

As has been stated in the recently published Army Field Manual 100-5, "The war in the Middle East in 1973 might well portend the nature of the modern battle. Arabs and Israelis were armed with the latest weapons and the conflict approached a destructiveness once attributed only to nuclear arms. Use of aircraft for close support of advancing armor, in the fashion generally practiced since 1940, was greatly reduced by advancing surface-to-air missiles and air-defense guns. In clashes of massed armor, such as the world had not witnessed for 30 years, both sides sustained devastating losses."

The October War provided the impetus for a reevaluation of how the U.S. Army would fight its next land battle. This reevaluation has combined the lessons learned in the Middle East War with a consideration of the constraints imposed on the military establishment by economic, social, and political realities. It has reoriented our thinking from how we would like to fight to how we must fight.

The Army's reevaluation accepts austerity and attempts to deal with it by providing the most effective weapons system to accomplish the Army's mission. It attempts to create an awareness that the next war will be a come-as-you-are one; that we must be prepared to fight the first battle with our onhand equipment and personnel; that equipment to replace combat losses or essential repair parts to place nonoperational equipment back into the fight will come from one of two sources—prepositioned war reserves or the residue of the battlefield.

The Army, as currently organized, equipped, and trained, is ill-prepared to effect a viable and aggressive recovery program. Imagine a maintenance section of a U.S. tank company having to cope with the hundreds of equipment casualties resulting from the battle of the Chinese Farm during the October War. Not only would their recovery assets be inadequate, but the evacuation policy which requires the company to evacuate to the battalion collection point would soon prove to be impractical.

Another consideration which impacts significantly on the recovery effort is the attitude, or lack thereof, of our personnel, from the vehicle crewmen to the unit commander, towards material things. It must be recognized that considerable retraining must be accomplished to overcome this attitude. We are a throw-away society which has learned to accept programmed obsolescence, to replace rather than repair, and to expect that a replacement will always be available. But such may not be the case in the next conflict, for we cannot expect our potential enemies to allow us the luxury of 1 or 2 years for our industrial base to transition to war.

We must be prepared to sustain ourselves from prepositioned stocks and, like the tactical commander, attempt to reconstitute a reserve once they are committed. We must plan for a short and violent conflict, short of a nuclear exchange, against a numerically superior enemy who is seeking a rapid conclusion to the conflict. If we can logistically support this type of operation, surely our industrial base can satisfy the requirements of a protracted war.

To develop an appreciation for the losses which could be incurred against a highly mobile opponent, let us examine the results derived from a war game simulation in which the active defense was played.

The enemy rate of advance was approximately 1 kilometer per hour. Equipment losses for the committed brigades of a division in the first day of defense was 158 tanks, 102 APC's and 24 artillery pieces.

To determine the percentage of these combat losses which can be recovered and, of that amount, those that can be repaired and at what level, a battlefield equipment recovery and repair variable percentage matrix developed at the U.S. Army Ordnance Chemical Center and School is utilized. A sample portion of the matrix is shown in table 1.

TANK STATUS	ATTACK	DEFEND	DELAY/ WITHDRAWAL
NONRECOVERABLE	4 to 18%	4 to 18%	37 to 51%
RECOVERABLE	82 to 96%	82 to 96%	49 to 63%
DIV REPAIR	25 to 39%	25 to 39%	17 to 31%
COSCOM REPAIR	14 to 28%	14 to 28%	21 to 35%
EXCEEDS THEATER REPAIR	40 to 54%	40 to 54%	40 to 54%

Table 1. Battlefield equipment recovery and repair variable percentage matrix for tanks lost or damaged in ground action.

Applying the percentage factor for a "Combat Posture of Defend" under the ground actions column to the gamed combat losses provides the following distribution.

	TANKS	APC	ARTILLERY
Number Recoverable	130	102	20
Repairable at Division	42	33	10
Repairable at COSCOM	27	19	6
TOTAL REPAIRABLE	69	52	16
Exceeds Theater Repair	61	50	4

The ability to repair and return to service one out of every two tanks recovered, as well as providing a source of repair parts, which is estimated will reduce the not operationally ready supply (NORS) rate by 25 percent, enhances significantly the combat posture of a force.

These findings clearly indicate the essentiality of equipment recovery. Thus, the amount of equipment recovered

must be optimized under all forms of maneuver. The reconstitution of combat power is proportional to the recovery effort and the return of end items to service through cannibalization and general support maintenance. The question which arises is how can battlefield recovery be optimized.

Using the same distribution of recoverables and assuming the losses were distributed equally throughout the 24-hour period would generate a recovery workload of 10.5 recoveries per hour. However, in a real-world situation, battle losses do not conveniently occur at an even rate but rather in surges, thereby overtaxing the existing recovery capability. It should also be pointed out that because of the task organization of the brigade, only three of the task forces will have a tank recovery capability. Thus, the maximum number of *M-88* recovery vehicles which will be available is 15, nine at company and six at battalion. It is readily apparent that the recovery workload will require an inordinate amount of the *M-88's* time, thereby detracting from utilization of its lifting and on-board labor saving devices in effecting cannibalization and fixing the normal maintenance failures in the forward area.

Should we allow the other combat vehicles of the company to be diverted in support of the recovery effort? Emphatically, no; to do so would only lead to further degradation of combat power in an already outnumbered situation.

Who then should be responsible for recovery and how should the recovery effort be organized? Does the responsibility rest with the tank company commander, the tank battalion commander, or the general support maintenance commander? The commanders of the tank companies and the battalion have higher priority demands on their time than to concern themselves with vehicle recovery, particularly combat-damaged vehicles which cannot be repaired immediately and returned to service, thereby improving their current combat power or influencing the outcome of the current engagement. The general support maintenance commander, on the other hand, is vitally concerned because he knows that the recoverables constitute repairables and the repairables constitute returns to supply for issue, which is his primary mission.

Accepting the premise that responsibility for recovery operations rests with the general support maintenance commander, how then should it be organized? The concept of employment will be the determining factor. As envisioned, these recovery elements, to be effective, must be in close proximity to the committed tank companies and be able to respond immediately to requirements as they are reported from the company team. They will be attached organizationally to the forward support maintenance company and placed in direct support of each committed battalion with sections of two vehicles placed in support of each committed maneuver company. Priority of employment will be to the committed tank companies with support provided to the mechanized companies as determined by maintenance priorities. The provision of an additional platoon at the division level and the additional detachment at brigade level provides the recovery commanders with increased flexibility to react to the changing tactical situation or a realignment in maintenance priorities.

The battlefield recovery company will be assigned to a composite service battalion (general support); or under the Restructured General Support Concept, it will be assigned to the Armament and Combat Vehicle Center (ACVC). Each division will be supported by a recovery platoon with each brigade supported by a recovery section.

The organization, as envisioned, will require about 96 vehicles per heavy-type corps, thus creating an initial procurement requirement of 300 to 400 vehicles. Immediately, the question of affordability impacts significantly on the concept if the *M-88* recovery vehicles are utilized. However, is the *M-88* the most cost effective/efficient recovery vehicle for front line recovery? To be sure, the *M-88's* highly sophisticated hydraulic system gives the vehicle the capability to accomplish almost every type of recovery, but is this multifunction capability required? It is submitted that it is not and that a less sophisticated and less costly vehicle could be utilized for the majority of tank recoveries. Some of the desired characteristics/capabilities of this recovery vehicle are:

- Armor protection for the crew.
- Sufficient power/torque to effect recovery.
- Uncomplicated towing apparatus.
- Sufficient space to transport survivors.

It is envisioned that these desired characteristics could be incorporated into a vehicle configured similar to the launcher for the Armored Vehicle Launched Bridge (AVLB) less the internal hydraulics system.

The major recovery equipment would simply consist of a tow bar. A 40-mm.-high velocity grenade launcher (HVGL) and a multibarrel smoke discharge device would be added to provide protection and increase survivability of the three-man recovery crew while operating in the forward areas.

Currently, the Army's inventory of obsolete tanks abounds with candidates which could be reconfigured as described above with minimal development and production cost. Utilization of these obsolete tank hulls to support this program versus the *M-48A5* rebuild project might even prove to be a more cost effective utilization of these assets.

The lethality of the modern battlefield cannot be overstated nor can the aftermath of the battle be forsaken like the wreckage of a freeway multicar accident. We must organize, equip, and train a recovery force so that in time of war we can optimize equipment recovery which, in turn, provides the fuel from which combat power is regenerated.

MAJ DUNDAS S. ORR, JR. was commissioned in Armor upon graduation from Pennsylvania State University in 1961. He has commanded tank companies both in Europe and CONUS. In Vietnam, he served as a subsector Advisor and DISCOM S-3 of the 101st Airborne Division. A graduate of the Command and General Staff College, he has recently completed an assignment as a logistics analyst with the Evaluation and Test Directorate, U.S. Army Logistics Center. Major Orr is currently assigned to HQ, 21st Support Command, USAREUR.

TRAINING OUR NCO's

Since the Arab-Israeli War of October 1973, the U.S. Army has been deeply involved in developing methods of training both individuals and units to win the first battle of the next war. Concurrently, new equipment has been designed for our soldiers to accomplish the defeat of the enemy on the next battlefield. As the training and equipment necessary to achieve this goal becomes more complex and the resources to train become more scarce, it is essential that the development of the noncommissioned officer (NCO) Corps be a matter of concern to the Army. The evolution of training programs has put greater emphasis on the skills necessary to accomplish the technical aspects of soldiering. The Army has realized that the first battle will be fought with the equipment and personnel in the system when the next war begins. The skill qualification test (SQT) has become the skill level indicator of the individual soldier. His training and competence will, as in past, determine the Army's success on the next battlefield.

Historically, it has been the role of our noncommissioned officers to train and lead these soldiers. The Arab-Israeli War demonstrated that a large number of our company grade officers will be killed during the first battle. It appears that the initiative, training, and leadership provided by our NCO's will again be called upon to provide the continued success of our forces. The development of the NCO Corps must be as well planned as the development of the Officer Corps. The schooling system necessary for this is present in the Army. However, the use of this system, and other professional development programs must receive the attention of the officer as well as the NCO Corps.

The remainder of this professional thought will attempt to outline what the authors believe necessary to insure that our junior and middle grade NCO's receive the training required for success in their jobs.

The Primary NCO Course should not be a technical course, but a leadership course. The course should be designed to train our E4's to *think* and *act* like NCO's rather than train them in the technical areas of their specific fields. The Primary NCO Course should be 2-weeks long. The first week of instruction should be a week of diagnostic testing to *identify* weak points in general military education areas, such as map reading; first aid; and chemical, biological, and radiological (CBR) operations. Failure in these areas would result in dismissal from the course. Additionally, the soldiers would be required to take a method-of-instruction course, and present a class in a subject in which they demonstrated a weakness. During the second week, these soldiers should be exposed to real world leadership problems and solutions in a seminar-type class. Additionally, classes in authority and responsibilities of the NCO Corps, and the NCO functions in implementing the Army's Equal Opportunity Program, Drug and Alcohol Abuse Program, and the Army policies on education should be presented. The goal must be to get them to *think* and *act* like NCO's.

The Basic NCO Course on the other hand should be a technical course. This course must be a thorough review of the tasks of the gunner, loader, and driver. After this is accomplished, it must become a tank commander's course. At a minimum, it should be 6-weeks long covering every aspect of tanking—automotive and turret maintenance, gunnery, and tactics. Additionally, the course should include greater emphasis on method of instruction, how to establish a comprehensive crew training program, and hopefully, a review of the NCO's responsibility to the development of subordinates.

As we said earlier, the school training program is already in the system. What we need now is greater emphasis on the role and responsibility of NCO's *supplied* by NCO's in the unit. Every platoon sergeant, first sergeant, and command sergeant major should be in the field talking to their NCO's about their roles, responsibilities, and training. The role of the senior NCO must be to train subordinate NCO's. The role of the middle grade NCO is to *train his tank crew.* All NCO's must develop a pride in their role, responsibilities, and training. To achieve this goal, it remains for the NCO's to recommend only those soldiers for schools and promotions that have the ability to become NCO's.

The Officer Corps also has a primary role in this development. First, the officers in the battalions must understand that they are responsible for the training of their *units* to accomplish their missions. Officers establish unit training goals, training policy, and plan training time. Additionally, they supervise and monitor the individual training of their soldiers and present and accomplish the unit training. To accomplish these goals, the officers must allow the junior NCO's the opportunity to take the initiative to conduct individual training, thereby freeing the officer to plan and coordinate training requirements on a long term basis.

The authors realize that nothing said in this article is new. However, it is imperative that the officers and NCO's reaffirm their roles and responsibilities, understand the functions the other has, and work toward developing the junior NCO so that he will have the initiative, confidence, and ability to step forward and lead as he has so frequently been asked to do in the past.

MASON J. POE
Master Sergeant

MARTIN J. SVOBODA, II
First Lieutenant, Armor

Fort Knox, KY 40121

NOTES

ARMOR GRADUATES CLASS OF 1977 UNITED STATES MILITARY ACADEMY

On 8 June, 111 graduates of the USMA Class of 1977 were commissioned as 2d Lieutenants, Armor. This impressive group included the Deputy Brigade Commander, Brigade Executive Officer, Brigade Operations Officer, Brigade Athletic Officer, one regimental commander, three regimental executive officers, one regimental adjutant, two battalion commanders, three battalion executive officers and eight company commanders. Seventeen of these cadets ranked within the top 100 of their class. In addition to attending AOB, 105 have or will attend Airborne School and 74 have or will attend Ranger School. Ninety-seven have expressed a strong desire to attend Motor Officer Course while 47 would like to attend Flight School after their initial assignments. Initial assignments include 39 to USAREUR, 4 to Korea, 51 to FORSCOM and 17 to TRADOC units. Congratulations to Armor's newest Tankers and Cavalrymen!

1st Row: PLERSON, MCCANDLESS, BRANNIS, MATHIS, TERRY, WITCHER, BEGINES, PRALL, ANDERS, HRUSKA, CRUZ, YOUNGKER, PILGRIM, WILT, KELLETT, ASENCIO
2d Row: MULL, GREENHOUSE, BECK, SANDOY, LABRADOR, GILLESPIE, BLACK, PHILLIPS, SCHMIDT, ROUSE, BROWN, BUCKNER, LINEHAN, GRAVLIN, HAWKINS
3d Row: LEE, WARRICK, RYAN, KANNER, DOUBLER, NICHOLAS, UNDERHILL, GEHLER, BLYTH, HENRY, BOMIER, GREER, FAIR, LIGHT, HOLTVOIGHT, COCKE
4th Row: GAETZKE, HOLDEN, NARDI, TRUBIA, PYNE, JOHNSON, BENSON, JACKSON, WEBER, ADAMSON, GATLING, MANGAN, OFFUTT, KOPHAMER, MCKEOWN, LANGHAUSER, PAULO
5th Row: MCCONNELL, MORRIS, CALKIN, MALCOLM, LARNER, O'CONNELL, LIEBENOW, FLETCHER, MCCONE, KELLY, CHAPMAN, THOMPSON, SMITH, NYMARK, PLATZ, MANUELE
6th Row: GARVER, CICERELLE, GROTHEER, WOMACK, SULLIVAN, VAUGHAN, SOLLNER, MURPHY, SCHNEIDER, TUROWSKI, CULLINAN, TILLERY, KAROL, WILLIAMS, DALY, STEVENSON
Not Pictured: ANTAL, BATCHELDER, BURDAN, COLLIER, CONNELLY, DINNELL, GOTSCHALL, GREENWADE, KWAN, LANE, LIETO, MONTGOMERY, MYERS, RUEGEMER, YOUNG

SABERS PRESENTED

Armor Association Sabers were presented by Colonel Thomas F. Cole (center), the Director of the Department of Military Instruction, to two distinguished cadets from the Class of 1977 during ceremonies at the United States Military Academy in June 1977. The sabers were presented in recognition of the cadets' outstanding achievements in academic study, physical education, and military leadership.

Second Lieutenant John S. Prall (left) graduated 11 in his class of 697 cadets. As a cadet, he stood highest in his class in Russian, became airborne qualified, and trained with I Troop, 3d Squadron, 11th ACR. Following Ranger School and Armor Officer Basic Course, Lieutenant Prall will be assigned to the 4th Infantry Division (Mech), Fort Carson, CO.

Second Lieutenant David A. Hruska (right) was the first cadet of his class to be commissioned in Armor and graduated fourth in his class. As a cadet, he stood highest in his class in tactics, became airborne qualified, and trained with the 1st Battalion, 33d Armor. Following Armor Officer Basic Course, Lieutenant Hruska will also join the 4th Infantry Division (Mech).

Communications Alternatives

by Major L.D. Holder

A generation's growth has done much to mature the mechanized combined-arms team which was still in its infancy in World War II. Probably no single innovation has advanced this growth more than the broad adoption of radio communication as a corrective measure for the control difficulties, guesswork, and approximation which dogged the pioneers of armored warfare. The rugged, portable radios of the recent past permitted unique precision in the manipulation of large mobile units over wide frontages and through radical changes in the battlefield situation.

Inevitably, however, countercommunication techniques have begun to equal the improvements in radio systems and there is now a growing realization that the close operational tolerances achieved in an atmosphere of unimpeded radio use cannot be expected in future conflicts. Not even the best countermeasures can guarantee us anything more than occasional and temporary use of electronic communications in the coming years.

The consequences of this development touch every aspect of our doctrine and operations. How would a cavalry platoon of today's covering force transmit its vital report on the approach of a fast-moving enemy column under a blanket of electronic interference? Could artillery or air power be directed against such a target in the face of intelligently-employed jamming? Would commanders in the main battle area be able to mass troops and fires effectively in an intense electronic countermeasure (ECM) environment or after the electromagnetic pulse of a surprise nuclear strike? How could a command post or a critically placed unit continue to function if every radio transmission brought in a cascade of fire? The answers American commanders might give to such questions would reveal a great deal about our true potential for modern combat, and the aggregate result probably would not be encouraging.

Attacks on Communications

The point is that U.S. forces lean too heavily on the luxury of uncontested use of radio communication and our enemies have fielded a potent system for exploitation of this weakness. We bore the costs of our dependency in repeated security defeats in Vietnam. The Israelis felt the pinch of active electronic opposition in their operations of 1973. In the future, we have to expect attacks on our communications and, in the meantime, we should prepare to fend off

and survive those assaults. Since it is easier to capitalize on windfall bonuses of unrestrained radio use than to learn to do without an assumed capability on the spur of the moment, it seems obvious that we should train now to get along almost exclusively on alternate means.

That's far more easily said than done, however. Our habits and doctrine are heavily imbued with our established assumption of free access to the airwaves. The centralized control, fast cross attachments, and sudden shifts that characterize our defensive doctrine rely on continuous and rapid communication. Our commanders think in terms of the speed and smoothness of radio-controlled operations and are unaccustomed to accepting the lapses and uncertainties imposed by inferior communications means. Our staff officers expect to be able to amend their plans easily and quickly by radio and are used to seeking outside guidance during the course of operations.

The voluntary sacrifice of these conveniences might not be greeted as an improvement in any army of competitors and tactical perfectionists like ours, but such sacrifices would certainly approximate more closely the real terms of combat. Flexibility—revered as the greatest American military virtue—would still be demanded of commanders out of immediate contact with their superiors, but the large scale, high-speed tactical improvisations for which we are known would become vastly more difficult.

To a degree, of course, our radio nets can be protected and their use extended. Terrain masking, the use of low power, transmission discipline and limitation, the avoidance of patterns, employment of remote and directional antennas, and the use of Morse code all deserve emphasis. By and large, they are receiving command attention and exercise. The problem of nonradio communications, though, is rather fresh territory to most troop leaders and it requires as much stress.

Communication Techniques

The general techniques available are familiar from the classroom. Sonic, visual, messenger, and wire communication are taught too much as abstractions, although all demand a great deal of practice, planning and imagination if they are to be effectively integrated into our combat communication system. One of the prime obstacles to their use is the uncritical and widely held belief that such devices are historical curiosities with no place in the dynamic realm of modern operations.

Wire, for instance, is a fast and fairly reliable medium that is too easily relegated to the internal communication within command posts (CP's) and large facilities. Platoons and companies in defense or delay should employ their wire equipment routinely to provide simple, inconspicuous, and secure communication on their positions. With greater effort, battalions can use wire links to their companies, brigades to their battalions, and divisions to their brigades. The planning required to lay these lines to and through successive defensive positions would support, rather than hinder, the tactical plan as well as fall easily into the category of battlefield preparation.

Interruption and interception of wire traffic is, of course, possible, but simple security precautions and regular maintenance offset these shortcomings. If time for deployment and organization of the battlefield is available, wire lines to the front should receive a high priority of effort, since they afford a communication "tunnel" out of the areas most vulnerable to electronic countermeasures. They will also help conceal occupied battle positions by their reduced radiation signatures.

Defensive shifts and offensive movement make the use of wire more difficult, but it has been employed profitably in the past even under fluid conditions. Linemen followed the

action of World War II swiftly and stayed close to the lead units. We should polish that skill in our defensive and offensive training today—we will need it in the future.

Sound and visual signals are more limited and less flexible than wire or radio, but in tough situations, they are better than nothing. While the hand and arm signals of small units get the attention they merit, higher levels of command tend to ignore this category of communication because of its difficulty. Despite their limitations, the use of lights, panels, pyrotechnics, loudspeakers, and even semaphores should be planned and practiced. In all but the thickest vegetation or fog, carefully sited light or flag stations can pass messages over great distances using Morse code. A small version of the Navy's shuttered signal lamp might serve the Army well in Europe or almost any other theater of operations.

Similarly, smoke, strobe lights, and ground displays have demonstrated their value for marking friendly positions or vehicles, pointing out the enemy and designating drop zones and pickup zones. Such visual signals have been necessary near the line of contact in most modern wars even with the advantage of radios. Their application may be broadened considerably in an active electronic warfare (EW) situation.

The time-phasing that coordinated the movements and actions of units before the wide introduction of wireless communication can still serve as a standby means of control in a hostile environment. More easily used in the offensive since the attacker sets the pace of action, schedules can regulate the delivery of fires, the movement or commitment of forces and the dropping of supplies. They can also enhance the effectiveness of sonic or visual signals. In defense, time sequences are much less certain, but they can coordinate movement between phase lines and can be started, suspended, and stopped by visual cues or by standard operating procedures (SOP) during effective ECM. In a

difficult situation, time-phasing might run continuously, functioning as a primary control only during periods of complete communications blackout.

Used alone, timetables are poor substitutes for real communications—World War I experience attests to that. In extreme circumstances, though, such expendients may be the only form of coordination available; therefore, their use cannot be neglected entirely. Adjacent platoons and companies are frequently thrown back on timed arrangements; battalions and brigades may also be forced to rely on them occasionally.

Routine courier routes commonly provide for the delivery of periodic, noncritical communications, but messengers can also fill gaps in contact during combat, especially with the use of helicopters. An attack under radio silence or through an electronic barrage might include plans for dropping messengers from the lead elements at predetermined pickup points for following control groups. Headquarters to the rear could reserve messengers and fast transport—helicopters, motorcycles or automobiles—for quick dispatch to the front. Messengers would only have to travel beyond the range of jammers or to intermediate wire terminals to relay their messages by quicker means.

Satellite technology, laser signal devices, and fiber-optic lines currently being developed for communication use, may be available within the decade. Mechanical messengers such as drones, rockets, and special artillery rounds may also help us counter EW eventually. But for the present, commanders and signal officers should provide a trained group of operators and messengers and a complete plan for tactical message relay centers to support any operation threatened by radio interference. These facilities should correspond to tactical dispositions and should knit together all available communications means in a secondary net. Civilian telephones should be included where possible and facsimile transmitters should also be provided.

Command presence or representation at the crucial points on a battlefield can also compensate partially for the loss of instantaneous communications. Most successful commanders lead from the front anyway, but today's leaders will have more at stake in their choice of location than has recently been the case. With the danger of losing all radio usage in the immediate area of the forward edge of the battle area (FEBA), commanders will have to take special care to avoid being cut off from their subordinates.

Control can be preserved in the forward area by wire systems, but such communication means will obviously limit the command group's ability to move to the point of decision. By colocating with battalion or brigade CP's, a division commander can obtain some freedom of movement. Even so, he may find himself out of contact with distant elements at awkward times.

Doctrine emphasizes the responsibility of subordinate commanders and staff officers to take charge in such circumstances. A commander's best bet for retaining control or preserving his own conception of the operation under such conditions, is the careful preparation of his subordinates before each operation. In the interludes between active engagements, he should educate them to his own tactical preferences and techniques.

Liaison officers seeded through the command can then advise subcommanders out of contact with the general's plans and intentions, and local commanders can make the important decisions while isolated with greater confidence. Such occurrences are normal in the history of military operations—they can work out as well as at Tannenberg or as badly as at the Marne—but we must expect to meet more of these contingencies than in the recent past.

Summary

All of this only suggests some of the problems and alternatives that will confront us in the future. Every situation will be unique and every affected command will have to resort to communication "fixes" appropriate to its own immediate circumstances and assets. We cannot hope to get the same levels of tactical performance out of coarser communication means, nor can we expect to erect a fail-safe system beneath our first-line radio nets. We must, however, anticipate the difficulties we will face by training our troops and leaders to deal with them now.

We might very profitably extend the range of assignments for signal specialists to company level; the requirements for code qualification and for trained versatility legislate strongly in favor of such a change. We should also resist the temptation to pare away communications redundancy in the name of austerity. That would be the worst kind of false economy.

More immediately, maneuver units of all sizes should incorporate the use of alternative communication systems much more strongly into our doctrine and training. Current wargames and Army Training and Evaluation Programs (ARTEP) direct the attention of commanders to EW in a healthy way, but the play of electronic interference might be extended beyond those guidelines as a unit's proficiency improves.

To prohibit the use of radios or, better still, to jam a training unit's nets for half the time given to field training would be a useful experience for all. At that level of activity, communicators would become accustomed to having to work for the use of their radios and to falling back routinely on alternate methods. Commanders would develop a much better impression of the actual character and tempo of combat and of their forces' capabilities to fight through EW. Most importantly, all of our troops would learn to function on something like the real battlefield of the present day.

MAJ L.D. HOLDER was commissioned in Armor as a Distinguished Military Graduate of Texas A&M University in 1966. He has commanded cavalry troops in Germany and Vietnam and is a graduate of the Armor officer advanced course. He was a history teacher at the United States Military Academy and is now a student at the Command and General Staff College.

SOVIET TACTICS

A central problem in the study of Soviet tactics is whether or not a Soviet commander in an offensive situation in Europe will commit fresh units from his second echelon into an axis of advance on which his first-echelon units have been stopped by the defender. In other words, will the Soviet Army commander commit good units after bad, or will he change directions and try another axis if he runs into stiff resistance initially?

There seem to be two clear schools of thought in this problem. The first might be called the *po planu* school which is the Russian expression meaning "according to planning." It holds that the Soviets make elaborate plans and that there would certainly be a minutely detailed one for any invasion of NATO territory. The feeling in this school of thought is that they would follow the plan in all but the most dire circumstances. And their reasons for doing so are extremely good: On a nuclear battlefield (or even on a nuclear-scarred battlefield), command and control would be difficult at best, and modern electronic warfare devices might make communications all but impossible. These are disadvantages that make sudden changes in a large-scale offensive action extremely risky.

In addition, the main attack in an army or front sector is weighted, just as one of ours would be. Most of the supplies—ammunition, fuel—and most of the artillery support available would be oriented toward that main axis. Again, on a high-intensity battlefield, this orientation might be difficult to shift.

Finally, there is the question of speed. If the Soviets are obsessed with anything, it is the concept of the need for speed in offensive operations. Following the plan means minimum loss of speed, which is of the essence, since every Soviet commander will have a goal and a time frame in which to achieve it. To that commander, high casualties will matter less than achieving the goal on time.

The other school of thought says:

The Soviets are no fools. They would no more continue to stick their necks in a meat grinder than we would, and we must give them credit for being at least as perceptive as we would be.

They point to the normal Soviet practice of making two attacks—a main and a secondary. The general, say a division commander, commanding the forces of the secondary or supporting attack of a combined-arms army will not be just marking time as the main attack is launched. He will be attacking also. And, if the main attack bogs down or loses momentum and the subordinate attack commander finds a defensive weakness in his sector, he will take advantage of it if he can and create a breach at that point. Then, if the army commander is alert to the situation and has not already committed his second echelon, the chances are good that he would switch emphasis to the subordinate attack, commit his remaining divisions, including the tank division, on that subordinate axis and attempt to exploit into the rear of the defending force. He would do this, knowing that the NATO defender, with few reserves at his command, might already have committed those reserves against the main axis, leaving little or nothing behind the area of the subordinate attack.

From the Blue commander's point of view, the dilemma is acute. Emerging tactical concepts dictate that the U.S. corps commander, faced with the probability of attack by a Soviet army or armies, must be able to "see the battlefield" clearly enough to concentrate his limited forces in the area where the main attack will come. But, if he moves too many forces or moves prematurely to concentrate at the place where he thinks the main blow will fall (and all the best signs indicate it will fall there), he exposes his lines to the secondary attack. Then, if the Soviet commander of the army making the attack sees that the secondary attack is experiencing little or no resistance, he can commit his second echelon on this axis and "the horse is out of the barn" because there are no Blue reserves to meet this second effort.

This latter situation represents the worse case for Blue forces. The most likely case, we believe, is the first one: that the Soviets would be so "plan-minded" that they could not stop or change the direction of an offensive once it started. Unfortunately, we cannot rely on that estimate. Ultimately, the worst case must be recognized, and we must prepare for the second alternative—that is, the Soviet commander, either at army or front level, will wait until he is fairly sure of the success or failure of his first-echelon forces before he commits his second echelon. We have thus given him credit for being at least as foresighted and flexible as we would be. To think otherwise would be foolish and dangerous.

Saying that, then, the U.S. corps commander would be wise to watch for at least *two* attacks in his sector; he should not commit everything in front of the main attack until the enemy's second echelon has been committed. "Seeing the battlefield" in the jargon of new defensive tactics must mean seeing it beyond the initial commitment of the enemy's main forces.

Condensed from an article by Lieutenant Colonel George F. Steger in Military Review 1976.

CHEMICAL WARFARE

The United States will not be the first to use chemical weapons. That has been the official position and policy of the United States since World War I and remains today as the cornerstone of U.S. chemical warfare (CW) doctrine. Like the Soviets, we have seen the horrors of gas warfare. General Pershing, commander of

U.S. forces in Europe during World War I, called CW "a cruel and unnatural use of science" but recognized at the same time that it was "so deadly to the unprepared that we can never afford to neglect the question."

The chemical warfare policy of the United States is centered on the concept of DETERRENCE. That policy has two objectives:

- Deter the use of chemical agents by other nations.
- Provide a retaliatory capability should we be attacked with chemical agents.

If we are attacked with chemicals, and if the national command authority authorizes our retaliatory use of chemical weapons, then the primary objective is to cause a termination of CW operations at the lowest possible level of intensity at the earliest moment.

Deterrence, to be effective, must be based on a manifest capability to act. This means that U.S. forces must be prepared to detect and protect against chemical and biological munitions and agents; conduct operations in a nuclear, biological, chemical (NBC) environment; and use chemical weapons in retaliation.

A well-prepared force, properly trained and equipped, presents an obvious ability to deter enemy CW initiatives. If training lags, equipment becomes obsolescent, the quality of the retaliatory arsenal diminishes, and leadership emphasis dissipates, then the ability to deter the actions of others also erodes. Regardless then of how distasteful the subject, our interest and efforts in CW operations must not be allowed to diminish.

Training in CW and NBC defense must be integrated into individual and unit training programs and into higher echelon tactical exercises. Training objectives must be designed to develop and evaluate the readiness of forces to operate in an NBC environment and to insure proficiency with all available offensive and protective materiel. Emphasis must be placed on performing all operational missions while using NBC detection, warning, and protective equipment. Toward this end, simulated agents should be used whenever possible to provide realism.

Sure, chemical training is an inconvenience; so are all other aspects of combat training. Protective equipment is effective against chemical agents but not noted for its comfort. It's not easy to wear a mask for long periods of time in training when you know that there are no toxic agents present. Yet such training is vital. Your unit must be able to perform its job even under toxic chemical conditions. To be unwilling or unable to perform your mission under such conditions is to be vulnerable to the enemy; just as vulnerable as if you had a rifle, but no ammo for it.

The U.S. has a retalitatory arsenal of chemical weapons. They are designed to threaten the enemy should he be the first to use them. He has the trigger on the weapon that is pointed directly at him.

The Soviet chemical arsenal is oriented toward offensive action. Their weapons and delivery systems are sophisticated and effective; their chemical agents exceedingly deadly. Their troops are well trained and possess excellent protective equipment, detection devices, and decontamination machinery. *There can be little doubt that the Soviets will initiate chemical warfare when and if it is to their national interest to do so.* The United States must possess a posture to deter Soviet actions in that regard. We must be sure that we are prepared to survive the first attack and discourage the second. *We must be prepared to bring such a curse of lethal agents upon the enemy that he will reject future use of those weapons. This is not a desired objective. It is a must!*

Don't let all the jokes about the bugs and gas lull you into a sense of disrespect for the subject. Chemical warfare represents one of the greatest dangers on the modern battlefield. The Soviets consider chemical weapons to be an integral part of the future tactical scheme and to be one of the most powerful means of destroying an enemy under modern combat conditions.

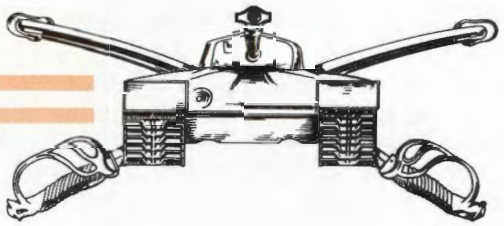
To survive in the chemical warfare environment, it is essential that commanders assure that their forces are provided the highest degree of protection and training against the CW threat. While these measures will save lives, commanders must realize that as the degree of chemical protection increases the efficiency and endurance of their troops to accomplish the mission decreases. Commanders must be aware of the problems associated with fighting in a CW environment and understand the actions they can take to limit the impact of those difficulties.

Some casualties will inevitably result from the employment of chemicals, even against a fully protected force. Additionally, U.S. forces will suffer serious degradation of performance caused by the requirement to wear chemical protective clothing and equipment for prolonged periods. Unless well-trained and conditioned, our soldiers will suffer reduced effectiveness during NBC operations. The problems associated with wearing protective equipment (heat stress, respiratory strain, psychological stress, reduced mobility, visual acuity, and manual dexterity) will adversely affect mission accomplishment. Soldiers wearing chemical protective equipment have a limited tolerance time for hard work and must be allowed to attend to body functions. Without proper precautions, the dual vulnerability of forces to both the effects of the chemical agent and the stresses from the protective equipment can result in an unacceptable degradation of combat effectiveness and attrition of the force. This degradation can be reduced through training, and by use of the Mission-Oriented Protective Posture (MOPP) as described in FM 21-40, *NBC Defense.*

The primary objective of training is to insure that the mission will be accomplished. The emphasis of CW training must center on the ability of the unit to accomplish its mission. Regardless of the unit, the soldiers must be trained to accomplish that mission in a CW environment. Chemical agents do not differentiate between combat and combat support units. Maintenance or mechanized, armor or transportation, all units must be trained to perform in a hostile chemical environment. If your unit is unable to do its job while working in protective equipment, then something is missing in the unit training program.

Condensed from DA Spotlight, March 1977. ▲

OPMD - EPMD ARMOR



Copies of Material in Your File

Recently, the Officer Personnel Management Directorate (OPMD) has received numerous requests for copies of all or part of officers' Official Military Personnel File, (OMPF) and/or Career Management Individual File (CMIF). Due to the increasing number of requests and the importance to the requesting officer and OPMD of being able to respond in a timely manner, the following guidance is provided:

- All requests must be in writing and signed by the officer. Third party requests for information on a specific individual must be accompanied with written authorization from the officer concerned.
- All requests for copies of documents contained in the OMPF or CMIF should be addressed to HQ MILPERCEN, DAPC-MSP-PS, 200 Stovall Street, Alexandria, VA 22332.
- Officer will be billed by MILPERCEN as prescribed by AR 37-30 and should allow up to 30 days for receipt of requested information.

Company Grade Alternate Specialty Changes

The proper alignment of specialties in terms of numbers, skills, grades, and utilization opportunities within and between specialties is a primary goal of the Officer Personnel Management System (OPMS). The present alignment of company grade officers against current force specialty requirements is as follows:

OVER-ALIGNED: Specialties 54 and 83

UNDER-ALIGNED: Specialties 21, 27, 35, 42, 43, 44, 49, 53, 74, 75, 86, 91, 92, and 93

Effective on 1 November 1976, the moratorium imposed in July 1975 on alternate specialty changes for captains in basic year groups 1968 and earlier was lifted. However, a 1-year moratorium still applies to the aviation specialty (Specialty Code 15) which was subject to redesignation by a Department of the Army Board in July 1976. Alternate specialty changes from over-aligned to under-aligned specialties can occur now and are encouraged. Requests to change from under-aligned to over-aligned or involving the aviation specialty are discouraged. MILPERCEN will process each request individually and approve or disapprove based on the officer's experience, education or aptitude, and the alignment within the specialties.

A 1-year moratorium is in effect for basic year group 1969 officers who were designated an alternate specialty on 31 August 1976. Officers in this year group may request a specialty change only as an exception to the moratorium. A significant change must occur in an officer's experience or education to justify an exception; e.g. advanced civil school or military schooling which better supports a specialty other than the designated specialty. Company grade officers, who meet the criteria above, desiring to change their alternate specialty should submit their request in letter form to MILPERCEN, ATTN: DAPC-OPE-R, 200 Stovall Street, Alexandria, VA 22332. Questions pertaining to specialty changes should be forwarded to the address above or if convenient call Specialty Coordinator in Combat Arms Division, AUTOVON 221-7819/7820.

Branch Clearance for Command

We all recognize that a time lag exists between the date an officer changes jobs in a unit and when that change is actually reflected in his personnel records at MILPERCEN.

In past years, particularly in the Vietnam era, installations and units were required to obtain "branch clearance" prior to placing an officer in a company-level command position. The purpose was to insure that an officer was not about to be notified of some pending assignment or personnel action which might be in conflict with an opportunity to command. In today's environment of stabilized tours, many installations and organizations have failed to call for branch clearance while others have done so consistently.

We solicit the support and assistance of all commanders in requesting branch clearance. This insures that stabilization is obtained prior to placing an officer in command. This will help us stay abreast of what individual officers are doing and better manage their careers. It will preclude a situation like the officer recently alerted for PCS to Germany who had just assumed command of a tank company. It will also assist senior commanders in future planning by identifying those officers that have been programmed for command so they are not slated for other requirements.

Specialty Education

Specialty education requirements are satisfied by both the Army's military schooling system and civilian institutions.

The Officer Basic Course and follow-on training includes specialty education appropriate to the officer's primary specialty. The Advanced Course, C&GSC-level schooling and the senior service colleges provide opportunities for additional primary and alternate specialty education. A wide spectrum of Army courses are available to support officer professional and specialty development. Additionally, other services and elements of the Federal Government offer many specialized courses which support officer development. Many of these courses are available by correspon-

dence in addition to resident configuration.

Officers must become intimately familiar with DA PAM 600-3, "Officer Professional Development and Utilization"; research DA PAM 351-4, "U.S. Army Formal Schools Catalog"; and DOD 5010.16-C, "Defense Management Education & Training," to determine the professional or specialized training available. It is difficult to anticipate and specify the many combinations of courses which are applicable to both the Army and the individual's needs. However, representative courses which are particularly suitable for the various specialties are reflected below:

Automatic Data Processing	**7E-F1**	**ADP Systems Analysis Officer**
Comptroller	**7D-45A**	**Military Comptrollership**
Foreign Area Officer	**7B-F3**	**Foreign Area Officer Course**
Logistics Management	**8A-F17**	**Logistics Executive Development Course**
Public Affairs	**7G-F6**	**Information Officer**
Personnel Management	**7C-41A**	**Personnel Management Human Resources Management**
Research and Development	**5L-F3**	**Research and Development Management Orientation**

Headquarters, Training and Doctrine Command (TRADOC) and the specialty proponents are working to develop courses to support each specialty.

Degree Completion Program

The partially-funded Undergraduate Degree Completion Program is the only program whereby an officer can receive full-time civilian schooling to complete an undergraduate degree. The partially-funded Degree Completion Program will allow officers who have completed a portion of their graduate degree requirements through off-duty study the opportunity to complete a graduate degree through a period of full-time study. A 3-year utilization assignment is required following schooling in this program. Considering the demand for these programs and the limited number of schooling spaces available, OPMD must give priority to those who require the least time to complete the degree requirements.

If interested, apply under the provisions of AR 621-1, Chapter 8, dated 6 May 1974.

Armor Aviator Notes

The question most frequently asked by Armor aviators pertains to the need for ground assignments now that aviation is an OPMS specialty. We must address the term "need" on two levels. . .the individual's and the Army's. In order for you to better understand how Armor Branch copes with meeting the Army's needs while trying to provide the maximum professional development opportunities for its members, the following points must be made:

- Vietnam and post-Vietnam aviation training rates have created severe imbalances in the year group (YG) strengths of aviators. YG 1970 and earlier have more aviators than there are aviation job opportunities for proper aviation career development. YG 1971 and later are understrength in aviators. These officers can expect heavy utilization in the aviation specialty in order for the Army's aviation mission to be fulfilled.
- Most YG 70 and earlier aviators have already had at least one ground assignment and have commanded companies. Aviators in YG 71 and later will have diminished opportunity for ground assignments as the overstrength YG's are promoted out of the company-grade ranks and per capita aviation requirements increase.
- A significant portion of company-grade Armor officers are aviators. This means that many aviators are needed for non-aviation assignments (both in specialty 12, branch material, and in other specialty requirements) to meet Armor's share of the total Army requirements.
- It is a worthwhile and desirable goal to retain the ground orientation within our aviation corps. Those officers who have had opportunities to command as captains should make better field-grade commanders of aviation units and more fully integrate Army aviation into the combined-arms team. The point is that non-aviation (other specialty) duties should be viewed as worthwhile and desirable to the overall broadening of our aviators.
- Company-grade command is still a desirable goal and should be sought if the opportunity is available, but since the aviation specialty command opportunities are largely in the field-grade arena, a lack of command must not be considered negatively. Performance must be the major consideration in judging an officer's potential.
- Each time an Armor aviator is due for reassignment, assignment officers must consider the above points and relate them to each individual's and the Army's needs. Career counseling and assignments may vary significantly with each individual because no two officers are exactly the same. This is the reason Armor officers get such individualized and personal treatment from their career managers. Each time an assignment is made, the following questions are asked:

What does the Army need him for and does he show the potential to perform the job?
What experience has he had to date?
Is he qualified in his specialties? If not, what type assignment does he need?
How well has he performed in past assignments? What is his "gate" situation?
What is his civil and military education level?
What are his preferences?

These are the major issues that make up the thought process of the assignment officer. Of these, the first question, Army needs, must carry the greatest weight.

A second question frequently asked pertains to the desirability of the Armor (SC 12) and aviation (SC 15) OPMS specialty combination. There is no "right" answer to that question. The answer will vary from year group to year group. There are a number of major factors which should be considered. Among these factors are such things as:

- The utilization rates (job opportunities) for service in these two specialties diminish rapidly in the field-grade years—especially for lieutenant colonels and colonels. Avia-

tion, unlike most other alternate specialties, has decreasing positions available in those ranks. In fact, most officers with these specialties (12/15) will serve in a third specialty much of their later career. When this occurs, how qualified will he be when competing with officers in his specialties who have considerably more experience?

- Stabilization constraints limit our ability to move officers into an environment which will allow adequate development in both specialties at *each grade level.*
- Other Army requirements will often dictate assignment out of these two specialties and create an experience gap in one or the other of the two specialties.
- The Aviation Career Incentive Act and its expected aviation utilization rate of 50 percent along with military/civilian schooling periods, mathematically insures a marginal amount of time for experience in the Armor specialty when compared with nonrated officers.
- Those who have acquired successful experience in both Armor and aviation specialties will have greater opportunity for command at the lieutenant colonel level as they can compete for both.
- Army funded advanced schooling will probably not be possible for the 12/15 specialty combination. The Army trains officers at the graduate level only in those disciplines which are considered shortage (ORSA, ADP, Engineering, etc) and officers selected for school must have specialties associated with those disciplines. Almost none of the Army's shortage disciplines are associated directly with Armor or aviation.

As you can see, the Armor/Aviation (12/15) combination will be extremely difficult, if not impossible, for an officer to sustain. There will be very limited numbers of officers in YG 71 and later who will be designated 12/15.

Even knowing this, we feel that those of you in YG 71 and later, who desire and who have the opportunity, should serve time in Armor (12) positions, company/troop command if possible. This experience, if acquired, will enhance your value to the Army because of the broad experience base; not to mention the value to you as an individual in the development of your overall leadership capabilities and experience.

Advanced Course Attendance

Attendance at the Advance Course *ideally* will occur between the fourth and fifth year of commissioned service. The intent is to send as many officers as possible to the course before they have commanded at company/troop level since advance courses are designed to help prepare officers for command at that level.

Armor has two classes each year and Armor Branch has about 140-150 quotas per class. We also send about 50 officers each year to one of the four Infantry Officer Advance Courses (IOAC); and as many as five officers a year to each of the Field Artillery Advance Course (FAOAC) and Air-Defense Artillery Advance Course (ADOAC). One officer is selected annually to attend the Marine Corps Amphibious Warfare Course in lieu of AOAC.

Obviously, not everyone can go to an advance course before they command, but every effort is made to maximize the number who do. Priority for IOAC selection is given to those officers who have already commanded or otherwise have very extensive Armor credentials and a strong manner of performance. Priority for FAOAC and ADOAC is given to those few officers who qualify for IOAC, have commanded successfully and have a strong math background. If you are interested in either FAOAC or ADOAC, you should let us know.

Officers on an overseas tour can generally expect to attend the advance course at the completion of that tour. Those with a date eligible for return from overseas (DEROS) that does not match a school start date will normally be involuntarily extended to preclude spending more than 60 days in a "snowbird" status at a school. CONUS based officers usually attend the advance course after spending a minimum of 36 months on station but some will remain in place until a quota is available for them. There is no stigma attached to this situation and they will be programmed for attendance at the earliest possible time.

Foreign C&GSC-Level Schooling

Desire an exotic assignment? Want one of those faraway places with strange-sounding names? Majors Division is currently identifying officers to attend foreign C&GSC's in a number of countries. If you are interested, contact your career manager in MILPERCEN. Some general prerequisites for these schools are:

- Be proficient in the language of the country concerned.
- Be available (complete a normal tour on station by course start),
- Be a volunteer.

As a general rule, officers who have a specialty of Foreign Area Officer receive preferential consideration for these schools as attendance supports their OPMS specialty.

Some of the language requirements with applicable countries are:

Spanish .. Spain, Argentina, Uruguay, Venezuela, Peru.
German ..... Austria, Germany.
Indonesian ..... Indonesia.
Italian ..... Italy.
English ..... India, Pakistan, Canada, Great Britain.

RECOGNITION QUIZ ANSWERS

1) Soviet ASU-85
2) U.S. M-60A2
3) Soviet T-62
4) Britian Chieftain
5) France AMX-13
6) Soviet ASU-85

☆ U.S. GOVERNMENT PRINTING OFFICE: 1977—757-041/3

BOOKS

BEYOND NUCLEAR DETERRENCE, NEW AIMS, NEW ARMS by Johan J. Holst and Uwe Nerlich. Crane, Russak & Co., Inc. 1977. 320 pages. $16.50.

This book is the result of a broadly based effort to examine emerging security crises which confront the Atlantic Alliance. The chapters are independent papers written and discussed by members of the European-American Workshop. The first workshop was organized by the Foundation for Science and Politics and held at Ebenhausen, FRG, in March 1975. The second, organized by the Norwegian Institute of International Affairs, took place in Copenhagen in September 1975. The workshops were attended by defense experts on both sides of the Atlantic with a view of jointly assessing emerging issues before governmental positions are established. They were based on ongoing research and have endeavored to be conducive to both more scholarly effort and future policy formulation.

The contributors took cognizance of the increased Soviet buildup in both conventional and nuclear arms. They have also realistically approached the high personnel costs required by NATO forces and the fact that the percent of the national budget for defense will be difficult to sustain. With this backdrop, the participants examined in detail the effect of more accurate munitions on the battlefield. In particular, they make a case for all precision guided munitions (PGM's) from the TOW to the Cruise Missile. Their thesis revolves around the fact that with reduced circular error probabilities (CEP's), less munitions are required to destroy, damage or suppress the enemy. Moreover, using this surgical approach an attendant nondestruction advantage is accrued. Budgeteers will see this as an opportunity to first reduce ammunition stockages and then to reduce the numbers of delivery means.

Implicit in all of these evaluations is doing more for less. Further, the in-depth challenging of where we are today and where inertia will carry us tomorrow provides the decision makers with the baseline from which appropriate changes can be directed. Thus, the role of the tank and the need for mechanized infantry versus the lightly-equipped soldier heavily supported with PGM's are posited. In a like manner, the attack helicopter and fighter bombers are discussed.

The conservative soldier will find much fault with the ideas presented in this book. As the new administration looks for additional ways to reduce defense spending, these ideas will gain supporters and more space in the press. Unfortunately, only a war will prove who ultimately is correct.

Colonel C. A. Mitchell
USAARMS

THE PETER PLAN by Laurence J. Peter. William Morrow and Company. 224 pages. $6.95.

Dr. Peter tells us early on what his new volume is all about.

> *The Peter Plan* completes a trilogy that began with *The Peter Principle,* an explanation of how individuals escalate to respective levels of incompetence. A second volume, *The Peter Prescription,* demonstrated how individuals could avoid their level of incompetence. This final volume, *The Peter Plan,* shows ways by which we can protect our planet while civilization moves confidently forward to new achievements with which to secure the future for the human race.

The first two efforts were light, enjoyable and satisfying, like a good souffle'. *The Peter Plan,* however, reminds me of my Aunt Maizie's fudge—too sweet, too heavy, and safely taken only in very small bites. Dr. Peter tried to present a weighty, filling book using his tried and tested souffle' recipe. Unfortunately, it fell. Such profundities as "the military has maneuvered the elected representatives into waging war with distant countries that pose no threat to America" permeate the book. Or how about, "modern man tends to believe that competition is the driving force behind progress, but this belief does not stand up to close scrutiny...Competition has no inherent virtue. There is plenty of competition in organized crime."

Dr. Peter should perhaps ruminate some more on his second volume. He was a most entertaining author when he sought to amuse and inform. What compels so many good comedians to leave their element and try their hand in a serious dramatic role?

Major Terry A. Gordon
Field Artillery

THE LAST CHANCE: Nuclear Proliferation and Arms Control. by William Epstein. New York: The Free Press, 1976. 341 pages. $14.95.

William Epstein, a Canadian, is a special consultant on disarmament to the Secretary General of the United Nations, a Special Fellow of the U.N. Institute for Training and Research, and since 1952, has been Secretary of the U.N. Disarmament Commission. He stated that for the first time in a quarter of a century of working with the problems of the arms race, he is beginning to get scared. Alarmed by India's explosion of its first nuclear device in May 1974, Mr. Epstein wrote this book out of fear that the nuclear arms race is about to burst—that the possibility of a nuclear holocaust is approaching certainty.

The author examines many aspects of the nuclear problem, such as the basic dilemma caused by the first use of atomic weapons in 1945; the uses of nuclear energy in both war and peace; nuclear nonproliferation; the security of nonnuclear states; the value of international safeguards; stopping the nuclear-arms race; and the danger of proliferation to terrorists and criminals. He maintains that if nonproliferation fails, the prospect for humanity is not promising. According to Epstein "man is an endangered species" because of four "time bombs" which are linked, in some degree, to each other and threaten human survival and welfare. They are the nuclear bomb, which he considers most dangerous; the population bomb; the poverty bomb; and the pollution bomb. Each of these bombs leads to growing competition and violence worldwide. Although science, technology, and economic growth should have provided the solution to mankind's problems, they seem to have compounded and added to them. The author further maintains that the United States and the Soviet Union must assume the initiative in changing the world's attitude concerning nuclear weapons, and only they can halt and reverse the vertical proliferation of nuclear weapons.

This is not a "doomsday book." It compels the reader to seriously consider the perils of nuclear weapons proliferation, and it offers a penetrating analysis of the dilemma that the arms race poses to world security.

Lieutenant Colonel Ronald A. Duchin
USAARMC ▲

Coming in ARMOR

"ATTACK HELICOPTER GUNNERY PROGRAM"

Major Joseph Laehu and Chief Warrant Officer 3 Albert R. Trevino provide an overview of a successful attack helicopter gunnery program which was planned and conducted using guidance contained in TC 17-17.

"THE ARMOR BATTALION OF THE HEAVY DIVISION"

In his article examining the Armor battalion of the restructured division, Lieutenant Colonel Nicholas A. Andreacchio questions both the proposed changes and the rationale upon which they are based.

"LETTER TO A COMPANY COMMANDER"

"As I move to a new position of responsibility, I would like to offer my advice to you on how to develop a platoon leader," writes First Lieutenant James F. Gebhardt in a Professional Thought about those activities which take up most of a platoon leader's time—training, maintenance, counseling, and extra duties.

"IMPROVING THE ARMY"

Presenting a "game plan" by which changes can be effected within the Army, Lieutenant Colonel Peter F. Bahnsen shows how methodical procedures and tactics, moral courage, and tenacity can be used to improve the Army.

"DUAL-TEX CAMOUFLAGE PATTERN"

Major Timothy R. O'Neill describes the preceptual processes used in identifying a target, then describes a camouflage system designed to defeat those processes.

ARMOR

november-december 1977

Dual - Tex Camouflage

US 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."

Cover

The cover art for this issue depicts the Dual-Tex Camouflage Pattern which is designed to defeat the perceptual processes used in identifying a target. The development and testing of this pattern is described by Major Timothy R. O'Neill in his article beginning on page 21. (Cover by Karen Randall)

ARMOR

the Magazine of Mobile Warfare

November-Decmeber 1977

Vol. LXXXVI No. 6

ARMOR Magazine is published bi-monthly by the U.S. Army Armor School at 4401 Vine Grove Road, Fort Knox, Kentucky 40121, to stimulate interest in, provoke thought on, and provide an open forum for decorous discussion of professional matters. Unless otherwise stated, material does not represent official policy, thinking or endorsement by any agency of the U.S. Army. Use of funds for the printing of this publication have been approved by the Department of the Army, 23 December 1975.

SUBSCRIPTION RATES: Individual subscriptions to ARMOR are available through the U.S. Armor Association, Post Office Box O, Fort Knox, Kentucky 40121. **Domestic:** $8.00 one year, $14.00 two years, $20.00 three years. **Foreign:** $10.00 one year, $18.00 two years, $26.00 three years. Single copies: $1.50.

CORRESPONDENCE: Address all correspondence to U.S. Army Armor School, ATTN: ATSB-MAG, Fort Knox, Kentucky 40121. (Telephone: Autovon 464-2249 or Commercial (502) 624-2249).

POSTMASTER: Controlled circulation postage paid at Louisville, Kentucky, Department of the Army, DOD 314.

ARMOR may be forwarded to military personnel whose change of address is caused by official orders (except to APO addresses) without payment of additional postage. The subscriber must notify the postmaster.

LETTERS

AFTER THE BALL

Dear Sir:

I have returned from my annual trek to the Home of Armor. The occasion was of course the Annual Armor Conference and the 87th meeting of the Armor Association. It was a glad time and a sad time for me. There is so much of me in the Home of Armor and it hurts that I am no longer a participant in the making of tank soldiers. I did see many men with whom I have soldiered and from whom I have learned. I care for and respect them, and believe that in some measure this feeling is returned.

I was relieved that the MICV project is alive and well, and that the vehicle commander has been relocated so that he has the capability of 360 degree vision. This was something that I tried to bring about unsuccessfully, while assigned to the Office of Doctrine, Development, Literature and Plans (ODDLP) at the Infantry School in 1970-72. As then located, the vehicle commander was blinded in a 130-degree arc. Hang in there Stan. The product is shaping up. How about the TRW gun?

It looks like we are getting a new tank too. If the drawing board capability is translatable to field reality for a tank crew, along with the requisite durability, maintainability, and reliability, the project manager will have achieved what has long been lacking. Armor needs no more scout/recon vehicles that are stopped by a 2 foot vertical barrier. Nor do we need a "Gamma Goat", a "SPAT", an air dropable toy (the *M-551*) such as we struggled to justify in Vietnam.

Our credibility has suffered from all this junk and the soldier has gotten a belly full of miracle vehicles that can't clear the tank park. We may be on our way!

One thought comes to mind; KISS (keep it simple, stupid). None of these projects mean a thing without a crew who will, and is capable of using the entire system. Make it durable, reliable, maintainable, and capable of a first round kill; nothing happens without the crew to make it happen. Are we getting too far from capability or potential of the crew to man the wonder vehicle?

Certainly, the care, training, and maintenance of a crew and it's integrity is going to be the driving factor, as it always has been. Doing the correct thing *as a crew*, over and over again is the answer to survivability of both men and systems. Detailed supervision of each step of a task or sequence; patience—yes and more patience—is required of the tank commander and platoon leader. Almost right is not good enough! It can kill a crew and lose a tank; and this thought should override the impulse to pull a crewman from a tank on the range or other skill maintenance drill, to whitewash stones or rake leaves. Maintain the integrity of the crew at all costs. Insure that each crew is trained to their full potential and that the equipment they use is equal to the task assigned. This is the road to not only survivability, but to victory lane.

The point (if there is one) to this tirade is that machines have not yet replaced man on the battlefield and *until they do,* there is no substitute for training that produces a *first effect use* of the equipment available *at the time it is needed!* If you see to this, you may even one day meet the sons and grandsons of the tank soldiers who followed and were trained (correctly) by you; and who by their execution gave their leader the victory that will keep the United States a nation of free men.

JOHN G. BELT
Colonel (Retired), Armor
Gahanna, OH 43230

CREDIT TO NCO's

Dear Sir:

I found Captain John Lee's article in the March-April 1977 issue humorous; however, I have two questions.

Does Captain Lee really expect to be able to produce a small tank simply by reducing crew size? His picture, which I realize is not to be considered seriously, shows a vehicle about the size of the *M-114* mounting a high-velocity gun. How much must this vehicle weigh to be able to withstand the recoil? How much room is necessary to carry a sufficient number of rounds? How long is his automatic loader which replaces one man? How much room is necessary for recoil and clearance to allow for emergency manual loading? How much armor is necessary? How large must an engine be to move this mass? Frankly, eliminating crewmen may be a good idea or at least a practical idea for those countries which face a manpower shortage, but it will not do very much for reducing the size of a tank.

Next, why should the crewmen be warrant officers? Once upon a time, the sergeants in the Army were expected to be experts on "maintenance, small unit tactics, gunnery, and related subjects." If this is not the case now, it should be! There is no reason why warrant officers are necessary to "cope" with the sophisticated battle tank of the 21st Century. Captain Lee must have acquired this idea from his association with Army aviation where everyone who controls an aircraft, it is assumed, must be an officer. However, many countries utilize sergeants to fly fighter-type aircraft, which are probably more complicated than helicopters or tanks. As examples, the British have used sergeant pilots for years and more than half of the Israeli pilots are said to be sergeants. Both of these air forces seem to manage well enough even with sergeants controlling some of their sophisticated weapon systems. Even the Marine Corps at one time utilized sergeant pilots; although, they have since adopted the Army policy. Actually, as a platoon leader, I would rather have an E-6 staff sergeant with 8-12 years of service commanding the tanks in my platoon than a 19-year old warrant officer fresh out of school. In conclusion, I consider Captain Lee's article an insult to the NCO's of the Army.

PAUL FINBERG
Captain, USAR
College Station, TX 77884

Editor's Note: *The tank design used as an illustration in Captain Lee's article was a concept drawn up by the editor, not Captain Lee. The intent of the article was not to present a finished, workable design of a two man tank, but rather to foster some thought on a possible new direction for tank technology. Thought provoking isn't it?*

FIFTH CREWMAN

Dear Sir:

I wish to formally withdraw my comments concerning the "Fifth Crewman," reference the letter published in the July-August 1977 issue of *ARMOR*. From now on, this critical tanker guarantees to positively identify the target as friendly or enemy and to insure that the old cranial computer is out of travel lock prior to issuing a fire command.

In this particular case, a round was fired at an obvious "friendly" and a deserved apology is submitted.

LYMAN H. HARROLD
Captain, Armor
Arkadelphia, AR 71923

THE COMMANDER'S HATCH

MG John W. McEnery
Commandant
U.S. Army Armor School

MORE ON TANK FORCE MANAGEMENT

In the May-June issue of this year, I first mentioned the Tank Force Management Group and the probable establishment of a management system to monitor the status of tanks and tankers throughout the system. I ventured, at that time, that the Commander of the Armor Center would play a key role in this system. As you are well aware, a lot has happened since the May-June issue—we are well into the most significant personnel, logistical, and training changes in the Armor Force since World War II. Perhaps even more important—and more difficult—are the managerial changes we are trying to bring about. I would like to quote for you a few passages from the concluding paragraphs of Lieutenant General Kalergis' final report:

The importance of the Armor Center role in combat developments, training developments, and maintenance of tank force standards and doctrine is recognized and totally supported. Since the Armor Center is the "Professional Home" for Armor officers and soldiers of the Army, the Center Commander must coordinate and supervise the development and maintenance of standards worldwide to guarantee a properly

manned, trained, and equipped tank force. He is the principal spokesman for the Armor community and in this capacity must serve as the focal point for molding man and machine to optimize combat potential. He must also serve as the interface between combat developments, training developments, and materiel developments. The Armor Center Commander must coordinate on a continuing basis with the Tank Force Management Office to assure proper assessment of Army and DOD policies and procedures at Army Staff level which affect the Army's ability to man, train, equip, field, and maintain an Armor Force.

To assist me in these tasks, I have formed an Office of Armor Force Management (OAFM) here at Fort Knox. Its functions will be to:

- Monitor all areas of concept developments, combat developments, materiel developments, training developments, system management, and the development and maintenance of standards worldwide as they pertain to the Armor Force.
- Advise and assist me in my role as the principal spokesman for the Armor community.
- Provide a single point of contact for worldwide communication concerning the Armor Force.
- Act as coordinator and focal point for the development, design, implementation and ultimate proponent for the use of a data management system to evaluate and manage the Armor Force worldwide.

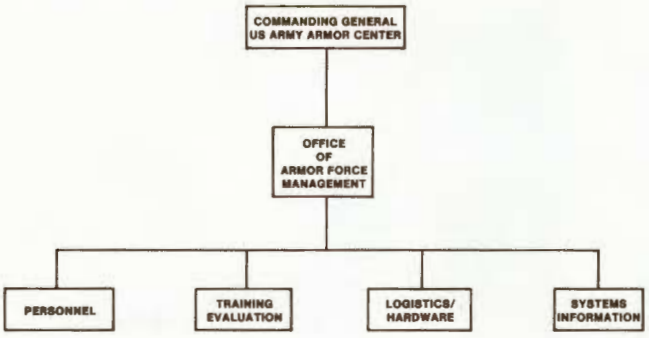


Figure 1

The OAFM is organized as shown in figure 1 with divisions for the major subsystems: Personnel, Training, Logistics and Hardware. Additionally, it has a Systems Information Division. Functional distinctions and key ingredients are as follows:

Personnel Division

MOS descriptions; career patterns; (including monitoring accession rates; institutional training output; and discharge/elimination rates); and Skill Qualification Tests.

Training Evaluation Division

External USAARMC/USAARMS training evaluation of both individual and collective training. Their evaluations become one of the inputs to the total systems evaluation.

Logistics/Hardware Division

Develop continuous Armor participation in Logistics/Hardware development through fielding and/or implementation, and modifications; functionalize by critical Armor/Cavalry weapon systems—both ground and air—*M-60A1/XM-1* desk, *M-60A2/M-48A5* desk, *M-551*/Air Cav/Attack Helicopter desk, and support equipment desk.

Systems Information Division

Provide analytical support for all other divisions within the Office; coordinate, in cooperation with the other divisions, requirements/use for management data on the total Armor Force.

As I previously stated, the role played by OAFM will be monitoring, worldwide, all aspects of the Armor system including personnel, training, hardware and logistics subsystems. Their responsibilities will be fulfilled, in part, by regular visits to the field to find out how well the system is working at the receiving end. The feedback will then be used to provide management data to the Armor Center and other using agencies. Certainly as a result of OAFM's monitoring, problems will be discovered. OAFM will assist me in referring those problems to the proper agenices, both at Fort Knox and elsewhere, to expeditiously provide the Armor Force assistance and good answers.

If you have something to tell OAFM, please don't wait until they show up in your area. Write them, or, if possible, call them. Their mailing address is:

Office of the Armor Force Management
HQ, U.S. Army Armor Center & Fort Knox
ATTN: ATZK-CG-AM
Fort Knox, Kentucky 40121

and their AUTOVON telephone numbers are:

Director	**464-7114**
Deputy Director	**464-3446**
Administrative NCO	**464-3446**
Logistics/Hardware Division	**464-1930**
	464-7752
Personnel Division	**464-2710**
	464-5155
Systems Information Division	**464-8247**
	464-1932
Training Evaluation Division	**464-5829**
	464-4847

Note: For commercial calls, use area code 502, prefix 624 and last four digift shown above.

OAFM may not be able to solve your problems, but they can give you very high visibility in very short order.

At the same time, we intend to remain visible with each issue of *ARMOR* Magazine. Beginning with the January-February 1978 *ARMOR*, a permanent department dealing with Armor management will appear in each issue. The first article in the new department will come from the newly created Tank Force Management Office at DA and will tell of efforts to ensure the successful and complete implementation of the 83 recommendations of the Tank Force Management Group.

FORGING THE THUNDERBOLT

PHYSICAL TRAINING AT USAARMS

Physical Training (PT) has long been recognized as an important part of the Army's overall readiness picture, both from a unit and an individual standpoint. The Armor School has recently revised its physical training programs for officer and NCO classes to highlight the individual's role in his own conditioning, to provide for sustained conditioning for personnel whether in short or relatively longer courses, and to involve more types of classes in physical training.

Armor School courses affected by this revision include the Armor Officer Advanced Course, Armor Officer Basic Course, the Motor Officer Course, the Armor Officer Advanced Course (Reserve Component), the Armor Officer Basic Course (Reserve Component), the NCO Advanced Course, and the Master Gunner Course. Prior to the revision, no formalized physical training was conducted for Motor Officer, Armor Officer Basic (Reserve Component), or Master Gunner courses.

The schematic portrayal of a type class program (figure 1) is helpful in describing how physical training works. The week number in the extreme left column may vary from 4 to 26 weeks.

The primary vehicle for orientation is a handout distributed during the first week of the course to each student.

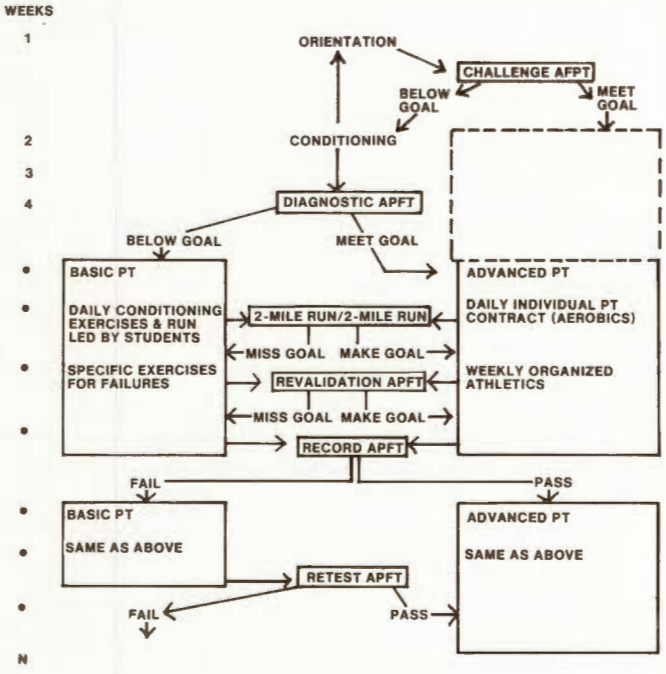


Figure 1.

This letter addresses in detail the applicable PT program including the purpose, objectives, standards and goals, conduct of physical training, facilities, uniform, weight control, profiles, and PT awards. Some past student criticism could be attributed to their not having a clear understanding of the existing PT program; hence, the orientation is really quite important.

All officer and NCO students are weighed very early in their courses. Those outside current DA guidance (AR 600-9) are sent to the MEDDAC Diet Clinic where they receive applicable nutritional advice. The weight of those students is closely monitored, and those in the longer courses failing to lose weight may receive adverse comment in their Academic Evaluation Reports. Once oriented and weighed the students normally have a 4 week conditioning period (7 weeks for Advanced Course Students). During the conditioning period, conditioning exercises are conducted along with specific exercises to improve performance on the five test events. Every exercise session concludes with a run. If a student feels he is in good condition, he may take the advanced physical fitness test (APFT) in the first or second week. If he meets Armor School goals on this test (400 points, 60 per event), he may commence the advanced PT track immediately, avoiding the conditioning period. If any individual has met Armor School goals within the preceding month at a previous assignment, he likewise avoids the conditioning period.

All personnel take a diagnostic APFT in the fourth week except advanced course students who are tested in the seventh week. This completes the PT program for the reserve component basic course. In the other courses, those meeting goals for the test begin advanced PT or return to advanced PT if previously in that track.

The advanced track (right side of schematic) is basically individual with the principles of aerobics as a basis. To aid advanced-track students, each will be issued a copy of *The New Aerobics* which may be kept by the student after completion of the course. The students agree to undertake various physical activities for which point values are contained in *The New Aerobics*. Total weekly points are recorded with an ultimate goal of progression in point totals during the advanced PT period.

Once weekly, advanced-PT-track students are assembled for organized athletics. During these sessions, students will participate in soccer, touch football, pushball, softball, volleyball, and basketball. Additionally, all students will participate in combat football and combat basketball for instructional purposes in order that they can teach these *esprit*-building sports in their future units.

Personnel failing to meet goals on the diagnostic APFT will take basic PT. The basic-PT track consists of conditioning drills led by students, special exercises to improve APFT

weak areas, and a 2-mile run. Students will be introduced to aerobics based on the run, and by using their copies of *The New Aerobics,* will establish progressive aerobic performance levels. Basic PT will be conducted in a group session daily.

Every 2 weeks all personnel will take a 2-mile run. Advanced track personnel completing the run in more than 18 minutes, 30 seconds will change to the basic track. In addition to the check runs, the advanced course has two revalidation APFT's between the diagnostic and record tests. These tests provide an opportunity for basic PT personnel to go to advanced PT, if goals are met, or for advanced track personnel to go to basic PT if goals are not met.

A record APFT is conducted during the eighth week for the basic course, Reserve Component Advanced Course and Motor Officer Course students and the twentieth week for the advanced course. Those passing the test (300 overall, 60 points per event) pursue advanced PT. Those in the basic course or reserve component advanced course who fail have 4 more weeks of basic PT and one more chance to pass. Personnel in the two types of advanced course and the basic course are expected to pass the APFT before graduation.

M-88A1 MEDIUM RECOVERY VEHICLE

The long awaited update of the *M-88* medium recovery vehicle has arrived. No longer will the *M-88* be known as the "big loud monster" roaring down the road expelling smoke and flame.

The vehicle has been dieselized with the conversion of the engine to the AVDS 1790-2DR RISE engine. No longer will commanders have to carry motor gasoline (MOGAS) for the recovery vehicle since all track vehicles will use the same fuel. Those who thought pulling power would be lost due the change in horsepower, (1,000 h.p. gasoline engine vs 750 h.p. diesel engine) will be glad to know that the *M-88A1* will pull right along with the *M-88.* The *M-88A1* will have an Allison XT-1410-4 transmission modified to match the engine.

Other changes to the vehicle include the replacement of the auxiliary generator engine ("Little Joe," gasoline) with a diesel auxiliary power unit. It is a two cylinder, four-cycle engine that produces 10.8 h.p. It performs the same duties as the old "Little Joe," charging the batteries with its 150 ampere generator (the gasoline version had a 300 ampere generator), operating the refuel-defuel pump, impact wrench unit, and raising and lowering the boom and spade in the event of main engine failure. In addition, it will also inhaul both the main and the hoist winches with no load, a significant improvement over the old system.

An addition to basic issue item list (BIIL) is a pair of lockout blocks for the suspension that allows the operator to lift a 20-ton load without using the ground spade—which allows the vehicle to move wtih a 20-ton load. The old maximum lift of 25-tons still applies.

Changes to the hull are few and only one is noticeable, a new door and cover for the auxiliary power unit. Other changes include the relocation of the exhaust and the vise.

All in all, the *M-88A1* is a fine improvement to an already good vehicle and should be welcomed by commanders and maintenance personnel alike.

M-60A1 (RISE) Update

All TM 9-2350-257 series manuals have been scheduled for revision during this calendar year. Significant changes include an operator's manual in logbook size (6½ in. X 6½ in.), new charging system troubleshooting procedures, and updated information on the passive night sights.

The latest news from the project manager's office is that the automatic drain on the fuel/water separator will not be removed. There is talk, however, of relocating the low voltage protection relay in the starter circuit to permit replacement of it without removing the powerpack.

There is no substance to the rumor about having to insert the engine oil dipstick on *AVDS-1790-2C* a special way. The *1790-2A* and *1790-2C* dipsticks are not interchangeable though; the *-2C* dipstick is longer than the *-2A.*

ASSISTANT INSTRUCTOR's TANK SEAT

The Armor School has recently been involved with the development and testing of a seat for the Assistant Instructor (AI) to be used on tank ranges during crew firing.

Brigadier General Doyle, Armor School Assistant Commandant, initiated the testing by stating that improved stability was needed for the "Fifth man" on the tank—the AI.

Several types of seats were tested, including versions which bolted to the bustle rack, the cupola, and to the side of the turret. None proved satisfactory.

The Armor School received reports of the successful use of a seat in Israel and acquired a seat for testing.

The Weapons Department has tested the seat and found that it allows the AI to observe crew duties inside the tank during both firing and training.

Forty-five seats are presently being built by the Directorate of Industrial Operations Maintenance Department for further testing and incorporation into training at Fort Knox.

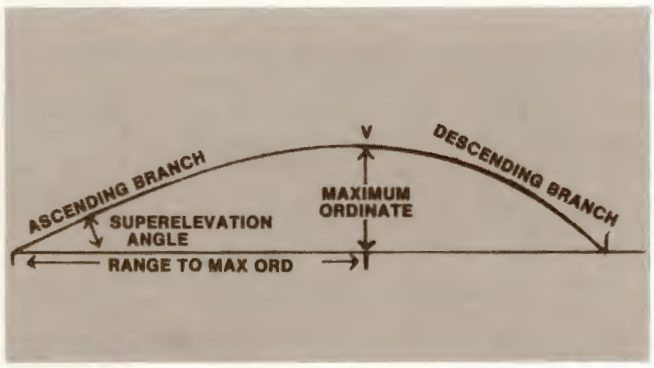
Blueprints and additional information about the AI seat can be obtained by writing the U.S. Army Armor School, ATSB-WP, ATTN: Chief, Master Gunner Branch, Fort Knox, KY, 40121. ▲

MASTER GUNNER'S CORNER

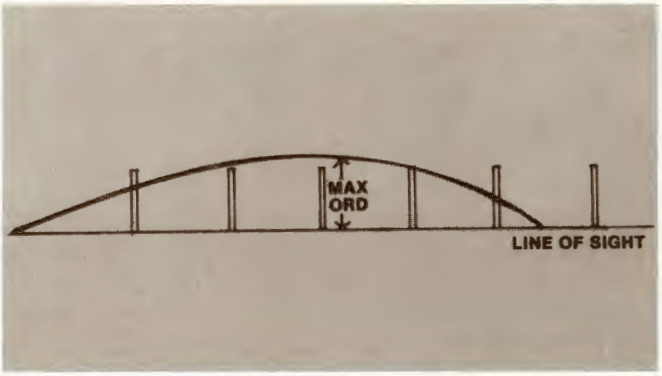
Battlesight gunnery has been the topic of several questions received by the Master Gunner Branch recently. If we are to lay to rest some of the misconceptions as well as better define the capabilities and limitations of battlesight techniques, we must understand the basic concept.

Essentially, battlesight is an answer to the problem of speed. Anytime shots are traded—from the dusty streets of an old West cow town with a pair of Colts, to an *M-60* and a *T-62* in the Fulda gap—the fastest gun usually wins. In order to gain the edge that battlesight offers, however, we must know what happens and why.

The first thing we need to look at is what happens to the round after it leaves the tube as shown in the following illustration.



We all know that "superelevation" is required to get a round to hit at a given range. This results in the round rising further and further above the line of sight (LOS), until finally the round reaches its maximum ordinate. At this point the round begins to *drop* back towards the line of sight. It can easily be seen that if we place a target on the line of sight (base of target aiming point) that what occurs in the following illustration is true.



We could hit the target all the way out to where the trajectory crosses the line of sight, if the target were tall enough. Or on the other hand, if we know how big the target is, we can figure out how far we can shoot and not pass over the target. This is basically how it's done.

The firing table provides you with the trajectory information required to determine a battlesight range given the target height, or in other words, the highest maximum ordinate we can use. For example, if we want to shoot at 1.5 meter tall targets with APDS, the trajectory that gives us a 1.5-meter maximum ordinate will result in the round traveling 1,600 meters.

Obviously, this is all leading somewhere. First we decided on 1.5 meters as the average height of a battlefield target. This is the *average* height of a *T-62* (2.3 meters tall, fully exposed; .7 meter tall, hull down). Presto, APDS - 1,600 becomes our battlesight setting.

This starts raising weird questions when people try to shoot 3-foot-tall targets at 800 meters or 9-foot-tall targets at 2,000 meters using a base-of-target lay. The accompanying illustration shows what happens to an APDS round fired using the *M-32* periscope on a base-of-target lay.

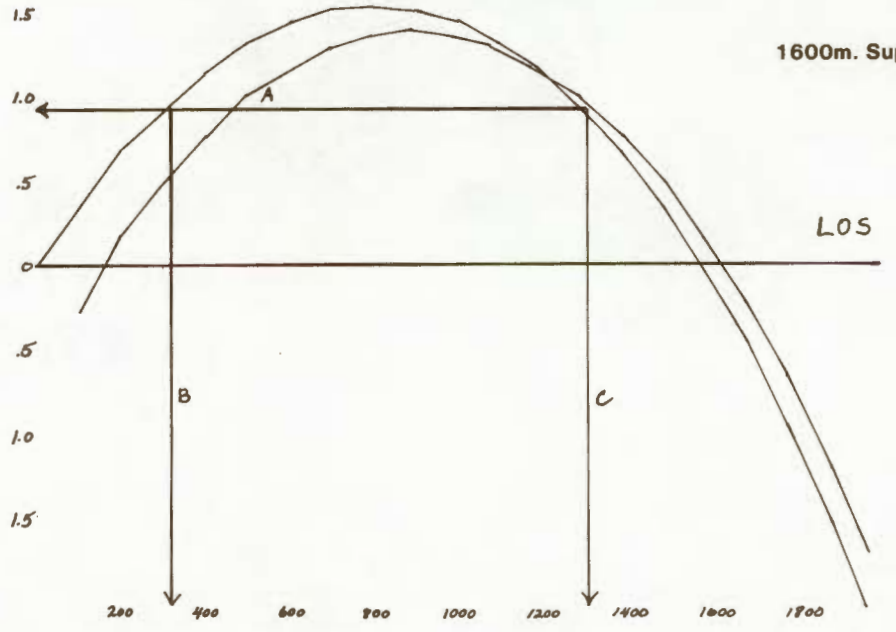
The brown line depicts the path of the round as determined from the firing table. The superelevation angle of 3.8 mils causes the round to fly above the line of sight until it reaches its maximum ordinate of slightly over 1.5 meters at a range of 800 meters. At this point the round begins descending until it crosses the line of sight at 1,600 meters.

Line "A" is drawn corresponding to target height, in this case, .94 meters (3 feet). The point at which the line intersects the trajectory show the theoretical limits of this particular battlesight-target combination. We should hit the 3 foot target until 320 meters downrange (line "B"). After this point we will be *over* until about 1,315 meters where we will again come back on target (line "C"). At 1,600 meters the trajectory crosses the line of sight and beyond that range we will be consistently *short*.

In actuality, however, because we are using the *M-32* periscope to aim the gun, parallax error will cause the ordinates of the trajectory to be modified, as depicted by the green line. In this case, parallax causes us to hit *short* on battlesight targets closer than 160 meters but allows us to remain on target until 470 meters, or an improvement of 150 meters. Corresponding shifts in the trajectory can be seen on the descending branch of the trajectory where we now do not cross the line of sight until 1640 meters.

Of course, while this type of analysis is *nice to know,* a degree in physics is not required to be able to use battlesight effectively. All we really need to know is that if the target is within battlesight range and at least 1.5 meters tall, we have a good chance of hitting the target.

To expand battlesight ranges we can use the same techniques we learned in basic training with an *M-16* or *M-14* (or for you ancient ones, the *M-1*). After zeroing the rifle, we had a fixed superelevation for a 250 meter battlesight setting and we would shoot at targets from 50 to 300 or 350 meters. Close in you would aim low, far out you would aim high. Again using the graph for APDS *M-392A2,* we can see that we can hit out to 2,000 meters by shifting our aiming point a little more than 1.5 meters from the base of the target up,



Trajectory
APDS *M-392A2*
1600m. Super Elevation 3.8m
Trajectory
Corrected For
Parallax -*M-32*

about 3 mils or one target form at that range. Under 200 meters - aim center and blast away.

Similarly, if you have a hull-down *T-62* at 800 meters, you know that you will have to aim a little low to hit because of a 1.5 meter maximum ordinate versus a .7 meter target.

This proposal is not exactly earth-shattering or a departure from the basic guidelines in FM 17-12. All we say is that we can, if necessary, shoot a tank gun like we used to shoot a rifle. This type of technique requires the gunner to have some experience in this type of shooting so that he has a mental picture of what he is doing and why, but it does give him a little more flexibility in firing battlesight.

Of course, if he had the time to fire with precision, he would, but sometimes speed is more important. That is why we have battlesight in the first place.

EMIL M. DULAR
Sergeant First Class
Master Gunner

WE'LL HAVE NO PROBLEM FINDING THE ENEMY?

by Brigadier General David K. Doyle
and Major William V. Chiaramonte

"The enemy will hit you in such large numbers you'll have no problem finding him—he'll find you!" This statement has often been taken out of context, redirected, and used to simplify the extraordinary complexities of battle. This simplicity is desired by some to ease their understanding of an environment of infinite variables, multiple systems, and the nonquantifiable human element. The size, shape, depth and composition of the enemy force or the fact that you have no enemy in front of you are vital questions each commander must have answered in real time. These questions, when fully answered, may very well determine victory or defeat.

In a recent *REFORGER* exercise, the Orange forces had no problem finding the Blue Forces. Orange forces knew precisely where the Blue units were because their own units were being overrun. This situation occurred because aggressive Blue ground cavalry scouts detected and reported a 30-plus kilometer open flank to their commander. The regiment then boldly exploited this opening because its commander could *see the battlefield* better than the "enemy" commander.

The Helicopter-mounted Scout

In the September-October issue of *ARMOR,* we addressed a key element in the process of seeing—the ground scout. More specifically we talked about what is demanded of him, how he must operate, and what it is that makes him unique and invaluable. Let's now discuss a scout who operates from a different machine, but who must perform the same vital and demanding missions—the air scout.

Analyzing the *REFORGER* situation just described, it may be seen that it is not just an "aviation" problem. It is of interest to, and definitely will affect, the ground force. In the *REFORGER* situation, the Orange armored cavalry squadron was on the division's northern flank and could not respond rapidly enough to plug the exposed southern flank. The southern brigade was oriented on the offensive and needed all its forces to continue to attack. The lack of trained forces to provide "eyes" on the division's flank denied the commander the ability to "see" what was happening on that flank. The only unit with the training, inherent speed, and mobility to effectively screen this open flank would have been the air cavalry. On that flank, the mission success of the air cavalry, as well as that of the force, would have depended upon scouts to find and fix the enemy force in *time* and *far enough away* to enable the force commander to react. Had the commander used his scouts in this way, he would have had no trouble in finding the enemy and, more importantly, finding the enemy on his own terms.

The mission success of air cavalry in this maneuver "lesson learned" depends upon the effectiveness of a scout mounted in a different machine—the helicopter. The aeroscout is only an extension of the mission capabilities of the ground-mounted scout. This extension is through the additional mobility of the helicopter over the armored vehicle, similar to the mobility extension that mechanization provided over the mobility of the horse. However, the fundamental missions of cavalry and the scout have not changed. Fundamentals which guided cavalry scouts in the campaigns of the Civil War are still valid today. The mounts may have changed dramatically, but the need for the scout and requirements to fulfill that need have not.

Where do we find these scouts who are mounted in and operate from the helicopter as their combat vehicle? They are located in two very different units and employed in three different roles. They are commissioned officers, warrant officers, noncommissioned officers, and enlisted men.

Air Cavalry Scouts

The image of the "Matel Messerschmitt" (*OH-6*) hovering in the jungle, using rotor wash to expose a North Vietnamese Army (NVA) bunker, which many saw in Vietnam, will bring to mind one type of scout—the air cavalry aeroscout. This almost legendary scout relied upon personal qualities and training not unfamiliar to any scout. These qualities were intelligence, aggressiveness, decisiveness, and total orientation on the mission. The qualities which guided the aeroscout in Vietnam are required today—in even greater amounts. Each air cavalry troop is authorized 10 aeroscouts in the aeroscout platoon. These commissioned and warrant officer scouts still carry the success or failure of their troop's mission as they did in Vietnam, but now they carry it alone.

The air cavalry troop has a second platoon, the reconnaissance platoon, whose primary mission is to scout, but in a different way. This platoon consists of four, 10-man scout squads and five utility helicopters—sound familiar? It should—the reconnaissance platoon replaced the old aerorifle platoon. In May 1976 the Department of the Army approved a change to the air cavalry troop table of organization and equipment (TO&E) which altered both the name, personnel, and mission of the platoon. This change was made to tailor the platoon to accomplish different missions in a very different environment, not because the aerorifle platoon had not done a magnificent job in Vietnam. The platoon's Vietnam missions normally required it to fight as airmobile infantry to develop a situation or to act in an economy-of-force role. These missions were accomplished in a low-intensity environment, providing the air cavalry troop

with an invaluable and immediate airmobile force which fully complemented the troop's combat capabilities.

An examination of how the platoon will complement the air cavalry troop mission in a midintensity war focuses on two areas where the troop's capabilities are constrained. The highly-mobile reconnaissance and security capabilities of the air cavalry troop are limited by nature and by the combat vehicle providing that mobility. The air cavalry troop's mission capabilities are presently restricted somewhat by limited visibility, although vision equipment now in development will soon provide a 24-hour capability. The combat vehicle of the air cavalry troop does not lend itself to detailed or lengthy reconnaissance or security activities. Cavalry skills in airmobile reconnaissance and security operations are required to effectively compensate for limitations in these areas. These skills will range from stay-behind reconnaissance patrols to observation posts or listening posts (OP/LP's) thinly deployed along a screen line. For this reason, the new reconnaissance platoon is manned by 40 cavalry scout career management field (CMF) 19D's, who replace the 40 infantrymen (11B's), required when the platoon fought as airmobile infantry. When the combat environment and mission of a unit changes, its personnel skills and training must also change. The missions of the reconnaissance platoon on the modern midintensity battlefield and the important change in skill authorization are key elements in the air scout field.

The Attack Helicopter Scout

The other unit with a scout mounted in a helicopter is the attack helicopter company. This unit has a different mission on the battlefield than does the air cavalry troop—a major point of confusion to many. If it is accepted that when the unit's mission changes, its training skills must change, then it should not be difficult to understand the different role of the scout in an attack helicopter company.

Same Machine Different Mission

Quite simply, the air cavalry is responsible for enabling the force commander to "see the battlefield" or to find and fix the enemy. The mission of the attack helicopter unit is to assist the force commander in the conduct of the battle or to fight and finish the enemy. If we fully understand the phrase "fight outnumbered and win" we can understand that we must find the enemy on our own terms and with the minimum expenditure of forces. The forces are not available to do otherwise! A commander would quickly realize that he cannot screen or reconnoiter an area with a tank or mechanized infantry unit when in another sector he must

fight outnumbered and win. This obvious fact fully applies to air cavalry and attack helicopter units. Air cavalry provides the eyes and ears required to locate the enemy, and the attack helicopter provides the muscle required to destroy the enemy *when* and *where* the force commander chooses. If these capabilities are combined into one unit, the commander will then have to make a choice: either "see" the battlefield or fight the battle—but not both.

This difference in fundamental contributions to the mission of the force commander changes the role and mission of the aeroscout compared to the attack helicopter company's scout. The air cavalry aeroscout is the focal point of the troop's mission and much of what the troop does is to complement the aeroscout. The attack helicopter company's mission success depends upon the actions its three attack helicopter platoons take to fight and finish a detected enemy. The other members of the company, most importantly the scouts, must orient on complementing the attack helicopter platoons' performance of their mission. The aeroscout performs reconnaissance and security tasks for the force as a whole, while the scout of the attack helicopter company performs these tasks solely for the attack helicopter platoons. This apparent academic difference, in actuality, is basic to the significantly different battlefield actions of two scouts in the same type machine, but with different *missions.* If the machine dictated the mission, then all *M-113's* would be identically employed, as would jeeps.

Attack Helicopter Company's Scout Crew

The attack helicopter company is authorized 12 scout aircraft and scout *crews. Crews?* Yes, each scout pilot is authorized an enlisted scout observer to assist him in the demanding tasks of operating his combat vehicle and accomplishing his mission. When the attack helicopter company TO&E was formulated, it was recognized that the tasks demanded of the pilot in operating his vehicle *under* wires and among trees and concurrently effectively scouting for the attack helicopter platoon could overload even the best. To share the mission demands, an enlisted scout (19D) was authorized as an aerial scout observer.

It may be remembered that when we discussed the air cavalry aeroscout we never mentioned anyone to help him carry out the mission responsibilities of the troop. No other person was mentioned because there are none authorized, except as a *wartime augmentation.* A recent detailed task analysis of the duties of the aerial scout observer was conducted by the Armor School. The analysis revealed a long and complex list of critical tasks which are vital in complementing the scout pilot. The length and complexity of these tasks make the present wartime augmentation status appear ludicrous at best. We will further examine this apparent disjointed contradiction in logic later.

Armor Aviation and the Force Structure

Armor aviation units (air cavalry and attack helicopter) have been recognized for their combat value on the midintensity battlefield. The recently approved Aviation Requirements for the Combat Structure of the Army study III (ARCSA III) provides the active Army force 33 air cavalry troops and 38 attack helicopter companies. These 71 aerial maneuver units will account for more than half of the total ARCSA III force. This fact is brought out to give dimension to the discussion of the air scout. These units represent a total of 1,800 officer and enlisted scouts in the active Army force structure and over 2,100 with the wartime augmentation mentioned previously. This represents a sizeable investment in personnel and resources, therefore, a lucrative target for budgetary and systems analysts who may confuse mission with machine.

One could easily, emotionally dispatch the attacks on the scouts in Armor units, including Armor aviation units. However, if one looks to see the limited effort previously expended to train these indispensable personnel, it would appear that the Army did not consider them to be really indispensable.

Three Armor Aviation Training Initiatives

We in the Armor School and Center recognize the need for Armor aviation training. What is more important, we are doing a lot to satisfy that need. There presently is very little available in either institutional or correspondence courses to assist the Armor aviation unit commander in training his unit's scouts for combat. This need was even more in focus at the Armor Center because the Armor community is well aware of the vital role that the scout plays in ensuring that there is "no problem finding the enemy." The need for the trained scout is recognized, the value of the scout in the Armor aviation unit is understood, and the problem is under attack on three broad fronts:

- The air cavalry scout must have a trained crewmember to share the load, as does the attack helicopter scout, for the even more-demanding air cavalry mission.
- The unit must receive replacement personnel for its reconnaissance platoon who are at least familiar with air cavalry and its combat vehicles.
- Armor aviation units should be provided the means to train the enlisted observer as a short term fix and be provided a trained observer in the near future.

The Air Cavalry Aerial Scout Observer

Not too long ago, in an Army-wide message, the Armor Center proposed a solution to the present incredulous augmentee status of the air cavalry aeroscout observer. The proposal was made with full realization of the Army's present personnel constraints, and that simply changing from augmentation status to an authorized status would require 330 additional unavailable personnel. The extra step of authorizing two aviators per scout aircraft, which many feel is necessary, would increase officer strength by 330 and would fly into the maelstrom of the enlisted aviator proposal. The fact that the air cavalry scout requires an additional crewman to accomplish his mission more effectively, however, appears indisputable. The recent change from the aerorifle to the reconnaissance platoon is the key to the problem. The aeroscout observer must be trained in all reconnaissance tasks, knowledgeable in cavalry missions, and mission-oriented toward a combat environment. Where could personnel with the requisite training and personal qualities be made available to commanders to meet the requirements for aeroscout observers?

By using trained personnel who are presently available, the conflict between personnel constraints and operational requirements could be solved. Ten selected positions from the reconnaissance platoon would be made augmentation positions. These 10 spaces would then provide the manpower to give the units their authorized aeroscout observers. This move would provide the much-needed second crew member for the aeroscout without a net increase in manpower. This tradeoff in authorized TO&E spaces is not to be considered a measure of the importance of the reconnaissance platoon. The platoon is vital to the effective execution of the air cavalry troop mission. This proposal, however, will fill critical positions that require substantial training by using other critical positions requiring relatively less training to be effective. In other words, we must make the augmentee training load manageable for the unit and still ensure all members of the unit are trained when they enter battle. This proposed change to the basic TO&E is presently in the process of submission.

Training the Aerial Observer/Scout

How does the commander train the observer presently authorized in the attack helicopter company, and that should be authorized in the air cavalry troop? Several units have expended much of their limited local resources to develop training courses designed to meet the vital requirement for trained aeroscout observers. These units are doing a good job in filling the recognized need, but they are only a small portion of the total Armor aviation community. A complete exportable training package, to enable the unit to train aeroscout observers, is presently being developed by the Armor School. This package will provide the unit with lesson plans, training aids, and performance-oriented examinations. With a minimum amount of resource dedication, the unit will be able to train individuals or groups with an authorized course of instruction. Graduation from this course will award crewmember's wings, pay, and a skill identifier to personnel who can meet the challenge. The exportable training package should be available for test-unit validation towards the end of this year and be ready for Army-wide use in 1978.

Steps are also being taken to provide a long term solution to the problem of trained enlisted scout observers. A plan is being studied by the Armor School to select volunteer graduates from the 19D training course for further training as aeroscout observers. These personnel would be given additional instruction on the different skills required of a scout operating in a helicopter. This instruction would also include inflight training with the scout pilots at Fort Rucker. This long term solution would provide the unit commander with trained scouts who are ready from the outset to assist in mission accomplishment, without requiring major training efforts by the gaining unit.

Finally, what is being done to familiarize potential reconnaissance platoon members with his duty requirements? Trainees in the reconnaissance course are presently receiving a brief exposure to employment by an air cavalry troop. A more extensive familiarization is desired; therefore, plans are under way to provide the replacement reconnaissance scout a better understanding of air cavalry and his role in its missions. Plans are for more extensive training in air scout responsibilities during normal 19D training.

Officer Air Scout Training

The commissioned and warrant officer scouts are also to receive long-overdue, mission-oriented training. Changes have been accomplished in two areas significantly affecting the training received by the officer scout prior to his assignment (in flight school) and during his assignment (in the Aircrew Training Manual).

Previously, the Initial Entry Rotary Wing (IERW) course taught by the Aviation School produced a generalized "aviator," qualified in the *UH-1* and assignable to any of the

widely diversified "aviation" units. Graduation from IERW basically meant that the graduate could operate a *UH-1* in the air without undue hazard to himself or others. The gaining unit was required to provide mission-related training to the aviator, whether it was a Corps flight detachment, or an assault helicopter, air cavalry, or attack helicopter unit. Training for a scout had to start from "square one," including unit qualification in the *OH-58,* which was the type aircraft used for his mission. This situation, which was unusual and inefficient from the unit's standpoint, is soon to be changed for the better with the "tracked" IERW. In this major modification to IERW, the Aviation School will train the student for a specific mission and in a specific machine. This specialized training is similar to the one station unit training (OSUT) concept and will occur in the second part of IERW. The first part of IERW will still be general basic aviation training. What this means to the Armor aviation unit commander is that the aeroscout pilot he receives from the IERW training program will be qualified in the *OH-58* and be knowledgeable of the mission of the aeroscout.

Aircrew Training Manuals

The other significant action this year is the establishment of the Aircrew Training Manual (ATM). The ATM will replace the "annual minimums" which have hung like an albatross around the neck of aviators probably since the days of Wilbur and Orville. The old "minimums," dictated by AR 95-1, applied equally to all aviators in the Army without respect to the combat mission of the aviator or the aviator's unit. The answer "but that's the way we've always done it!" did not suffice, as it always had before, to the question: "Why?" when asked by DA last year. The ATM keys not only on the specific machine the man is operating, but, more importantly, on the mission he and his unit are to perform in combat. When fully established, the "minimums" flown by an aeroscout will be directly related to his combat effectiveness in his unit.

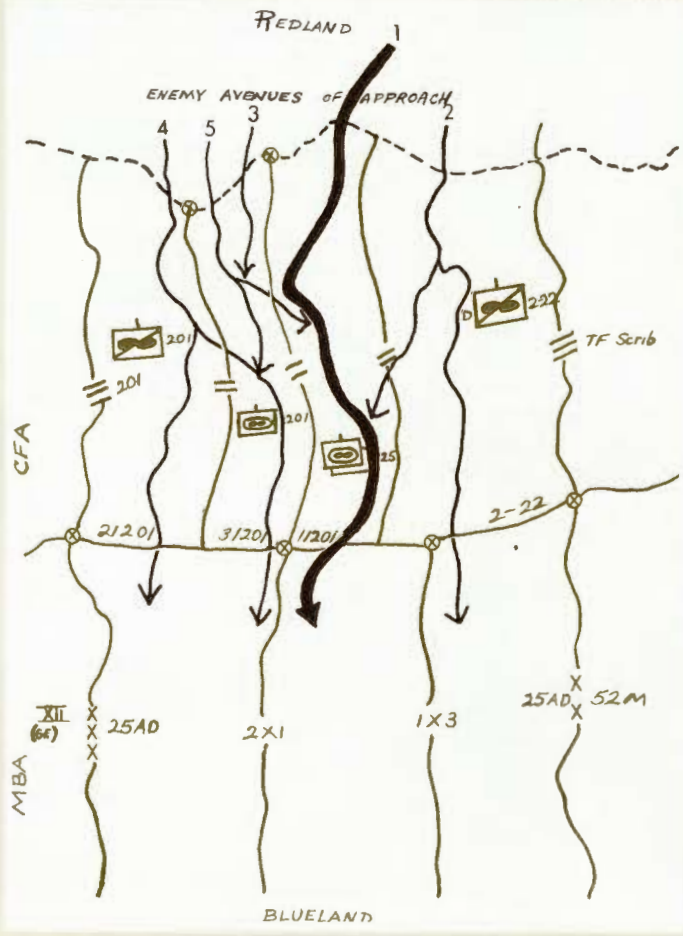
As proponent for the aircraft, the *OH-58* ATM and the *AH-1* ATM were prepared in draft form by the Armor School. ATM's for other aircraft were prepared by the respective proponent TRADOC training centers. A DA briefing team, composed of members of each of the proponent centers, traveled throughout the Army to explain the ATM and its concept and test implementation this fiscal year. Under the ATM system, the unit commander regains control of individual training in his unit from the old AR 95-1. He will have an individual training program that is related specifically to tasks in his unit's ARTEP. The ATM will enable him to ensure that every dollar expended in training will improve his unit's combat capabilities. Machine similarity was not allowed to standardize training at the expense of the mission when the Armor School prepared the *OH-58* ATM. It was fully recognized that the *OH-58* in a combat support aviation unit, division artillery, or brigade aviation unit is not employed in the same manner as the *OH-58* in combat aviation, air cavalry, or attack helicopter units. For this obvious reason, the tasks, conditions, and standards of training in the *OH-58* ATM were specifically tailored to the *mission* of the unit to which it belongs.

The Scout in Action

At this point, it would be prudent to note that other nations (England, France, Germany, and the Soviet Union), each quite familiar with the European battleground, are engaged in massive *combat* helicopter programs. Assuming the rest of NATO and the Soviet Union are correct in their assessment of the role of the combat helicopter, and that the helicopter can operate effectively on the midintensity battlefield, we again come face-to-face with the value of the scout—and in effect—air cavalry. As an example, the following scenario may shed some light on the employment capabilities and the specialized training required of an Armor aviation scout.

* * *

Allied forces are in a defensive posture preparing for the expected assault from Redland. The 201st Armored Cavalry Regiment, with its organic air cavalry troop and attack helicopter company, has established a covering force for the 25th Armored Division, "Ol' Hell on Paper." This sector contains the major enemy avenue-of-approach into the heart of Blueland. (See sketch 1.) The 25th Commander has reinforced the covering force area (CFA) with both of his organic attack helicopter companies with the provision that the units are not to fall below a certain strength level. This will enable them to assist in fighting his battle in the main battle area (MBA). The air cavalry troop is also in the CFA as part of the division's armored cavalry squadron, prepared to revert to division control on order. These actions have provided the CFA commander three attack helicopter companies and two air cavalry troops to assist him in his mission. (*The inherent speed and employment flexibility of their combat*



vehicles will allow Armor aviation units to operate in both the CFA and in the MBA.)

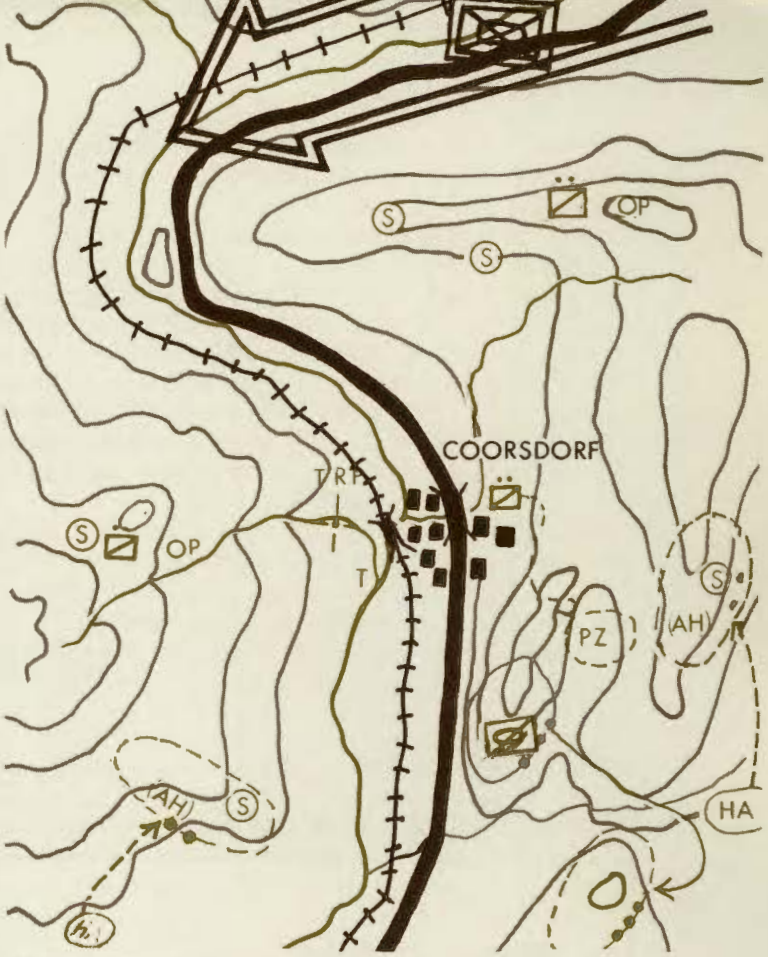
The Redland forces attack. (They have to of course, or we would have no scenario.) The Redland's Nastykov Front crosses the border behind a tremendous artillery preparation in an advance-to-contact. In one sector, that of the 3/201st ACR, the artillery was so intense and accurate that it succeeded in neutralizing several key positions overwatching avenue-of-approach 5, which feeds the main enemy axis of advance. The squadron commander has lost all contact with his troop in that sector. The only thing he can be sure of is that the artillery preparation was of such intensity as to warrant a sizeable Redland effort on avenue-of-approach 5. He is blind in that sector. He knows the squadron is presently involved in fighting a major battle on avenue-of-approach 3. He has already employed the attack helicopter unit placed under his operational control. The company is still required in assisting his units in defeating a larger-than-expected Redland thrust. He contacts regiment and requests control of the air cavalry troop working the regiment's left flank.

On his arrival, the air cavalry troop commander is instructed to move to this "blind" sector and reestablish the squadron's influence in that sector. (*One of the many values of the mobility of an Armor aviation unit is that it can rapidly move away from artillery fires, especially preparation fires. Yet the units, in this case, can just as rapidly move back to key positions when the fires are lifted or shifted. This reestablishes surveillance of an area almost as soon as the last round has impacted, without having to weather the awesome effects of a Redland artillery preparation.*)

Aeroscout teams and the reconnaissance platoons immediately move to the threatened area. One section of aeroweapons is also dispatched with the scouts to provide immediate direct fires if required. Once in the sector, the scout platoon leader establishes contact with a platoon of the troop originally assigned to that sector. Although the platoon escaped being hit by the preparation, it has been unable to reestablish contact with its troop's elements. The platoon has engaged and destroyed several Redland reconnaissance vehicles, but has had no further enemy contact. The aeroscout platoon leader knows the enemy avenue-of-approach and directs his scout teams to positions from which they can observe what is going on and, just as importantly, what is *not* going on.

One of the teams, upon occupation of their position, realizes its close proximity to the avenue-of-approach and dismounts its scout observers. The observers carefully gain the crest of the hill and establish an observation post. (See sketch 2.) One aeroscout remains in close proximity to the temporary observation post to serve as a radio relay. The other scout ranges to the flanks and rear, providing security for the OP while on the watch for more Redland reconnaissance elements. The observers quickly detect what appears to be lead elements of a motorized rifle unit moving down the valley. This information is immediately transmitted to the aeroscout who quickly moves to a location where he can contact squadron headquarters.

The troop commander, engaged in reorganizing the surviving ground cavlarymen into a new battle position, monitors this spot report. He knows he does not have the combat power to stop an enemy advance along this avenue, but he also knows he will be able to extract a heavy toll for its use.



The scout teams are instructed to maintain enemy contact and begin adjusting artillery fires on the advancing enemy force. Other scouts are given missions to reconnoiter for the upcoming troop battle.

Two reconnaissance squads are directed to prepare a railway bridge and a highway bridge near Coorsdorf for command destruction. (See sketch 2.) The other two squads are preparing observation posts from where they can monitor enemy movement in the valley after other friendly forces have withdrawn. These squads have been tasked to remain behind to enable the friendly force commander to continue to "see" this vital sector. Aeroscouts have reconnoitered safe withdrawal routes and have selected rendezvous points for the squads' pickup early the next morning. Meanwhile, other scouts are reconnoitering attack helicopter battle positions in anticipation of the enemy's advance into the killing area being prepared by the troop commander. This information is briefed directly to the aeroweapons section located in two secure holding areas that were also selected by the aeroscouts. This information will also be of tremendous assistance to the attack helicopter unit when freed from the other threatened sectors to reinforce the air cavalry troop.

Harassed by continuous and accurate artillery fire, yet unable to pin down any friendly defenses, the enemy force commander speeds up his advance to be clear of the Coorsdorf bridges before they can be destroyed. He begins to feel secure when the lead company reports crossing the bridges. Suddenly this feeling of security is blown away, along with the bridges and the *ZSU-23-4* that was on one of them. The reconnaissance squad leader reports what he has accomplished and begins moving his squad to their pick-up zone behind the town of Coorsdorf.

To cover the extraction of the reconnaissance squad, the troop commander has ordered the ground cavalry to open

fire when his aeroscout reports the enemy's movement past the target reference point established for the ambush. The aeroscout, who is in direct contact with the leading enemy elements, gives the warning order and pays particular attention to the surviving *ZSU-23-4.* When the enemy force crosses the "trigger point," the ground cavalry is prepared and fires several volleys into the formation making the other *ZSU* the proud owner of one of the projectiles.

At last the enemy force commander has an enemy he can fight because the muzzle flash and smoke have revealed the defender's position. He directs his organic artillery to begin suppression of the position as he maneuvers his attacking force across the difficult stream.

This logical action was anticipated and reported as it happened by one of the reconnaissance squad's observation posts. The troop commander ordered the first aeroweapons section to attack the maneuvering enemy force and provide cover for the ground cavalry as it moves to its subsequent battle position. The aeroscout is read into the immediate situation by the reconnaissance squad as he moves to the pre-selected attack helicopter battle position overlooking the stream. In the battle position, the scout must ensure there are no unnoticed enemy elements which could affect operations and that the position will enable effective tube-launched, optically-tracked, wire-guided (TOW) missile engagement of the enemy. He contacts the alerted aeroweapons section and calls them forward to the battle position. While the aeroweapons are moving, the scout maintains near-continuous visual contact with the enemy force. When the section arrives, the aeroscout gives the section leader the latest enemy situation, the general attack azimuth and range to the target array, and points out the best firing position for engagement. Before the section engages, the aeroscout provides continuous local security to the attack helicopters.

* * *

What was just described is in no way all-inclusive, but just a small portion of what Air Cavalry with well-trained scouts can add to a battle. Now we have to man and train the force to do the job. As noted earlier, we're addressing the manning problem while major steps have been taken and are being taken to improve training—training which will ensure that the scout and his air cavalry unit can meet the tremendous battlefield responsibility of ensuring that the commander and his weapons have "no problem finding the enemy."

BG DAVID K. DOYLE enlisted in the Army in 1951, rising to the rank of sergeant before attending Officer Candidate School at Fort Knox. Upon graduation from OCS in 1952, he was commissioned in Armor. Brigadier General Doyle has been a training officer, reconnaissance and tank platoon leader, company executive officer, battalion intelligence officer, company commander, assistant operations officer, and assistant G-3 plans officer. After attendance at the Command and General Staff College in 1965, Brigadier General Doyle commanded the 3d Squadron of the 11th Armored Cavalry Regiment in Vietnam. In 1971, he attended the National War College and later commanded the 3d Armored Cavalry Regiment in 1973. Brigadier General Doyle was assigned as the Deputy Commanding General of Fort Knox in 1976 and is presently the Assistant Commandant, USAARMS.

MAJ WILLIAM V. CHIARAMONTE was commissioned in Armor upon graduation from New Mexico Military Institute in 1965. He attended the Armor Officer Basic Course and was assigned to the 3d ACR. He subsequently commanded a training unit at Fort Lewis, WA, and then attended flight school. Following flight training, he was assigned to D Troop, 3-4th Cavalry, Vietnam. After attending the Armor Officer Advance Course, Major Chiaramonte served as S3, 8-1st Cavalry, Fort Knox. From 1972 to 1975, he served with the 175th Attack Helicopter Company in Germany. He has served as an instructor in air and ground cavalry in the Command and Staff Department, USAARMS, and is currently assigned as ARTEP Team Chief, Air Weapons Branch, USAARMS.

Pages from the Past

THE "NEW" ARMY

If General Grant were to return to this world today, he would see military men handling Whitehead torpedoes; gigantic mined fields electrically connected; rapid fire artillery served by the indirect method, instead of being perched on a hill that advertises its position as far as the eye could see it; machineguns capable of pouring out a torrent of shots, 600 to 1,000 per minute; long range rifles capable of inflicting injury at 2 miles distance; smokeless powder that fails to indicate the position of hostile artillery or a line of advancing infantry; uniforms whose color scheme aids in concealment; wireless telegraphy forwarding messages instantly instead of by the uncertain and slow personal messengers; aeroplanes observing and signaling the position of the enemy; and many other inventions all unknown to him, and all this within the life of many of his old soldiers.

The Cavalry Journal
January 1915

PATRIOTISM

Our children don't get the love of country inculcated in them in the schools as we did ourselves. In the average family this is the case as well. We amuse the children by taking them to see the moving pictures, not by telling them stories of the deeds of our ancestors. We do not lay the foundation for strong patriotic character as did our fathers. Our population is becoming more and more mixed in character. No longer can we raise regiments where every man will be of the characteristic American stock, of the same general level of education and ability, of the same good average, honest, faithful personal character. No longer can we count on our average man making the best of what he can get in the way of rations; instead, we will try to furnish infinitely more and meet much more grumbling for our pains.

The Cavalry Journal
May 1911

SHORT CAMPAIGN

Since modern war is fast and furious it does not take a Solomon to see that this country might be hard pressed, even defeated, by a powerful and vigorous opponent who could see the advantages to itself of a quick and determined campaign. Give this country 6 months time, and men and means can be secured probably to hold back any country that might attack us, but will an enemy wait when it already has its trained millions? Success comes from offensive action and offensiveness under such conditions would result in a short campaign.

The Cavalry Journal
January 1915

RESPONSIBILITY

Every man should be trained to fill a job higher than his rank calls for—how much higher depends on the man and the one who is training him. "Kill" off some of the officers and noncommissioned officers for a period of time, occasionally, and let others develop their ability and self-confidence. It may disturb the even tenor of routine peacetime life, but you will be beginning to have an outfit trained for war.

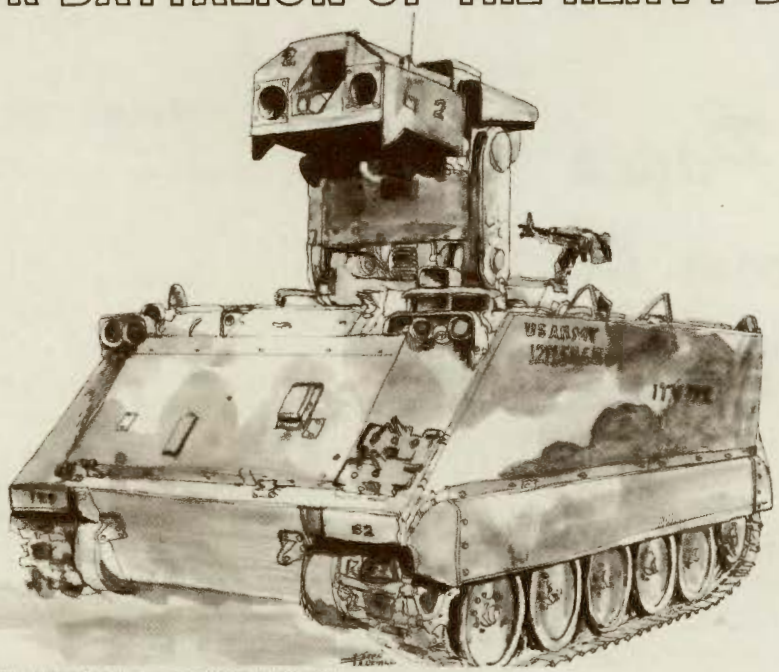
The Cavalry Journal
October 1920

PREVENTING WAR

War is a terrible fact! As a counter-fact, only one principle has ever been known. Just as disease is best prevented by sanitation or the organization of society in physical health and strength against the attacks of disease, so is war prevented only by the sound and healthy organization of society to withstand the attacks of war.

The Cavalry Journal
July 1923

THE ARMOR BATTALION OF THE HEAVY DIVISION



BY LIEUTENANT COLONEL NICHOLAS A. ANDREACCHIO

Will a 40-percent reduction in fighting tanks and the substitution of a company served with tube-launched, optically-tracked, wire-guided (TOW) missiles in the Armor battalion improve combat effectiveness? Are three tanks per platoon better than five? Should "normal" cross-attachment be at battalion rather than company level? Does TOW alone demand major organizational changes? Do these changes support FM 100-5 better than the current organization? If you answered "yes" to all of the above, you are in agreement with the TRADOC-initiated Division Restructuring Study (DRS).

The study recommends the testing of a new organization—the Heavy Division.[1] The specific impact of the study on the Armor battalion is that it advocates: eliminating the scout platoon; substituting 81-mm. mortars for 4.2-inch mortars, centralizing maintenance at the battalion level; reducing "fighting" tanks by 40 percent, (fighting tanks are those assigned to tank platoons and do not include command and control vehicles), by cutting the company to three platoons with three tanks each; battalion will be the normal level for cross-attachment, and companies will remain pure.

The proposed changes are based on many factors, the principle ones being:

- "TOW is here now and it alone virtually demands major changes."[2]
- Can the "Army . . .continue to issue increasingly complex systems to captains or their wartime replacements. . .?"[3]
- "Doctrine (FM 100-5) prescribes a need to adjust organizations in order to integrate better the combined-arms team by moving the focus from company to battalion."[4]

While no one can deny that great technological advances have been made over the past 20 years, we should remember that the Commandant of the U.S. Army Armor School stated recently, "the *M-60*-series tank in its several versions will be with us well into the next century. In fact, it will be in the majority."[5] Further, before we become too wrapped up in the weapons revolution, we must constantly remind ourselves that the other side is at least an equal partner in that revolution.

Many believe that one revolutionary weapon system is here now—the TOW. The premise that the TOW "alone virtually demands major changes,"[6] appears to be at the heart of the reorganization and deserves close scrutiny. The TOW's obvious advantages, long-range accuracy, ability to destroy any current tank, and relative low cost, are well known and well publicized. However, the disadvantages, including vulnerability to small arms and artillery fire, are also well known. The artillery's ability to directly and indirectly reduce the TOW's accuracy by reducing the gunner's *concentration* and *visibility* is not so widely touted. This is a major consideration in view of our potential enemy's heavy reliance upon artillery. A brief example of the Soviet's artillery capability illustrates this point rather dramatically.

"Tonnage which could be expected to impact from a first launch or salvo of 92 artillery and 200 multiple rocket launcher (MRL) tubes in a one square kilometer area:"[7]

TYPE	WARHEAD WEIGHT	GROSS WEIGHT
60 x 122-mm. HOW	47 lbs.	2,820 lbs.
32 x 152-mm. HOW	107 lbs.	3,424 lbs.
5 x 122-mm. MRL (40 ea)	42 lbs.	8,400 lbs.
	TOTAL	14,644 lbs.

Mounting the TOW on an armored vehicle does reduce its vulnerability, but also reduces the dollar advantage, especially in the area of personnel costs. The (apparent) increase in officer strength due to smaller tank platoons

[1]COL John W. Foss, USA. COL Donald S. Phil, USA. LTC Thomas E. Fitzgerald, USA. "The Division Restructuring Study," *Military Review* Vol. LVII, March 1977, No. 3, page 11.
2.Ibid., page 11.
[3]Ibid., page 12.
[4]Ibid., page 13.
[5]MG John W. McEnery, USA, "The Commander's Hatch," *ARMOR Magazine* January-February 1977, page 5.
[6]COL John W. Foss, USA. Col Donald S. Phil, USA. LTC Thomas E. Fitzgerald, USA. op. cit., page 11.
[7]FORSCOM Weekly Intelligence Summary 5-7 (U) para 6.

might cause some congressional eyebrows to be raised. More importantly, the Heavy Division's reliance on TOW appears to ignore a major aspect of the technological revolution that is at hand—chobham armor, the development of which impacts significantly on any missile (or round) that uses the shaped charge principle. As pointed out in Senator Taft's whitepaper:

> Tanks protected with chobham armor are largely invulnerable to infantry and other light antitank weapons. . .Technological developments do not appear likely to reverse this situation. . .Clearly it would be unwise for the United States to rely more heavily on shaped-charge antitank weapons just as the future effectiveness of such weapons has been greatly reduced by new armor developments.[8]

The above statement is saying that the TOW will have great difficulty in defeating a tank equipped with such armor which may already be on the newest Soviet tank, the *T-72*. The school solution would be to fire to hit the tank on the flank, but as tankers know, this is difficult. A TOW gunner positioned on the North German Plain who takes 20 seconds to detect and acquire an enemy tank moving at 8 m.p.h. at a distance of 2,000 meters has only a 40-percent chance that the enemy tank will still be exposed when the missile arrives on target.[9] No data exists on how long this moving enemy tank would have its flank exposed at time of impact, but logically it would be considerably less than 40 percent.

The Taft paper goes on to say:

> Data analysis of over 500 tanks sustaining hits in the Mideast War indicates that a high percentage of those hits were in the frontal area of the vehicle, where chobham armor is extensively incorporated in the new main battle tank design.[10]

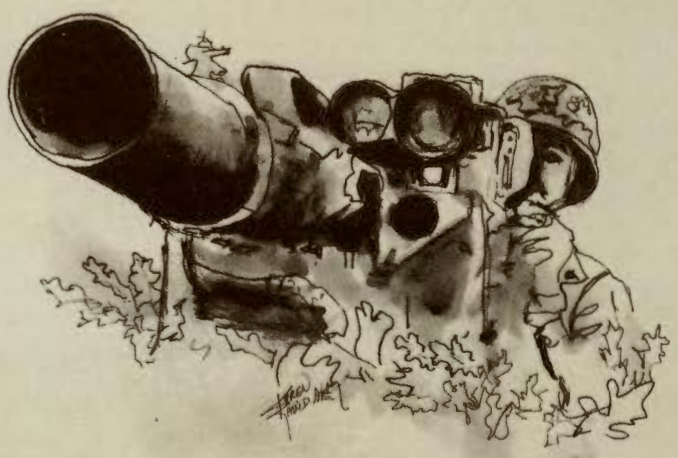
A rebuttal to the chobham armor argument would be that it will be many years before all the Soviet tanks are so equipped. While this may be true, against a TOW heavy defense, all the tanks wouldn't need the chobham armor, only *those tasked to destroy the TOW*. Based on the information available, it would appear more logical to examine the *present* requirement for and density level of the TOW rather than programming an increase.

Despite all of this, the proposed Heavy Division is "heavy" with TOW's, and in essence, substitutes a TOW company for a tank company in the armor battalions at a time when technological advances reduce the TOW's effectiveness. The proposed Heavy Division would have nine armor battalions,[11] each with 27 *fighting* tanks, for a total of 243 *fighting* tanks. Thus, while the Heavy Division will have more armor battalions, this will not result in an increase in overall tank strength. There will be more headquarters and more TOW's, but not necessarily more tanks.

Contrary to what the study purports, this recommended change appears to be in direct conflict with FM 100-5 which plainly states:

> The tank with its cross-country mobility, its formidable firepower, has been and is likely to remain the most important weapon for fighting the land battle.[12]

The DRS Group also expresses concern as to "whether or not the Army can continue to issue increasingly complex systems to captains or their wartime replacements and get the most firepower from company teams."[13] *To inject a personal note as a recent armor battalion commander, I had an opportunity to observe daily 11 company commanders (and many platoon leaders), and to conduct or participate in six battalion ARTEP's. They had few problems. I believe that the service schools are doing an excellent job preparing them for company command and combined-arms teams operations.*



The impact of the proposed changes would be felt down to tank platoon level and require changes in employment, since all echelons suffer a 40-percent loss in *fighting* tanks. In addition to the obvious loss in combat power, especially if survivability is considered, the tank platoon's ability to provide internal overwatch techniques is lessened and the tank company commander is reduced to fighting three heavy sections, if *all* vehicles are operational. Since we are dealing with smaller numbers, any loss will be more keenly felt, for example, within the present five-tank platoon, the loss of two or even three tanks still allows the platoon leader to employ fire and movement and overwatch, but a loss of two tanks in the proposed three-tank platoon would reduce it to the status of a self-propelled gun. Should cross-attachment at company level become desirable, the "tank-heavy team" commander could end up commanding only six tanks—again only if all were operational.

One of the declared benefits of the reduction in size of the battalion is that "smaller maneuver units will be more agile and responsive and should generate a greater percentage of available combat power."[14] A three-tank platoon may be more agile to a degree; however, when the proposed armor battalion organization is examined, it is not obvious how the substitution of a company of track-mounted TOW's for a tank company is going to dramatically reduce overall vehicle density. Adding more battalion headquarters will require the division/brigade commander to talk to and move more units; and if concentration is required, it would appear that

---

[8]Senator Robert Taft Jr, Mr. William S. Lind, "A Critical Look," *ARMOR Magazine* November-December 1976, page 40.

[9]Field Manual 100-5, Operations, Department of the Army, Washington, D.C. July 1976, pages 13-14, 13-15.

[10]Senator Robert Taft, Jr., op. cit., page 39.

[11]COL John W. Foss, USA. COL Donald S. Phil, USA. LTC Thomas E. Fitzgerald, USA, op. cit., page 20.

[12]Field Manual 100-5, op. cit., page 2-6.

[13] COL John W. Foss, USA. COL Donald S. Phil, USA. LTC Thomas E. Fitzgerald, USA, op. cit., page 12.

[14]Ibid., page 14.

command and control would become more difficult, placing an added strain on an already overburdened communications system. When the survivability and the ammunition capacity of the TOW are added to the equation, it is hard to see, at battalion level, how this results in a more "agile and responsive unit with more available combat power."

With the exception of the greater reliance placed upon the TOW, probably the most controversial change is placing the "focus" of combined-arms teams at battalion rather than company level; that is, cross-attachment normally will be made at battalion level, but no lower. The rationale for this change appears to be twofold: supposedly, it supports the new doctrine per FM 100-5, and the more experienced battalion commander is better equipped than the company commander to handle combined-arms operations. The reduction of company-level, combined-arms teams operations does not appear to be in accordance with FM 100-5, especially chapter 3 which states:

> The basic building block in mounted defensive warfare is the cross-reinforced tank or mechanized company team or battalion task force.[15]

Nowhere in chapter 3 does it state cross-attachment at either battalion or company level is the norm. While Chapter 4, "Offense" says that the basic *element* of the combined arms is the battalion task force, again it does not mention norms, but rather consistently states that the level at which cross-attachment takes place is dependent on the tactical situation.

To further illustrate the practical problems of pure companies, one only has to look at pages 4-8 of FM 100-5 which list tasks for the Mechanized Infantry as part of the combined-arms team:

- "Dismounting and clearing mines and obstacles blocking the way...
- "Suppressing by fire enemy infantry close enough to engage tanks with rocket propelled grenades (RPG) 7...
- "Suppressing antitank guided missles (ATGM) within range.
- "Dismounting and eliminating enemy infantry or ATGM positions which can't be suppressed.
- "Infiltrating on foot in advance of or in support...
- "Protecting tanks from enemy infantry during bad weather, in smoke or at night.
- "Protecting tanks in urban areas.
- "Providing long-range ATGM support from overwatching positions during the attack."

The only way that the infantry could accomplish *all* these tasks without cross-attachment at company level would be if the pure infantry company always led the attack, and then only if everyone advanced on the same axis. Attempting to accomplish the second, sixth and seventh tasks without physically being with the tanks would require an unnecessarily complex command and control set-up. To be fair, of the eight tasks listed for the defense, pure infantry could conceivably perform seven, but during any offensive action taken while in the defense, the offensive tasks would still apply. At the risk of "overkill" on this point, the final drafts of FM 71-2, "The Tank and Mechanized Infantry Battalion Task Force," and FM 71-1, "The Tank and Mechanized Infantry Company Team," were both specifically written to implement the doctrine contained in FM 100-5 and, as the title of FM 71-1 states, the company team is basic to this doctrine.

Although never stated, there is a school of thought that believes that the levels of command have changed, i.e. a battalion is viewed as a company, and a company as a platoon. The proposed organization appears to support this theory, especially as far as the number of tanks is concerned. For example, after normal cross-attachment, the tank force commander would actually command only 18 fighting tanks versus 30 as currently organized.

Central to this issue and the issue of increasing the tactical involvement of the battalion commander at the expense of the company commander is the question of space, time and, most importantly, communications. Given the Soviet's electronic warfare capability, will we have reliable communications to the extent envisioned?

This author's experience does not make him optimistic, and he strongly believes that there can be no substitute for *well-trained team* commanders capable of acting and reacting to sudden changes in the local situation, within the battalion's overall concept.

The concept that centralization is better because the battalion commander is more experienced appears to forget where he received this experience. He did not receive it at DA, nor even at brigade or division, but rather by spending 4-plus years at company level where he had the opportunity to grow and develop his ability to do many things well. If we make the company commander responsible only for training, we are cheating him of the experience *we* received and his potential as a battalion commander will be self-limited.

While eagerly awaiting the results of the test, this author believes that we need more tanks, not less. We don't need TOW's in the armor battalions. We don't really need more headquarters as we shouldn't worry to excess about our captains' abilities to handle the combined-arms team—they are doing a great job.

It is recognized that this is one man's opinion on a very complex subject. It does not purport to provide answers to all questions, but it is intended to stimulate thought on these vital concepts.

As many ideas as possible must be surfaced if we are to insure that our doctrine and organization maximize our combat power.

[15]Field Manual 100-5, op. cit., page 3-9.

LTC NICHOLAS A. ANDREACCHIO was commissioned in Armor upon graduation from Infantry OCS in 1957. He is a graduate of the U.S. Army Command and General Staff College and has served in tank and cavalry units in Europe, CONUS and Vietnam. Lieutenant Colonel Andreacchio served as the Armor School project officer for the Special Readiness Study Group report on the Arab-Israeli War. He recently commanded the 2-77 Armor and will be attending the 1978 class at the U.S. Army War College.

Dual-Tex Camouflage Pattern

by Major Timothy R. O'Neill

Fighting and winning outnumbered is a question of very unsympathetic equations.

We must simply kill more of them than they kill of us; a lot more. We cloak that inevitability in euphemisms such as "force-ratio," "exchange rates," and "Active Defense," but the equation is still the same. Talking about it and reducing it to Field Manuals (FM's), overlays, and journal articles is much, much easier than pulling it off on the battlefield.

To accomplish a successful Active Defense, we plan to field new weapons (*XM-1,* IFV, CFV, Improved TOW Vehicles), upgrade direct-fire techniques and training, preselect gunners, and emphasize the improvement of kill probabilities.

However, there is another side to this exchange rate problem: that of not only increasing our own ability to destroy enemy targets, but reducing his ability to destroy ours.

To hit us, he has to see us.

Camouflage was almost a lost art in our semi-gloss, white-starred Army until a very few years ago. Then it became an area of major interest. Technology dating from World War II was dusted off—unbelievable as it sounds, *we led the world in camouflage and deception techniques in WW II,* then abruptly ignored our expertise—and updated with newly available theory. By now, most units in the Active Army have at least pattern-painted their vehicles. New nets and garnish are entering the system.

But before we congratulate ourselves, let's think about the shortcomings that are still with us:

The very best plans and gadgets for countersurveillance are useless if the soldiers:

- *do not know how* to use them,
- *cannot* use them to best advantage for some practical reason, or
- are served by leaders who *do not know how to tailor the camouflage measures to the tactical situation.*

One very quick and easy way to destroy the effectiveness of countersurveillance doctrine is to damage the soldiers' belief in the practicality and usefulness of the system. If it cannot be used effectively in combat—no matter how effectively it works in theory—it will be abandoned.

Figure 1

Placing this in the context of the Active Defense, concealment becomes increasingly important in granting the defender the first-aimed fire, particularly in the case of direct-fire antiarmor systems. *This means very effective camouflage.* But the Active Defense also requires high mobility—frequent tactical displacement to new firing positions, and successive ambush sites. The typical mini-ambush will probably develop in practice as a very brief, intense period of fire from a limited number of vehicles followed by rapid disengagement and movement to the next position. This means pick-up-and-move *now.*

A crew *may* have leisure in a few cases to emplace its vehicle with care and tenderness: foraging shrubs, erecting sections of net, arranging and fastening disruptors. However, when the shooting starts and it is time to hasten to new places, anything that is not well secured when the order comes to move out is probably going to be abandoned. This is particularly true if the crew is under fire, which is very probable. There is no time *then* to draw straws for the "rolling-up-the net" detail; it is every crew for itself, and the nets and other gadgets left behind will be of no further use other than becoming something to tangle in the enemy's sprockets.

The result? After one use, one careful concealment effort, the fine points of camouflage go by the wayside, literally and figuratively, for the duration. This just won't do—we need concealment, very effective concealment, to reduce vulnerability and keep the weapons in action. If we don't—well, pass out the air matresses and start paddling, it's a long sidestroke from Dunkirk to Ramsgate.

The ideas presented in this article are only a few possible answers to the problem of designing an effective camouflage system.

The problem seemed a logical one for us to undertake, since our professional and educational backgrounds include both extensive service with mounted units in training and combat and graduate study in psychology.

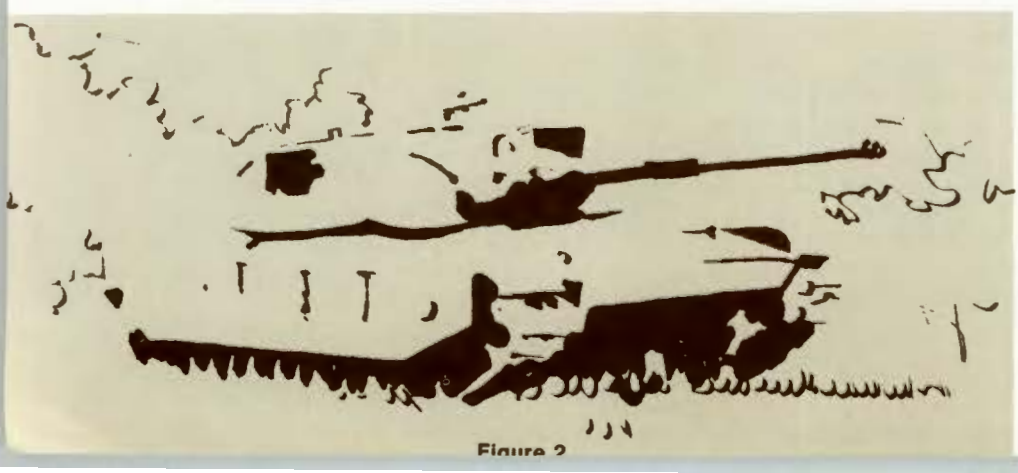


Figure 2

What Is Camouflage?

At the outset, we asked ourselves a simple question. Just what is camouflage? The answer: *camouflage is a term which we use glibly to describe a narrow range of countersurveillance measures, and about which we make quite a few commonsense (but incorrect) presumptions. In military terms, it is the purposeful degradation of a target signature with the objective of denying an enemy observer acquisition or detection information. This is, however, an incomplete and somewhat misleading way of thinking about camouflage.*

The term "signature" might be defined by a psychologist concerned with perceptual processes as "an organized aggregate of distinctive features or *schema* relatively unique to a specific stimulus-category." These *schemata* (or signatures) may be visual, auditory or olfactory in the battlefield sense ("visual" in this context being generalized to include visible-spectrum, infrared, thermal-radiant, and radar signatures). Typical visual signatures in the normal visible range might include: shadow patterns, glare, color, shape, texture, movement and other obvious characteristics that differentiate, for example, a personnel carrier from a clump of trees.

Exactly what processes are involved in detecting camouflaged figures have traditionally been in that general category of science known as "intuitively obvious but empirically elusive," or "I can't define it, but I know it when I see it!" Camouflage situations have usually been defined in terms of very simplistic psychometric exercises, such as hidden or imbedded figures tests. Most researchers, however, tend to dismiss field camouflage as having too many variables to control and measure scientifically.

Some research recently begun at West Point, however, suggests that much, although not all, of the process of camouflage involves disruption of two individual observer processes: perceptual organization and visual search.

Early perceptual theorists suggested that we tend to organize our perceptions of the environment in regular patterns (gestalts). These perceptual organizing properties make us tend to see simple and regular figures through a variety of processes. Among these are

closure (we see figures which are incomplete by "filling in" sensory gaps), *similarity* (elements with similar characteristics tend to organize into "figure" patterns, distinct from a visual ground), *continuation* (we extend regular figures despite background confusion and interposition) and *figure-ground* (we tend to see a stimulus or group of related stimuli as a figure distinct from its background). It seems logical to assume that these properties help us to "see" targets; and conversely, that an effective camouflage measure will *defeat* these skills.

The West Point research supports this general concept; however, this proved a misleading way of looking at camouflage. These skills are important in *identifying* the nature of a target once it has been *detected,* but seem to be secondary in the task of *finding* the target in the first place.

The most important contributor proved to be an individual's ability to make a rapid and organized search of a visual field and detect slight dissimilarities. We call this *cue-search.* It *seems* to be a combination of learned habits (soldiers who hunted squirrels in civilian life, to use a down-home example, might be more skilled at this than others), innate perceptual organizing processes (the *gestalt* phenomenon) which helps to make degraded objects stand out in their true shapes and appear different from the background, and a third and very powerful ingredient: *perceptual set.*

Set is a learned influence, a familiarity with certain things in our environment and an expectancy of encountering them in a given situation. The observer is *primed* to see certain things in certain situations.

The blotchy, fragmented illustration in figure 1 contains a suggestion of the face and shoulders of Jesus. Look at it for awhile (without getting frustrated—believe me, it's there!). Without the preparation (knowing what you are supposed to see), you might stare at it for hours and see only random visual *noise.* Now, if you've *seen* the face of Jesus, close your eyes for a moment, then open them and try *not* to see it. It's almost impossible. You have established an overwhelming *set.*

The second picture (figure 2) shows an *XM-1's* shadow *schema.* The shape

Figure 3

of the tank, despite its incompleteness, looks like a tank. The reasons are *closure* (a gestalt effect) and your familiarity with the tank's shadow signature, which *primes* you to see the image as a tank.

Those are the individual characteristics which must be overcome by a camouflage measure if it is to be effective. What are the camouflage characteristics? Our experience and the comments of experimental subjects suggest that the following target characteristics are the most important recognition features. We have listed them in a sort of rough order of importance, but experience also implies that their relative importance varies with the specific environmental and target characteristics.

- *Value contrast:* the difference in relative brightness between target and background.
- *Color contrast:* this seems intuitively obvious, yet this idea is the most frequently violated of all the principles.
- *Intra-pattern value differential:* a pattern is much less effective if there is so little difference in brightness between color-patches that the pattern merges into a monotone. In this case,

Figure 4

Figure 5

value is probably more important than color.

- *Texture contrast:* if the pattern is significantly broader (less "busy" than the ground to the observer, it will stand out. This is a common shortcoming of present measures, and is the major rationale for the Dual-Tex pattern.

These comments have dealt heavily with camouflage *patterns;* remember, however, that patterns are *only one part of a complete camouflage system,* and *used alone may in some cases do more harm than good!*

The Do-It-Yourself Blues

Why all the discussion about standardized patterns when soldiers with ingenuity have been doing it informally for years with scrounged paint, mud, or whitewash?

It's mostly because such efforts usually prove to be more than just ineffective: often they replace a modest vehicle signature with a new, powerful *pattern* signature that removes all doubt in the observer's perception that a target is there.

Remember the *gestalt* phenomenon—the human mind tends to arrange things in *symmetry.* Nature does so only at the lowest levels, and a wide natural forest is almost always random.

Given a paint brush or spray gun, several gallons of paint, and instructions to pattern-paint, most soldiers will paint stripes. (see the *M-551* in figure 3, the all-time nadir of effective pattern-painting.) Skilled camoufleurs must have minds which wander to random irrelevancy.

Given a small clump of trees (the only one in the area), we will cut them all down, park our tank in the middle, and pile them on (probably upside down to insure that the light green undersurfaces of the leaves are clearly visible against what is left of the background), then allow them to die and turn brown.

Given a bucket of nice, watery mud, we will paint tiger-stripes or worse, *and this is a true war-story, fans,* cover the white stars neatly with mud to produce mud-colored stars—which dry to the hue and value of khaki drill, several shades brighter than the surrounding lush forest.

No, we are stuck with the standard patterns. But human creativity and industry can even defeat the standard, carefully developed patterns.

The perfectly good U.S. Army pattern is designed as a standardized pattern with colors flexibly matched to the environment. It was first tested at Fort Hood, Texas, a semiarid sort of place, which suggested a mixture of forest green, field drab, sand and black. This blended well with the clumpy grass, dusty tank trails, and live oaks of central Texas.

We have an engineer detachment assigned to West Point. West Point is very, very nondesert-like. What colors do we sport?

You guessed it.

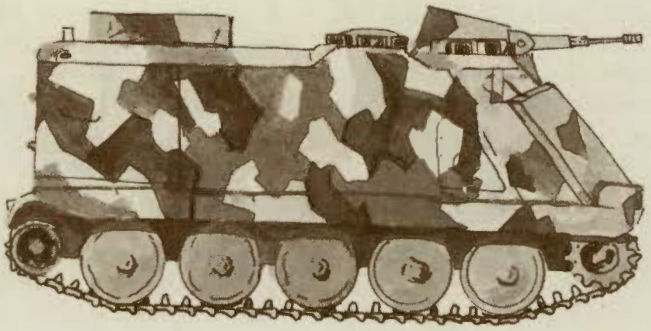


Figure 6

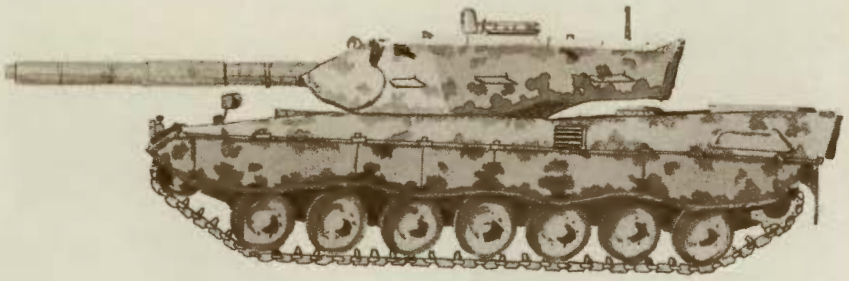


Figure 7

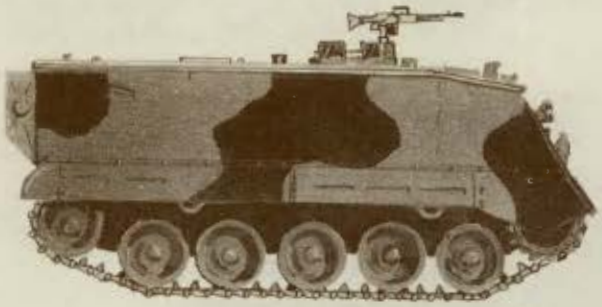


Figure 8

Patterns, Foreign and Domestic

The patterns illustrated here are a selection of measures currently in development or use in the U.S. Army and various foreign armies. Many other examples are available from other armed forces, but I have reduced the list by eliminating most informal, nonstandard patterns. Subjective comments are the opinions of the author.

U.S. Army Pattern (figure 4): A fairly recent measure now in wide use. It was designed by the Mobility Equipment Research and Development Command, Fort Belvoir, VA. The pattern is standard for each vehicle type, but choice of the four colors is a function of terrain and climate. It has proven highly effective, particularly when used with nets and other garnish. Its major drawback is not in the design, but in the execution: for a variety of reasons, units frequently use colors which are not appropriate to the locale.

U.S. Army, Europe Pattern (figure 5):

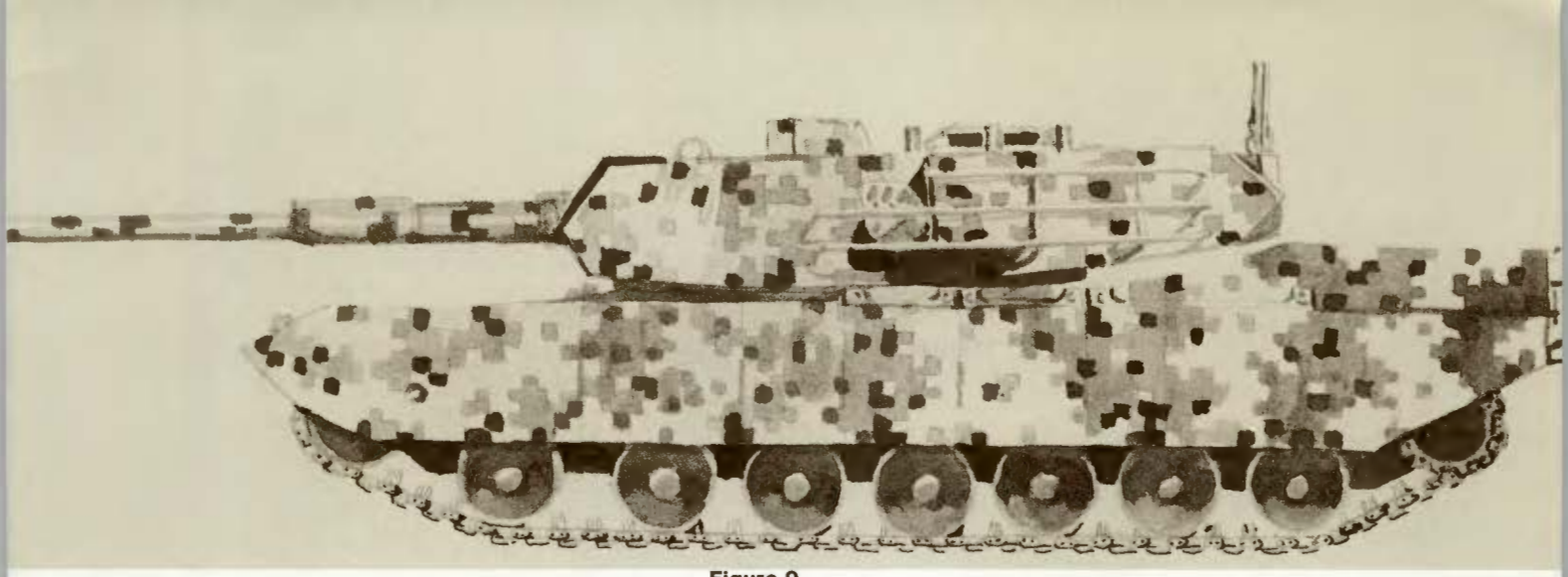


Figure 9

This measure is something of a mystery. Well conceived in shape and distribution, it suffers from two problems: a tendency towards symmetry, which is probably not too serious, and a bizarre selection of colors which are quite unlike the continent in question. The value-contrast is very unfavorable (the reddish and light green areas are set against a pale beige), and serve to provide pattern signatures which are probably more compelling than the original semi-gloss olive drab (OD) *schemata.*

Swedish Army Pattern (figure 6): This is what camoufleurs call a "splinter" pattern, due to its sharp, angular configuration. It is not otherwise significantly different from the U.S. Army pattern (and performed about as effectively as the latter in the West Point test). Its principal drawback is the relative difficulty of application.

West German Army Pattern (figure 7): The *Bundeswehr* pattern, still in the developmental stage, is designed principally to distort the shadow signature of vehicles by extending them onto the surface of the target.

British Army Pattern (figure 8): This measure is explicitly designed as a morale-booster; it looks quite handsome, but provides little real concealment advantage.

Dual-Tex — What and Why?

The Dual-Tex (for Dual Texture Gradient Pattern) is designed specifically to reduce—but not eliminate the need for bulky garnish by combining the long-range effectiveness of the U.S. Army Pattern with a more natural texture under optical magnification. (figure 9.) It consists of a *macropattern* of broad light and dark areas which is visible at longer ranges, and at these ranges is not readily distinguishable from the contemporary pattern. At closer range, or under a gunner or tank commander's optical magnification, it resolves into a *micropattern* of color bits which closely matches the environment. (The art lovers of *ARMOR's* readership will recognize the relationship of Dual-Tex to the neo-impressionist school called *pointillism,* admirably represented by Seurat. Yes, it's the same idea.)

Does Dual-Tex Work?

In laboratory simulation of field environment, Dual-Tex seems to have a clear advantage. An experiment conducted at West Point from August 1976 to February 1977, in which cadets viewed a 35-mm. color slide series of painted targets in distant tree lines, showed a significantly better performance record for Dual-Tex. Dual-Tex was compared in summer conditions against the U.S. Army pattern, and in winter (snow) conditions against the U.S. Army and an adaptation of the Swedish Army pattern which is quite similar to the U.S. Army pattern; in both cases, subjects tended to detect the Dual-Tex target later (at a closer distance) than the other patterned panel targets.

The Dual-Tex was tested in the field in May 1977 at Aberdeen Proving Ground, Maryland. Subjects (assault helicopter pilots and artillery forward observers) viewed the Dual-Tex and standard U.S. Army patterns painted on an *M-113;* observations were made at approximately 1000 meters through the TKN-3 commander's sight of a Soviet *T-62.* Mean time to detection and probability of detection and identification were significantly lower for the Dual-Tex patterned target.

The questions of cost and practicality of applying *Dual-Tex* have quite correctly been raised. The pattern is more complex than the current measure, and time and cost are factors to be considered whether the pattern is painted at the assembly plant or in the organizational maintenance shop bays.

However, Dual-Tex is a limited measure for use on certain critical vehicles—*XM-1,* ITV, and possibly IFV, CFV—in the active defense. It is not as complicated as it looks in figure 9. The squares are not a necessary part of the pattern, and in practical application would hardly be as neat and precise as depicted here.

In fact, the pattern was applied at Aberdeen using a four-inch paint roller from a local hardware store. This method made the seemingly complex grid easy to follow. Marking the vehicle prior to painting was more involved, but the designer solved that problem by "ad-libbing" the lines rather than following the carefully drawn grid. The test results do not suggest problems with this method, although alternative time-saving tactics are also available.

In any case, the question is: can we afford to lose these critical vehicles more easily than spending the time necessary to paint a really effective pattern on them?

A Complete Camouflage System

No single measure can conceal a target on the battlefield. There is no magical resolution, no cloak of invisibility.

But, given present technology, plus practical doctrine and thorough training, critical systems may hope for significantly reduced vulnerability.

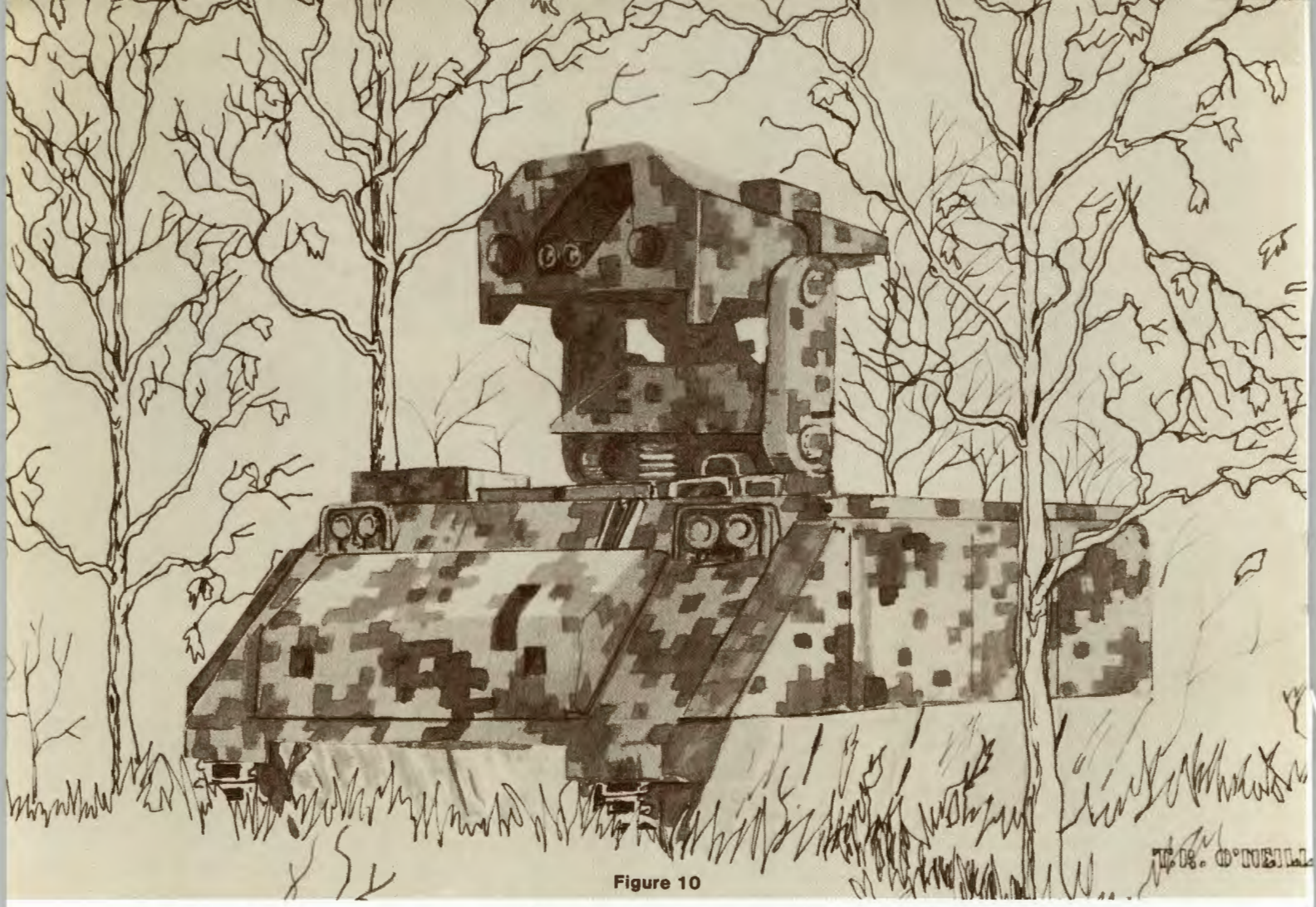


Figure 10

The complete system pictured (figure 10) is fitted to the Improved TOW Vehicle, which will form an important part of the Active Defense. Kits for other vehicle types will differ in particulars, but the array will be much the same in each case:

Dual-Tex Pattern: This measure reduces the need for extensive net and garnish, and probably offers the maximum concealment value, of itself, that can be expected from a pattern.

Disruptors: These are variations of existing devices—small areas of camouflage net mounted on light fiberglass frames to break up the vehicle shape and radar signature.

Thermal Shielding: On this vehicle, an intake blower and duct system channels exhaust gases away from the engine grill, through the right flotation pod, and down into the ground at the rear of the vehicle. This reduces the signature of the vehicle under thermal imaging observation.

Reflector Kits: These are highly reflective mylar sheets which are staked into the ground at an angle of 10° to the front and flanks. Their purpose is to reflect the ground around the vehicle and eradicate the shadow signature (this is the only truly "magical" component). The reflective sheets are flexible and mounted on spring-loaded rollers, after the fashion of a window shade. They are deployed by simply pulling them down and staking them to the ground; when the time comes to move, they may be stowed by hand or, if the situation dictates, simply ignored; when the vehicle moves, the stakes will pull out and the screens snap back into place automatically.

Carry this system with your unit, the one you will command in the first battle of the next war, and play the scenario through, with and without the advantages it offers.

Can you risk the first battle without it?

References: For further information, consult

T. R. O'Neill *et al, Dual-Tex: Evaluation of Dual-Texture Gradient Pattern.* United States Military Academy, April 1977.

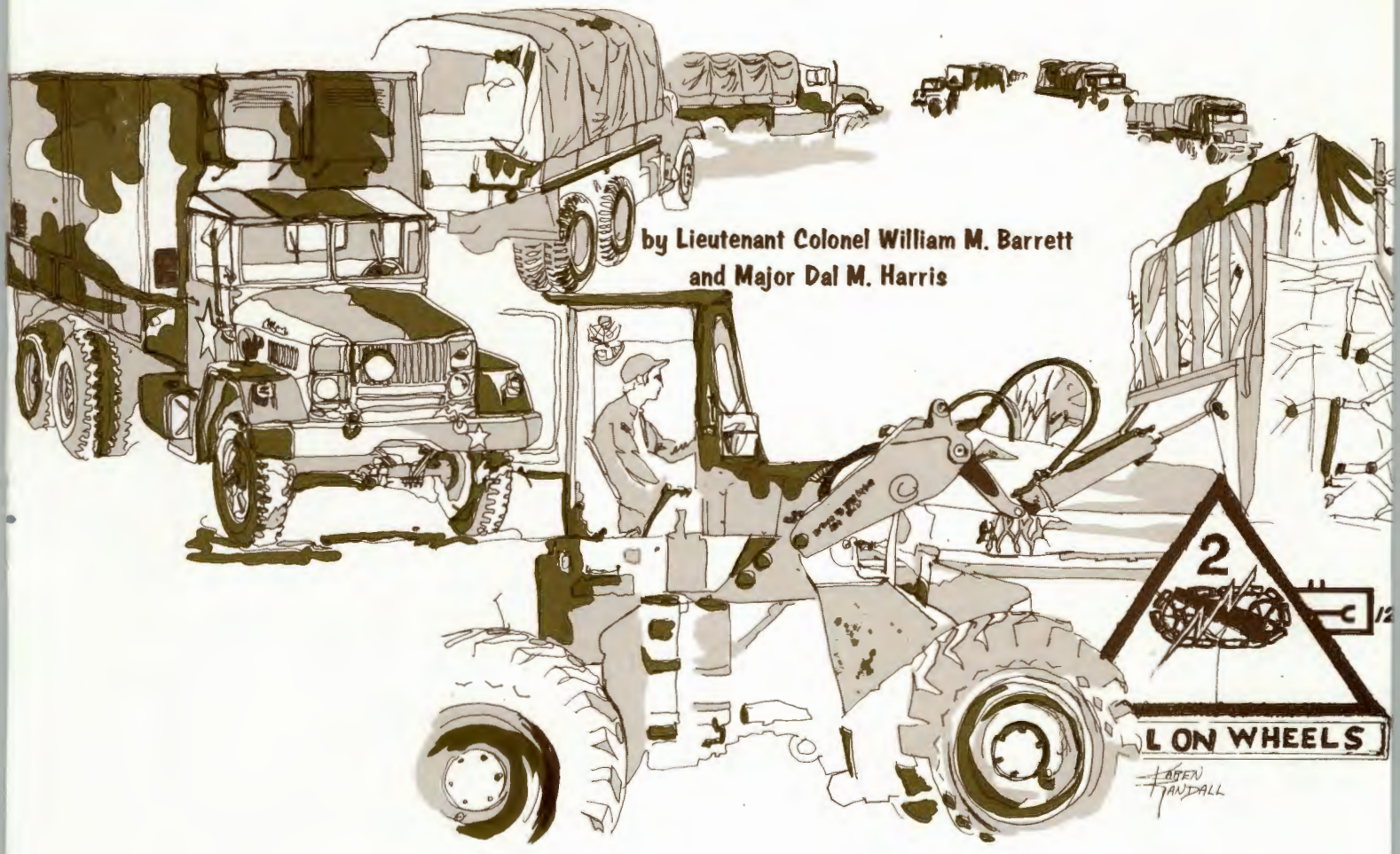
Investigation of Psychometric Correlates of Camouflaged Target Detection and Identification. United States Military Academy, May 1977.

Dual-Tex II: Field Evaluation of Dual-Texture Gradient Pattern. United States Military Academy, July 1977.

MAJ TIMOTHY R. O'NEILL was commissioned in Armor from The Citadel in 1965. He is also a graduate of the University of North Carolina. Major O'Neill has served as an OCS tactical officer, commanded armor and armored cavalry units, and served on squadron and brigade staffs. He is presently assigned to the Department of Behavioral Sciences and Leadership, U.S. Military Academy.

Testing the Tail

by Lieutenant Colonel William M. Barrett
and Major Dal M. Harris



It's time to do some hard thinking about maintenance on the battlefield.

An armored division has been engaged for 72 hours. The covering force is back in — badly chewed up. The enemy's first echelon is pushing slowly into the main battle area. Maneuver unit maintenance and recovery assets are strained to their limit. One brigade sector has been beefed up to meet the main enemy threat by attaching a number of company teams. That necessary action is causing problems for the forward support maintenance company supporting that brigade.

The division commander needs to get those covering force units back into the fight quickly. The other divisions in the corps are also committed. They can't help.

The division support command staff looks nervously at the situation map. The enemy advances steadily. It may be necessary to displace supporting elements to the rear. But disabled vehicles are all over the battlefield. Moving the support area will reduce responsiveness to recovering those vehicles. Yet, moving combat service support units is not like moving a tank battalion. It takes time.

The division maintenance battalion commander is faced with many questions:

- Where are the busted weapons systems?

- What's wrong with each one?
- How long do I have to get each one fixed or evacuated before the enemy gets to it?
- Which ones should be fixed in place, pulled back, cannibalized or abandoned?
- How is the battle going? Must I get ready to move? How much warning will I get?
- If I have to move, how long will it take? What help must I have?

These questions are of vital concern — not just to the *logistics types* — but to every battlefield commander. In the *heavy* divisions, Armored and Mechanized, the *tail* cannot be dismissed as less important than the *teeth.* The *tooth-to-tail* characterization is most misleading. That *tail* is not fat but muscle, and it translates quickly into combat power.

At Fort Hood, the 2d Armored Division recently looked at the maintenance battalion and the realities of the modern battlefield. The exercise had a number of objectives.

First, the 124th Maintenance Battalion and the division were trying out the draft Army Training and Evaluation Program (ARTEP) for the Maintenance Battalion. That effort, although interesting and significant, is not the subject of this article.

Second, the exercise was designed to take a critical look at the present battalion organization and equipment.

Third, the exercise identified and suggested some tentative solutions to the problems of maintenance operations on the modern battlefield.

Some problems were obvious without moving an inch from the motor pool. Using organic resources, the battalion is only about 58 percent mobile. Even this figure is misleading, because some of the battalion's companies are quite mobile (the forward support companies) and others (particularly the Headquarters and Light Maintenance Company (HQ and Lt. Maint. Co.)) are only slightly easier to move than the Main Post Exchange.

Specifically, the problems to be addressed were: How many trucks, of what type, are required to move the entire Maintenance Battalion at one time? How long does it take to load and unload those trucks? How much real estate does the battalion require? These and related questions could only be answered by looking in the horse's mouth and counting teeth. Computations based on weight and cube could only provide a starting approximation. Real world answers could only be determined by moving the complete battalion to the field—lock, stock, spare parts, and maintenance backlog.

To the best of our knowledge, this effort was the first attempt to operate a seven-company divisional maintenance battalion in the field over the distances envisioned in the conduct of the Active Defense.

It was clear that the battalion would be a monster to move. To determine just how big the monster would be, the exercise began with a 100 percent load out. For 3 days, the battalion loaded. To get every nut and bolt off the ground at once, the division used every asset in the Maintenance Battalion and the Supply and Transportation Battalion. Additional 5-ton trucks were borrowed from units throughout the division. In the end, the 2d Armored Division borrowed every asset that the 1st Cavalry Division and the 13th Corps Support Command (COSCOM) could spare.

As each truck was loaded, it moved from the battalion compound to an administrative assembly area. Vehicles were lined up by companies in parade ground formation. On a Friday afternoon, the job was completed. The result? To move the Maintenance Battalion in one lift, 413 prime movers, a total of 643 trucks, tractors and trailers, were required. On Saturday morning, this armada began deploying to five separate field locations for the tactical phase of the exercise.

This hodge-podge of transportation assets, while obviously unrealistic, provided for the first time a reliable measurement of "lift" requirements if the maintenance battalion had to be moved all at once. The division's dependence on the transportation battalions which would become part of the Corps Support Command on mobilization became painfully clear.

Early Saturday morning the 124th Maintenance Battalion moved from the "parade ground" to field locations, using all supporting vehicles in addition to organic assets. By Saturday night, all vehicles were closed into field locations. Tractors and trailers not organic to the division were released as they were unloaded. That process was slow. At one point, *both* of the rough-terrain fork lifts available for off-loading the battalion's technical supply became inoperative. Extreme care was required, especially at night under black-out conditions, to maneuver the loaded fork-lifts around trees and place loads in identifiable yet camouflaged locations. Requirements for local security and normal housekeeping functions reduced the manpower available for the task.

The battalion was to perform a normal division maintenance support from its field location, but the Headquarters and Light Maintenance Company was not fully off-loaded and operational until noon, Tuesday—80 hours after start point (SP) time. It takes time—and a good bit of acreage—to disperse and camouflage over 5,000 line items of authorized stockage list (ASL) parts on the ground and in parts vans, or a bunch of stake and platform trailers.

The routine task of convoy control disclosed some problems with the battalion's table of organization. There are only two radio sets authorized in the battalion headquarters, one each for the commander and materiel officer. The S-2/S-3 in a maintenance battalion has none.

On the battlefield we have predicted, it will be essential for the combat service support elements to be aware of the current tactical situation, task organization and immediate plans. At present, this data can only be provided through very high frequency (VHF) or radioteletype communications from the Support Command's signal support section. During the 2d Armored Division exercise, an improvised courier-liaison system proved essential.

Telephone communication in a battalion the size of the divisional maintenance battalion was also a problem. All land lines and VHF shots tied into the single SB-22 switchboard owned by the HQ and Lt. Maint. Co. The workload of the switchboard operator was tremendous, averaging one call every 12 seconds for extended periods. To understand this heavy telephone usage, it is necessary to realize:

- That the maintenance battalion occupies a "bunch" of real estate; it's a long way around the perimeter.
- That the battalion must provide its own local security and assist in the rear-area security effort. *Few combat troops*

will be available to assist in this task.

- And finally, that frequent telephonic coordination between the various elements of the battalion and among the other support command units, the field army support commands (FASCOM's) and other logistics operators is a normal part of maintenance operations.

Later in the exercise, the battalion displaced again, this time using only the vehicles and equipment organic to the 124th. The three forward support companies moved about 30 kilometers and closed into new positions 2 hours or so after SP time. Assets were provided from the other companies of the battalion to minimize the need for shuttling.

The bulk of the battalion, which is the four companies normally located in the division support area, displaced the next day. The forward support companies returned the favor and provided trucks to help. The aircraft and missile maintenance companies were able to move fairly rapidly, but the "heavy" companies took some time.

The Heavy Maintenance Company was burdened by 22 tanks that needed repairs and had to be moved to the new site. It became clear that — for maintenance operations in combat — the vehicle driver (and in the case of a tank, maybe the tank commander or the whole crew) should stay with the vehicle until it is repaired or evacuated farther back to the rear. Drivers can move operable vehicles about, assist in repair, provide local security and otherwise simplify and speed repair efforts. Despite problems, the Heavy Maintenance Company was able to clear its old location 26 hours after notification.

Again, the big problem was in HQ and Lt. Maint. Co. Loading and moving the division's ASL of spare parts is a long and arduous job using only organic assets. The task of clearing a previous location, while simultaneously setting up a new field "warehouse," receiving and issuing parts and maintaining accurate documentation took 48 hours.

The 2d Armored Division is still assessing the lessons learned from the Maintenance Battalion exercise. Some changes in the TOE seem clearly essential. Communication, both internal and external to the battalion, is inadequate for maintenance operations on the modern battlefield. As a minimum, additional FM radios, a wire team, and switchboard are needed in the battalion headquarters.

Additional cargo handling equipment is needed in the HQ and Lt. Maint. Co. and Fwd. Spt. Co's.

The military-owned demountable container (MILVAN), while essential to the battalion's exercise, is clearly too fragile for off-road operations. Some substitute, designed for the purpose, is critically needed.

Personnel adjustments are needed in the TOE as well. The S-2/S-3 Section needs an additional officer and NCO. Tech supply of HQ and Lt. Maint. Co. needs at least 16 more people and an officer to operate around the clock. These additional personnel can be found within the battalion by ruthless deletion of certain nonessential maintenance functions such as office machine repair, painting, glass and canvas repair.

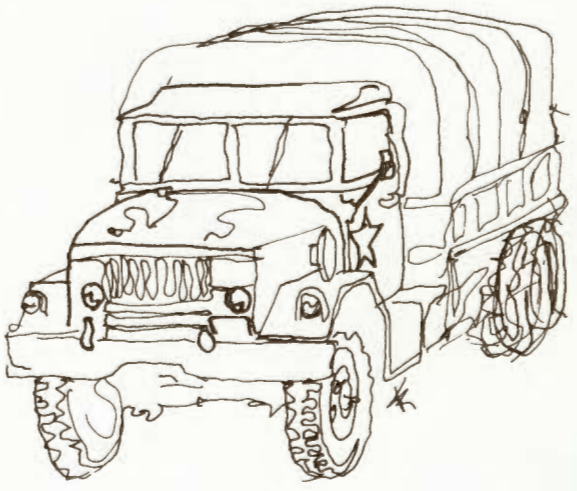
Although these and similar findings are important, some intangible results may be even more so. The battalion, support command and division staffs were able to develop some invaluable planning factors. Operators and planners gained an appreciation for set up and tear down times; the impact of weather; nuclear, biological, and chemical (NBC) environment; and security requirements on maintenance operations; convoy sizes and time and distance factors in the Maintenance Battalion.

Within the battalion, the need for real-time tactical information became strikingly clear. The unit was forced to deal with the routine but difficult problems of customer traffic flow. Light discipline and camouflage requirements affected maintenance operations and work planning. Organization of the tech supply area to provide concealment, yet prompt access to required parts, was a tough problem to be worked out.

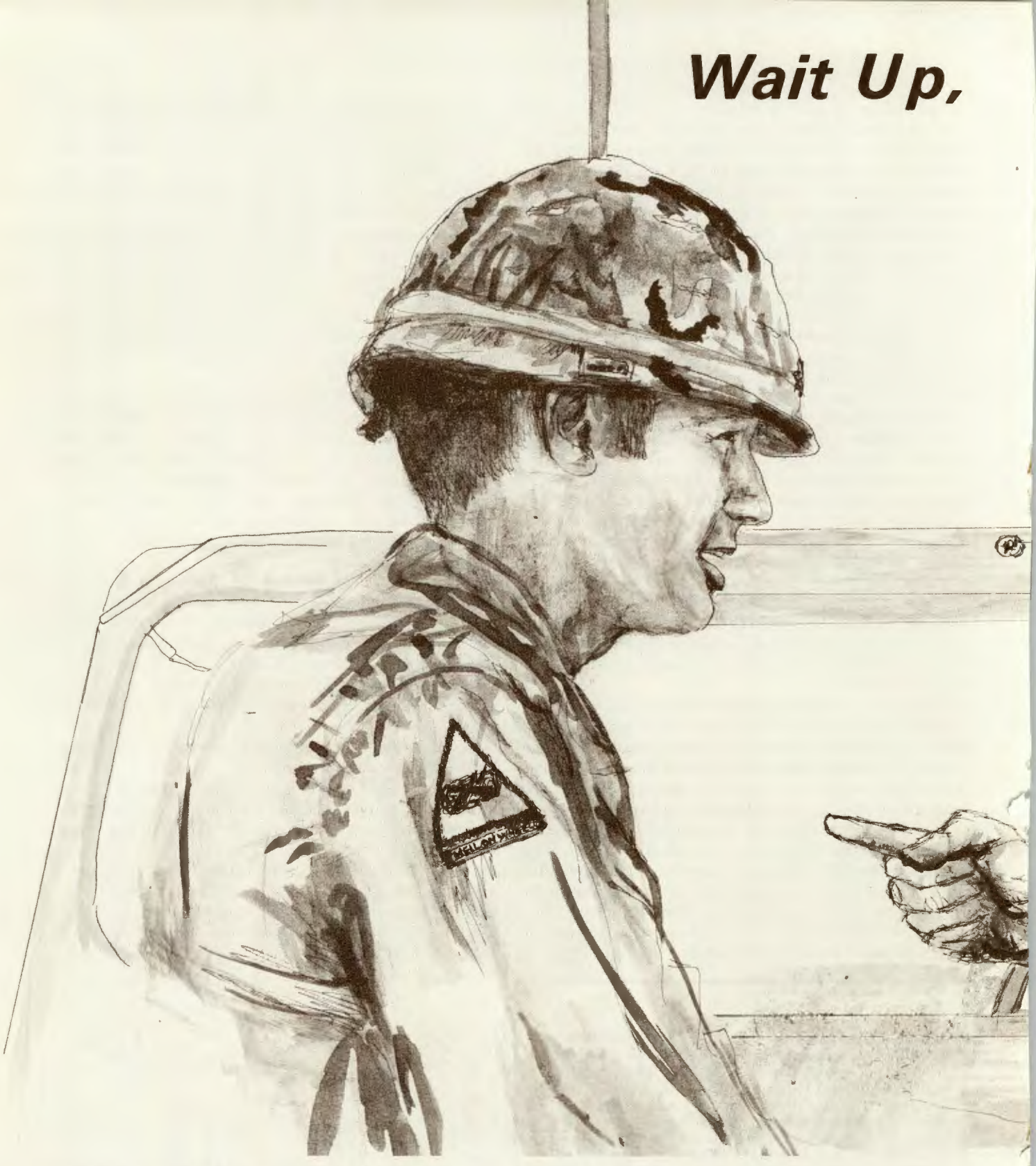
How does the combat division maintain its combat power on the battlefield, and at the same time keep *its tail* light enough to satisfy Congressional scrutiny and yet be responsive to the flow of the battle? That problem is not just for logisticians. It demands some careful thought by all of us, some modifications to our organizations, maybe a rethinking of our whole demand-supported repair parts philosophy in combat. Most of all, we must exercise the system as we come up with new ideas. Only by training with the system, in the field, will we shape the *maintenance tail* to the realities of the modern battlefield.

LTC WILLIAM M. BARRETT was commissioned in the Transportation Corps as a Distinguished Military Graduate from North Alabama State University in 1959. An Army aviator, he served in Vietnam with the 1st Cavalry Division and the Americal Division. A 1972 graduate of the Command and General Staff College, he later commanded the 124th Maintenance Battalion, 2d Armored Division, Fort Hood, TX, and now serves as G-4 of the Division.

MAJ DAL M. HARRIS was commissioned in Infantry as a Distinguished Military Graduate from Michigan State University in 1962. He served with the 1st Calvary Division, Vietnam, as an Infantry officer and as an information officer with HQ MACV on a subsequent tour. A 1976 graduate of the Command and General Staff College, Major Harris is currently serving as XO of 2d Bn, 58th Mech. Infantry, Fort Hood, TX.



Wait Up,



Battle Scene: At the hastily assembled command post, two weary, worried lieutenant colonels glare angrily over the jeep hood that serves as a mapboard.

"You haven't made five miles!" yells the slightly cleaner of the two. "If you want to creep along on your !®?!©?! belly, then give me my company back and let me take the lead! You're late to the phase line and you're going to be late to the objective! We give you blasted grunts the best mobility in the world and you still can't think past a hundred meters!"

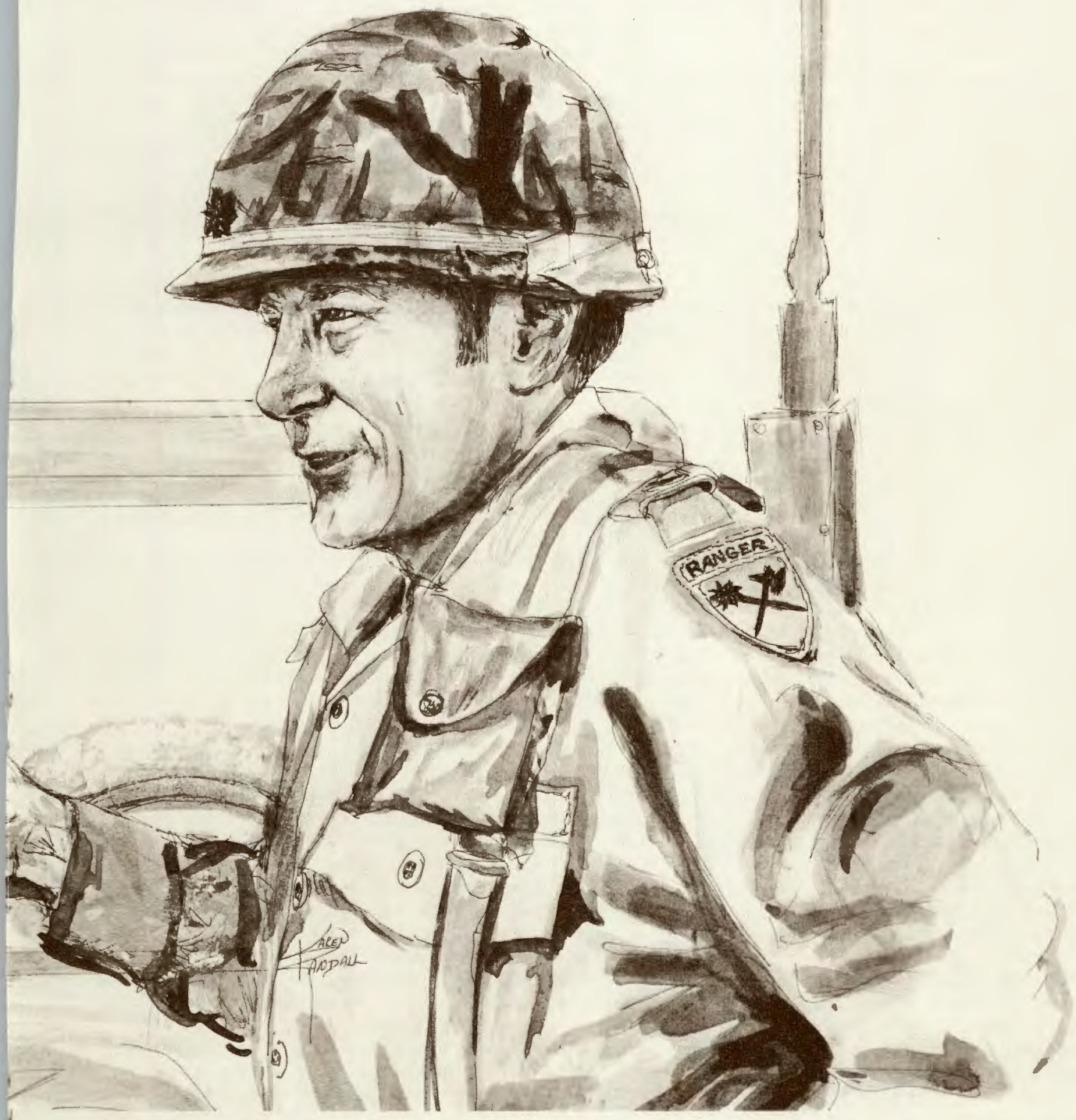
The lines of tension and fatigue in the other's face momentarily reform into an expression of sheer rage. He clenches his fist and actually takes a couple of steps toward his fellow task force commander.

"You stupid S.O.B.! You know damn well what that terrain up there is like, and you know I've already lost two platoons trying to bust through it! You want to lead? Sure you do! You'll put my carriers out front and you'll ram them against the *Saggers* and the *T-62s* until they're annihilated. Then you'll hunker your tanks down and scream for more infantry. Yeah, you mobile show-offs love to roll, so long as somebody else is taking the fire for you!"

He would say more, but an exasperated bellow from the brigade commander forces their attention to the problem at hand, which is to fight through a strong covering force to take a series of deep objectives.

TREADHEAD!

by Lieutenant Colonel Thomas J. Barham



Battle Scene: The *XM-1* noses cautiously over the low crest, sees a retreating *BMP* hustling for the far woodline and blasts it. The tank commander (TC) catches the signature of the *Sagger* to his right front and yells to the driver to maneuver, but the missile finds home low on the right rear of the hull, blowing away track and road wheels. Immobile and exposed, the TC has to order his crew to leave the tank, despite the small-arms fire peppering the hull.

But the fire slackens as two Infantry Fighting Vehicles (IFV's) charge over the hill crest, spewing fire from all weapons. One vehicle dismounts a fire team, which takes up positions around the crippled tank, frantically pouring fire into every position that might conceal an enemy soldier. The tank crew gets clear, just as a second *XM-1* arrives from the flank and adds its fire to the protective cover.

The infantry team moves back toward its carrier, but one soldier breaks a line of incoming tracers and flops writhing on the abused earth. Two of his buddies turn back for him, but despite the savage output of the bushmasters, enemy small arms increase in volume and the soldiers on the ground dive for scant cover.

The TC of the second tank gives a terse order, and the agile monster he commands springs forward, splashing through the steel shower until it virtually straddles the wounded soldier. Halted and exposed, the crewmen grimace with the expectation that their mobile fortress will momen-

tarily turn into a throw-away crematorium. But they hold there, shielding the infantrymen until the casualty is safely inside the IFV. Then all three machines back quickly to relative safety behind the hill crest.

Moments later, friendly artillery breaks the air above the enemy and the team again moves over the crest, tanks and IFV's almost on line. As the terrain before them opens a bit, the tanks forge ahead, while the IFV's move to the flanks and fire suppression at whatever looks suspicious.

A mile later, the advancing force finds a canal across the line of advance. The tanks slow. The IFV's move forward, sweep the far bank with fire, and swim the canal under cover of the tank guns. On the far side, they fan into an impromptu bridgehead, while the Armored Vehicle Launched Bridges (AVLB's) move forward.

There is little confusion and no argument. The men in the company are too young, too tired, and too scared to care about the historic malevolence between infantry and cavalry-tanks. They want to complete their mission. They want to stay alive. In reconciliation of those two desires, they don't much give a damn who gets there first.

* * * *

As an infantry platoon leader in the winter of 1959-60, my most unpleasant training exercise was spent during a week of attachment to a tank company. My platoon was hastily mechanized with four *M-59* personnel carriers and sent to work with the tank company as something of an afterthought.

For the entire week, the most attention I got from a company order was "Little men, follow company headquarters." Each night the company commander told me to "secure the perimeter and send out listening posts."Once, when the company had to move through several miles of rather dense terrain, I suggested that my platoon lead, dismounted if necessary. The suggestion was met with the scorn appropriate for a second lieutenant who didn't even own a shoulder holster. The tank company charged through the area in column, down the only two trails available. We rolled past aggressor 106-mm. recoilless rifle positions, where the men in crested helmet liners valiantly snapped firing pins against empty chambers. The tankers acknowledged their presence with obscene gestures as they rolled past. The controllers assessed no damage to the tank company.

With little to do but guard the tanks at night, we guarded conscientiously—for a while. After several nights, my troops realized that no one from the tank company ever checked security, and none of the tank crews left anyone awake outside the tanks.

Soon the sentries were seeking relief from the cold Fort Lewis rain, huddling in the bushes, wrapped in ponchos, often asleep and never very alert. During the final nights of the exercise, everyone around the perimeter got plenty of rest.

At the conclusion of the exercise, when the company made its final charge against the last objective, my platoon was directed to remain in the assembly area and come to the objective on call. The umpires gave the company a very good grade for the exercise.

Years later, as a company commander on Exercise Desert Strike, I watched from a ridge as an opposing tank company, with an attached infantry platoon, took up a perimeter defense and started feeding the evening meal. Remembering my own attitude as the "Little Man" in the company team, I couldn't help wondering what the security of that perimeter might be like. At 0230 the next morning, I took a combat patrol to the position. The infantrymen were asleep on the ground and the tankers asleep on, in and under the tanks. With much enthusiasm, my troopers broke half-pint milk cartons, filled with whitewash (representing thermite grenades), against the rear decks of all the tanks. Then I woke up the controller—a tanker, as it happened—and showed him our handiwork. He, in turn, woke the unit commander and rather apologetically explained that the force had just been wiped out.

I gloated over the coup for two days. Then a tank platoon from the company attached to my own battalion was sent to me in exchange for one of my rifle platoons. The platoon leader, a seasoned lieutenant, opened our first meeting by saying, "Captain, I'll work any way you like, but for Pete's sake, give me a mission. All we've done for the past two weeks is to try to keep from running over grunts crawling on their bellies."

But those were the old days. In the modern Army, we all understand the combined-arms concept, and nobody lets branch parochialism influence his operational decisions, right?

As editor of *INFANTRY* Magazine for the past three years, I have noted, through the articles received by *INFANTRY,* and those published in other branch periodicals, a curious swing in the pendulum of popular military thought. When I took this position in July 1974, the lessons of the October 1973 War in the Mid-East were fresh in our minds. We knew the combined-arms team was the only possible combination of victory. Tankers and infantrymen were learning new respect for each other, and both were quick to buy a drink for a Redleg. The pages of our branch journals fairly dripped the adhesive of mutual support. We became so combined-arms oriented that we scared ourselves. Infantry generals found themselves nodding in solemn agreement as very senior officers said things like, "In the next war, the *tank* will be the critical element of battle.

Wait a minute! I mean, this combined-arms stuff is great, and we do need it, and I'm all for it, and all that, just so long as everyone wears light blue scarves on parade!

I see the pendulum swinging back. I hear it in the talks of senior officers. I read it in the professional journals. I feel it, inexorably, in my own thinking. I *know* that I cannot exist on the battlefield except as a member of a fighting team composed of many different weapons and men of many skills, but I don't want any damn tanker telling me how infantrymen should fight. I grow worried that my attitudes are again starting to prevail, especially among senior officers. The feeling is intensified by periodic peeks at back-channel twixes that often translate as interbranch sniping.

Easy as it is to let branch pride dominate affairs, Armor and Infantry can ill afford to go at each other's doctrinal throats again. Each branch, I believe, has sufficient challenges in its own areas to keep its best minds busy for a while.

Most of the crunch points lately have centered around the proper employment of mechanized infantry—specifically, who writes that doctrine and who has proponency for training mechanized infantry.

Senior tankers are worried that infantrymen don't support the "Panzer-Grenadier" concept of mobile war. Regardless of what lip service we pay to the doctrine, our "musket mentality" will prevail when the battle starts. So far, the only supporting evidence given for that concern is that Infantry-oriented exercises usually involve a lot of dismounted activity.

Should the worried tankers be proven correct, the result would be mechanized infantry leaders whose thought processes could not adapt to mobile warfare. This in turn will result in tanks being left without infantry protection when they need it, or—worse, from a mounted warrior's point of view—having to slow to the classic infantry pace. Thus, the increasing consensus among tankers that Armor branch should have the proponency for training mechanized infantry.

This bit of heresy is accepted by infantrymen in much the same light that tankers would greet an idea of turning armored cavalry training over to the Infantry School (which has, in fact, been proposed, albeit somewhat with tongue in cheek).

As an infantryman, I of course, cannot indorse the proposal that tankers write mechanized infantry doctrine. I can instead add my voice to the chorus of thinking soldiers, many of them young, concerned professionals, who insist that tankers and infantrymen know the missions, capabilities and limitations of each other as well as they know their own, and that they train for their battle roles in unison and harmony, so that in combat there wll be no argument over who does what.

I don't know a single infantryman, mechanized or otherwise, who has any great ambition to pit his combat vehicle (whatever it may be) against a *T-62*. And, though my acquaintance with tankers is more limited, I've heard none insisting on the right to lead a dismounted assault against an enemy bunker line. In combat, mobile or otherwise, I doubt that either group is going to be long bored by inactivity.

But the controversy persists, and threatens to grow into proportions that may hamper the progress of combined-arms team development.

FM 100-5, the capstone manual of our "How-to-Fight" series, makes some pretty definitive statements about the employment of tanks and mechanized infantry. At one time or another, all of the branch proponents have agreed to the content of the manual. To reiterate:

"TANKS. Tanks can fight other tanks, punch through suppressed defenses, create shock and panic, and wreak havoc against soft targets. But tanks are vulnerable in close terrain, woods, cities and when visibility is reduced by bad weather or smoke; they cannot cross most rivers or swamps without bridging and they cannot climb steep hills or mountains.

"MECHANIZED INFANTRY. As tanks move forward, mechanized infantry supports and assists by: Dismounting and clearing mines and obstacles blocking the way, or supporting engineer troops so involved.

"Suppressing by fire enemy infantry close enough to engage tanks with *RPG-7* type rocket weapons mounted or dismounted.

"Suppressing antitank guided missiles (ATGM) within range.

"Dismounting and eliminating enemy infantry or ATGM positions which cannot be suppressed.

"Infiltrating on foot in advance of or in support of tank attacks to seize terrain from which the defender could stop the attack.

"Protecting tanks from enemy infantry during bad weather, in smoke or at night.

"Protecting tanks in urban areas.

"Providing long-range ATGM support from overwatching positions during the attack."

To this list could probably be added the function of seizing bridgeheads and taking primary objectives that tanks cannot reach. The point, so far as proponency goes, is that everything designated for mechanized infantry requires the function of, or the potential for, fighting dismounted—that

activity which infantrymen of all organizational classifications practice and train for all of their careers.

(Now the chorus begins—"Fighting dismounted, can't think mobile, can't wait to get their bellies against the ground, yah, yah, yah.").

But when the catcalls are done, some fairly distinct observations remain unchallenged. Modern antiarmor weapons available to the foot soldier are reliable and lethal. Our potential enemies include in their ranks a large number of disciplined, well-trained foot soldiers. In close terrain against such soldiers and such weapons, tanks face the same survival odds as does a blind giant fighting a tribe of pygmies armed with poison darts. He may mash a few pygmies, but he's going to die.

For tanks to survive, there's going to have to be some friendly pygmies out there somewhere. And for a large portion of the time, those "Little Men" are going to have to be doing their thing on the ground, not safely locked in a rolling box, going along for the ride.

We desperately need the new Infantry Fighting Vehicle (*nee* MICV). We need it to keep up with rapidly advancing armor. We need it to suppress enemy infantry and take on *BMP's*. We need it to add increased firepower and protection to the mechanized infantry squad. Most of all, we need it to *rapidly put fighting infantry on the ground where and when they are needed.*

I am personally saddened that in order to get all the implements of mounted warfare on the IFV we had to give up two infantrymen per squad. Let's face it, when that machine is functioning in an exclusively mounted role—when, aside from the driver, gunner and squad leader, the grunts inside have nothing to do but ride along and, in very special circumstances, happily spray fire around through the firing ports—what you have is an inferior sort of tank.

When the men in that IFV grow so comfortable with their mounted role that they become loath to leave their protective machine and do battle with nothing but a fatigue shirt between themselves and the enemy, what you have is an inferior sort of combined-arms team.

Do infantrymen understand mobile warfare? I think so, to the extent that theory and training and anticipation can prepare a man or a unit for a type of warfare never before actually experienced (by either U.S. Infantry or U.S. Armor). It really requires no great degree of foresight to realize that when tanks have the room and the circumstances to fight at fully mobile capacity, then everyone else on the friendly side of the battlefield does everything possible to make sure the tanks get to do their thing at full speed. For mechanized infantry, these times will likely see the IFV's revert to the status of the fighting machine—the inferior tank which, though lacking the firepower of its better-armed cousin, can still add its influence to the mission; and—while rolling, suppressing, breaking through and bypassing—carry along its vital cargo of ready infantrymen.

Even the "Infantry mind" can realize that, with our tanks heavily outnumbered to begin with, we can't afford to lose any to cheap ambushes by enemy tank-killer teams. Can the Armor mind appreciate that we cannot always protect tanks against that danger while we ride happily buttoned up in an armored vehicle? There will be times when the preservation of the force demands that tanks slow down while dismounted infantry seeks, finds and kills the enemy equivalent of the determined *Dragon* gunner.

There will also be times when speed, force and aggressiveness must take priority over risks of cheap shots against the tanks. Then everyone rolls full diddle over the danger areas, hoping that speed and suppressive fire make up for limited visibility and terrain restrictions. Most infantrymen realize this. With our combat experience limited almost exclusively to air-assault operations in Vietnam, today's infantryman is usually as impatient with footmobile progress to the objective as are our cavalry brothers. (In some cases, perhaps dangerously impatient.)

Much of the same criteria apply to defensive situations. Mechanized infantrymen know that while participating in a tank-infantry counterattack as part of the active defense, they are going to have to move at the tanker's pace—or get left behind.

I worry that we may be deluding ourselves in doing so much of our doctrinal planning in terms of 1,000 meter ranges. At Fort Benning, there are places where—in good weather—one can see 1,000 meters. One place is down the runway of Lawson Army Airfield. Another is across the parachute drop zones. Most of the others are on the carefully cleared TOW and tank ranges. Otherwise, there aren't too many places around here where one could fight at 1,000 meters and see what he's shooting it. Is Europe, with its frequent shroud of fog, and a town or village every 1,000 meters, any different?

Trying to force decisive combat at 1,000 meters means clinging tenaciously to positions that enable us to *see* that far, and thus forfeiting much of our inherent mobility. Whatever the killing distance of our weapons, much of the next conflict will be fought, even between tank forces, at infantry ranges. These are the ranges at which infantrymen must be prepared to leave their carriers and fight on foot with the weapons they can carry. These are the ranges at which tanks must have infantrymen around them to survive.

So, from the very heartland of Infantry parochialism comes this cry for renewed branch harmony. Let's quit jockeying to count coup over who trains whom and concentrate on a realistic approach toward building a fighting team that gets its job done in every circumstance. I know, the pages of *INFANTRY* Magazine are filled with instructions and exhortations to infantrymen on the subject of killing tanks. But honestly, guys, we're talking about *enemy* tanks.

LTC THOMAS J. BARHAM was commissioned in Infantry upon graduation from Louisiana State University as the ROTC Distinguished Military Graduate in 1958. He has served in all Infantry officer positions from platoon leader to division staff. Colonel Barham served with the 2d Bn, 27th Infantry "Wolfhounds" in Vietnam, and spent 2 years in NE Thailand as the Senior Adviser to a Royal Thai Army Regimental combat team. He is a C&GSC graduate and has been the Editor-in-Chief of *Infantry Magazine* since June 1974.

PROFESSIONAL THOUGHTS

Letter to a Company Commander

Dear Captain:

It seems that just yesterday I reported in to your company, fresh out of basic course. I had many thoughts and ideas in my head when I stepped in front of that platoon for the first time. I had many goals to achieve. Now it has come time to turn over the reins of leadership to another new lieutenant fresh out of the Armor Officer Basic Course.

As I move to a new position of responsibility, I would like to offer my advice to you on how to develop a platoon leader. My comments are centered around those activities which take up most of the platoon leader's time and in which he can make the most significant contribution to the unit as a whole. These activities are training, maintenance, counseling, and extra duties.

I realized when I received the briefings from you and the battalion commander that our company would not be able to train as much as either of you would like it to. Our dual mission of school support and combat readiness made the task of training exceedingly difficult. It was my goal when I took over the platoon to accomplish great things in the area of training. But largely, I feel that I failed. Some of the fault is my own, for not learning to cope with the environment in which we operate. Much of the fault lies with those in our chain of command at battalion, brigade, and post level, for they created the environment in which we operate. But alas, sir, some of the fault is yours. Let me explain.

Several times I approached you with the concept that my platoon, under my leadership, could significantly raise its level of physical fitness. Six months ago some soldiers in my platoon could not meet the prescribed minimum physical fitness standard for their grade and MOS. I felt that, by working in smaller groups and by structuring physical fitness training so as to emphasize those tasks on which our soldiers would be tested, we would be able to bring everyone up to and over the minimum level of achievement. Several times you turned down my request, usually with a statement to the effect that it had been tried before and did not work. Therefore, the physical fitness training in the company has been conducted in mass company formations, with emphasis mainly on those few exercises necessary to loosen up the body for the run. The runs, for the most part, have been the lowest-common-denominator type; just fast enough to beat the clock, but as slow as possible to enable the greatest number of people to stay in formation. Never mind those soldiers, found in every unit, who are not satisfied with the minimum, who seek to excel. They are relegated to running in the pack. And what about the exercises needed to prepare the troops for that semiannual Advanced Physical Fitness Test (APFT)? How many failed the last one because we neglected to include sit-ups, horizontal ladder, the inverted crawl, and the run-dodge-jump in our regular physical fitness training?

So you told me my method had been tried before and didn't work. Well, your method is being used right now and it is not working either. We will never know, sir, what might have been accomplished, had I been allowed to train my own men.

The tendency toward centralized command and control is evident in other areas of training also. Most classes given in our unit were presented to the entire company. Very few were given by members of a platoon to their own platoon. The overcrowded and stifling atmosphere of the company

classroom is inhibiting for both instructor and students alike. Large groups do not encourage the free and open exchange of ideas and concepts in the way that small groups do. An additional fault of centralized company level training, administered primarily by officers and senior NCO's, is that it does not foster and encourage the development of the middle and junior NCO as a trainer.

Small groups, such as tank crew or squad, training under the control and supervision of a platoon leader, would not only be of greater educational value to the soldier, it would also provide a more effective vehicle for developing subordinate leaders as trainers.

Platoon integrity in training applies not only on the PT field and in the classroom, but on the range or in the field. Soldiers, if they are part of a large group, such as a company, tend to ignore their responsibilities to their own subgroup of the company, the platoon, crew, or squad. Problems of accountability and control would be lessened considerably if platoon integrity were maintained.

"We will never know, sir, what might have been accomplished, had I been allowed to train my own men."

Not to be ignored in this plea for platoon training are the factors of morale and esprit. There is nothing inherently wrong with competition between platoons of the same company. We see it all around us in trying to achieve lowest vehicle deadline rate and highest tank gunnery qualification scores. So why not a little competition for highest PT average, best platoon ARTEP, best weapons qualification average, and so on?

Lest you think my ideas on training, sir, are all negative, let me say that our company participated in types of training which our men thoroughly enjoyed and which no other company in our battalion or brigade as yet has attempted. For example, there is the assault boat training you incorporated

"Problems of accountability and control would be lessened considerably if platoon integrity were maintained."

into our last 25-mile road march. The time and effort you expended to coordinate and execute that training was certainly to the benefit of everyone in the company. And I never heard less complaining about a 25-mile road march. Neither have the men forgotten the opportunity you gave them to throw a live hand grenade. They were impressed with the destructive force of this basic weapon, as evidenced by their exclamations as they watched detonations from the glassed-in control tower. Our units need more commanders who look, as you do, for ways to make routine training less repetitive and more challenging.

In the areas of maintenance, I think you did about as good a job as anyone could have done in helping me achieve our mutual maintenance goal, zero deadlined vehicles in my platoon and an effective on-going preventive maintenance program.

"Good soldiers will strive to become better soldiers if they know their leaders are concerned about them personally."

You did this by first of all encouraging me to spend a great deal of time in the motor pool. Where else can the platoon leader acquire the skills necessary for sound maintenance management? You encouraged me to actively participate in the maintenance activities, whatever they might be, from the simple task of checking and tightening end connectors, to the more difficult such as removing and installing power packs. When I had procedural or technical questions to ask, you always had the answer or knew where to obtain it.

Important to me as a platoon leader was the fact that you allowed, if not actively encouraged, me to establish my own maintenance program within the platoon. This enabled me to make significant improvements in the condition of my vehicles and in the maintenance skills of my men. Overall, in the past 6 months, the down time of my vehicles has steadily decreased in an environment that is generally hostile to preventive maintenance practices. You must share the credit with my men for supporting my efforts in this critical area.

Continue to demand that a platoon leader at times forsake the privilege of his rank and insist that he work alongside his men on the dirtiest of motor pool tasks, as you do. Leaders at every level need to know from first-hand experience exactly what is entailed in the accomplishment of the tasks to which they assign their men.

In the area of counseling, I have one specific suggestion. Require your platoon leaders, initially, to show you their counseling reports. When, in your opinion, they are diligent and conscientious in preparing counseling reports, relax this requirement. The net effect will be to insure that they are counseling the good soldier. Too often the only people who are counseled on an individual basis are those few who are unable to conform to the standard. Good soldiers will strive to become better soldiers if they know their leaders are concerned about them personally.

I failed to establish a counseling program, and in analyzing my shortcoming, I concluded that more command direction on your part would have caused me to be a more effective counselor to my men.

A fourth area where you showed keen judgement was in regard to extra duties. It is common knowledge that at the company level there are as many extra duties as duties, and that at times extra duties can become of overwhelming scope and importance. I was a member of your company for 2½ months before you assigned me any extra duties. A new lieutenant/platoon leader has enough concerns and worries upon arrival in a unit without on the first day being given a

variety of extra duties to perform. Let the other officers in the company tighten their belts for a few weeks while that new lieutenant gets his feet on the ground. Let him become familiar with the standard operating procedures (SOP's) in the company and battalion. Depending on the individual, when you feel that he is in control of his platoon and himself, and that he is sufficiently familiar with company and battalion SOP's, assign him those extra duties which you feel he can perform. You can increase or lighten the extra duty load according to his ability to bear the weight.

Give him a choice when possible, but also realize that he needs to be familiar with all aspects of company level management, for someday he will fill your shoes.

I leave now for a new assignment. You have done much for and with me these past months in your role as trainer. I will be fortunate if my subsequent commanders show as much interest and concern as you have in my development as a company grade officer. As my replacement steps in, work with him as you have me, but give him more opportunities and greater responsibility in the training of his own men. Keep him in the motor pool as much as is practicable. Require him to counsel his men, and introduce him to extra duties only after he has had reasonable time to get his feet on the ground in his new role. Both he and the Army will be bettered by your efforts.

JAMES F. GEBHARDT
First Lieutenant, Armor
Former Platoon Leader

Fort Benning, GA 31905

Airborne Tankers

The airborne infantryman seems to be an anachronism in this age of mechanized and automated everything. His protests to the contrary, the airborne trooper is still a "footmobile" weapons system, despite his "questionable" delivery system. With the risk of fueling interbranch rivalry, a need for all of us still exists in the combined-arms concept. The latest mid-East conflagration did not spell the end of the tank, dismiss the antitank guided missile (ATGM), or establish the helicopter as the salvation of the world. What it did do was to reinforce the need for a combined-arms force capable of working together, taking advantage of each particular branch's strong points to augment the weaknesses of the other.

To successfully orchestrate the actions of such a widely diversified force, a tactical "renaissance man" is required for a commander. His job would be much easier if we, down at the small unit level, knew more about the "other guy" and how to work together.

One area in which members of the 82d Airborne Division are doing some serious thinking is the "airborne antiarmor defense." This is an especially good arena for some serious thought on the part of tankers and airborne troopers alike. Basically, the airborne antiarmor defense is based on the "archipelago defense." This proposes a series of mutually supporting, tank-proof positions, arranged in depth. By arranging these positions skillfully, the airborne unit strives to destroy the tanks attempting to bypass these strong points and serve to stall the attack by holding back the combat and service support following the tanks.

There are several considerations that immediately come to mind. The authors of the "airborne antiarmor defense," an 82d Airborne Division special text, stress many of these.

"More so than with any other tactical concept, the airborne antiarmor defense depends on the understanding by the leader and the trooper of the two main fundamentals of the concept and their proper implementation against threat tactics and weapons. The first fundamental is that the airborne commander must optimize the fires of his antiarmor and supporting weapons, insuring their complete and coordinated coverage of the battle area, to engage the enemy from all directions, but particularly from his flanks and rear. Secondly, the commander must protect his forces from enemy fires. The skillful selection of terrain for cover and concealment, suppressive fire,

and the proper use of maneuver must be blended to degrade the effectiveness of the enemy's weapons and target acquisition equipment. The commander must fight his unit to destroy the combined-arms integrity of the enemy while maintaining the integrity of his own combined-arms team."

Now, under ideal conditions, the commander would be able to effectively implement this defensive concept because he, through "the occupation of terrain favorable to the accomplishment of the airborne mission, will compel the enemy to come to us, either because he must traverse our terrain to gain freedom of maneuver, or because he is threatened by our presence."

What happens, if after all the best estimates are made from the latest intelligence, the airborne trooper hits the ground in the "right place, at the right time" and Ivan decides it's time to pull the old "end run?" To continue the football analogy, the linebacker "reads" the play "wrong;" he can't run and the ball carrier has a motorcycle. Somebody is going to score, and probably not the "good guys."

One possible way that this could be overcome is to make the Threat commander choose the right terrain (from our standpoint) through the use of terrain, obstacles, mines and apparent "weak spots" in our lines. Subterfuge might achieve the results that we desire. Failing that, we must resort to force to make the enemy commander do what we want. The question remains, how does a foot-borne TOW gunner get the enemy riled up enough to draw him in without getting overrun and run over?

"We must resort to force to make the enemy commander do what we want."

One point in the "airborne antiarmor defense" that could be more aggressively addressed is the use of the *Sheridan.* As the airborne division's only Armor force, the *Sheridan* battalion cannot afford to be committed (and thereby annihilated) piecemeal. Nor can the *Sheridans* be looked upon only as a support weapon to be doled out to the infantry units. Subordinating tanks, in small numbers, to infantry formations, against a "blitzkrieg" attacker has been a bankrupt philosophy ever since the French tried to use it in 1940 against the Germans. In order for the tank to be effective, it must be employed in sufficient numbers to force a decision on the battlefield. The excellent mobility of the *Sheridan* allows it to remain dispersed until the proper time and place to mass and strike appear. Essentially, the tank can be employed in "guerrilla" fashion over a large area, much like light infantry operates in a small area.

Further consideration can be made about the role of a "lightly-armed" airborne division in Western Europe. Some of the ideas that affect the successful use of the *Sheridan* are that some people feel that the increased urbanization in this region favors the employment of infantry ATGM's. Actually, while it provides greater advantages to the infantry defender, it also provides some advantage to the Armor defender.

The concept of the "airborne antiarmor defense" concedes that due to "hills, valleys, and buildings, the line of sight for ATGM's is often interrupted." Due to the relatively long time required for a missile to fly to the target, the ATGM gunner must ensure the target will be exposed long enough to get a hit. The *Sheridan,* when carefully used, with its conventional gun capability, can engage targets successfully when missiles cannot.

"By using the Sheridan in a fast-reacting maneuver role, the airborne commander can blunt the attack. . ."

Other factors which demand better use of the *Sheridan* in the airborne division are also apparent. First, close air support will be marginal from September through February due to weather. Along with this, the fog prevalent during the same time of the year will negate the range advantage of TOW and the long nights will hamper the use of weapons systems that are not provided with night sights at present.

The *Sheridan* provides the airborne antiarmor defense at least a qualified answer to these problems The conventional gun has a higher rate of fire and a faster reaction time than the missile, and under periods of reduced visibility, can offer good hit probabilities with well-trained crews.

While its light armor affords little protection against Threat tank guns in a "toe-to-toe slugging match," the *Sheridan's* speed and agility, coupled with its cross-country mobility provide it with more survivability than a TOW jeep.

Realistically, it is unlikely that Threat forces will attack in July when the defender will gain the advantage of 16 hours of daylight and clear weather. Doubtless, no Threat Armor commander would deliberately allow an opposing force to take advantage of the standoff capabilities of TOW and *Shillelagh.*

Thus it becomes clear that, given the size and type of forces that the Threat maintains, and the current capabilities of his equipment, any antiarmor defense concept cannot permit him to mass these forces. By using the *Sheridan* in a fast-reacting maneuver role, the airborne force commander can blunt the attack and buy the time needed for foot-borne weapons to deploy or modify their "archipelago defense." Furthermore, he can use the *Sheridan* battalion to force or draw the attacker into the Armor kill zones he has formed with the infantry forces.

Allowing the *Sheridans* to use "hit and run" tactics, the airborne commander can do nothing but add to his capability. The major problem to overcome is one of attitude. The infantry must learn to view the tank as an asset, capable of reacting quickly and favorably to the overall needs of the division, and one that they need to preserve. The tankers must take the attitude that since they are all the division has, that they must strive to be the best possible tankers and be capable of delivering the firepower with all the dash, audacity and cunning that tankers pride themselves on.

EMIL M. DULAR
Sergeant First Class
Master Gunner

Fort Knox, KY 40121

FIRE CONTROL COMBAT SIMULATOR

by Colonel (Retired)
Carman P. Milia

Figure 1

During the Operational Testing (OT II) of the new *M-60AIE3* tank, it became evident that requirements for higher hit probabilities which demanded a greater degree of complexity in tank fire controls had resulted in more difficult training. In addition to the normal traverse, elevation and firing functions, the gunner's handles were required to accommodate laser and lead pushbuttons. This required a high degree of coordination on the part of the gunner to achieve good firing results. A new challenge to train tank gunners was obvious.

The answer was found in a joint venture between Chrysler *M-60* and *XM-1* engineers. Using an engineering rig that had been designed to test the stabilization function of the *XM-1*, a gunner's fire control combat simulator was built and offered to the Armor School for preliminary testing. Favorable results led to the issue of other models for the Armor community's evaluation.

Description

The trainer is a device (figure 1) which realistically simulates the critical interface between gun controls and the sight picture. It permits the gunner or operator to engage a moving target with the realism he would expect under actual conditions. Actual conditions of moving tank stabilization, ammunition (ammo) trajectories, target movement and hit or miss performance are visually presented to the gunner and separately to his instructor or monitor (figure 1).

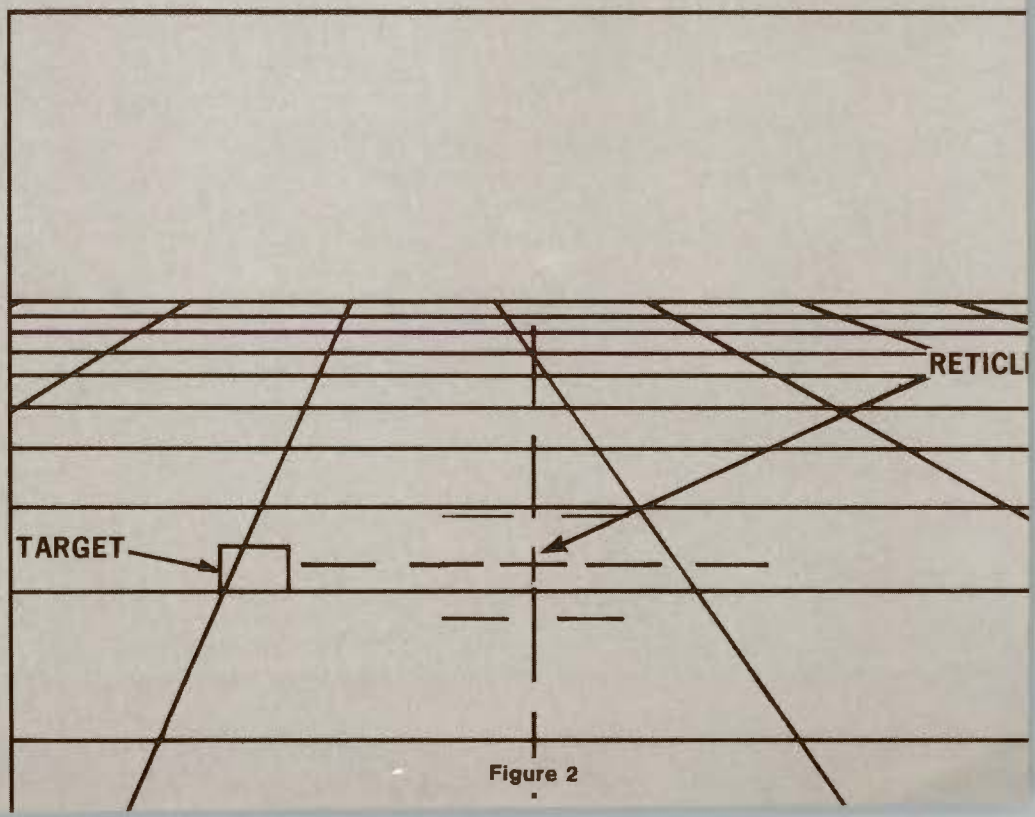


Figure 2

The fire control simulator is composed of two basic units, the instructor's console and the gunner's station, both connected by one electrical cable. The console is powered from a conventional 110 volt, 60 Hertz plug.

The instructor's console uses computer technology and contains the monitoring scope, the scenario selection push buttons, control buttons and the output printer.

The printer presents a written readout of the gunner's performance. This printout gives a pictorial representation of where the fired round hit or missed the target, together with the time (in seconds) needed to engage and hit the target. (See figure 2.) The scenario selection board is divided into two simple pushbutton arrays—one for the firing tank and one for the target.

The pushbuttons and their selections are listed below:

FIRING TANK selections are:

• SPEED (m.p.h.)	Stationary, 10 m.p.h., 20 m.p.h.
• AMMUNITION	HEAT, Missile for *M-60A2* HEAT, APDS, HEP for *M-60A1*
• TERRAIN	Smooth, Medium, Rough

TARGET selections are:

• SPEED (m.p.h.)	Stationary, 10 m.p.h., 15 m.p.h., 25 m.p.h.
• DIRECTION	to right, head on, to left
• RANGE (meters)	1,000, 1,500, 2,500

The gunner's station consists of the actual handles and eyepiece from the tank. Because of the different characteristics of each of the tanks (*M-60A1, M-60A2* and *M-60A1E3* and *XM-1*), each set of handles are distinctively different. The instructor's console, on the other hand, is common to all similar weapon applications. The only difference is the software programmed for its computer. Thus, the system used for one application can be converted to another by physically changing the gunner's handles and reprogramming the computer. Reprogramming is a relatively simple task, but does require a qualified technician. The software fed into the computer includes the tank stabilization, ammunition ballistics, and reticle conditions that are peculiar to a specific tank.

A unique capability is the presentation of the trajectory of the round fired. An *M-60A2* gunner, in a few minutes, can accustom himself to the difference between a 152-mm. HEAT round and The associated *Shillelagh* missile. An *M-60A1* gunner can get the feel of firing HEP, HEAT and APDS rounds. In the Infantry Fighting Vehicle/Cavalry Fighting Vehicle (IFV/CFV) version, the TOW missile and 25-mm. Bushmaster rounds are included in the software program. *M-551, M-48A5* or helicopter applications could be easily adapted.

Because the trainer simulates the real conditions of the tank, ammunition and target performance, advance techniques of gunner training may be perfected. For example:

- If a *Shillelagh* gunner makes a jerky correction to the missile flight, missile control will be lost when using the trainer, just as would be the case in the tank.
- Engagement of moving targets can be accomplished either by applying the appropriate lead or by using the automatic lead function. The gunner can "see and feel" the difference. Ambushing a target will cause a miss.
- To employ HEP ammo and the standard periscope reticle at the longer ranges, the "HEP offset" technique must be used to compensate for ammo drift.
- Round-to-round dispersion is programmed into the ballistic trajectory. Therefore the gunner may not always hit exactly where he aims—just as is the case under actual conditions.
- Targets may be engaged for a finite period of time only. When a moving target travels to the edge of the range safety area, it disappears and the engagement must be terminated. This time factor exerts a degree of pressure on the gunner.

User Training and Maintenance

For all practical purposes, there is no training necessary to use the simulator. The instructor's console requires only a few minutes of orientation. User maintenance is restricted to adding paper and ink to the printer and replacing burned out fuzes or light bulbs. Like a TV set, troubleshooting should be accomplished only by a skilled technician.

Design Philosophy

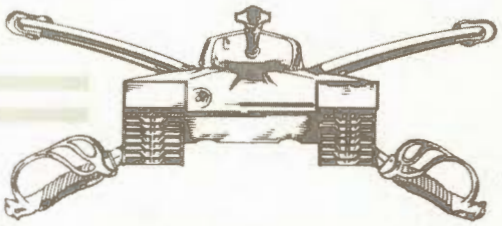
The design philosophy was to develop a simulator that solved a real training problem. As such, it should be simple, reliable and low cost. The low cost permits its broad distribution down to troop units, instead of exclusively to schools and centers. Its low weight and size make it ideal for Reserve and National Guard units. In that it utilizes common commercial components, it should not be used under extreme environmental or field conditions. Like a TV, it was envisioned to be used in the day room, mess hall or unit training room.

Status

Under the auspices of Project Manager-Trade, six simulators have been delivered. Four are in the *M-60A1* configuration; two are in the *M-60A2* configuration. Another is being built for Project Manager, IFV/CFV. The most constructive criticism of the simulator has been, "They should have put a quarter slot in it, so the troops will think it's one of the new TV games."

COL (Retired) CARMEN MILIA was commissioned in Armor upon graduation from the United States Military Academy in 1950. During the Korean and Vietnam Wars, he served in and commanded several tank battalions. A graduate of the Industrial College of the Armed Forces, he also served as the Director of the Weapons Department; Director of Doctrine, Literature, and Plans; and Director of Training, USAARMS. Since his retirement in 1973, Colonel (Retired) Milia has been associated with Chrylser Corporation as Program Manager of the *M-60A3*.

OPMD - EPMD ARMOR



The following lists include all Armor officers in Brigade and Battalion/Squadron level commands as of December 1977. Even as this goes to press we recognize that some of these names may have already changed. Please bear with us! We plan to provide periodic updates of this listing.

ARMOR BRIGADE/REGIMENTAL COMMANDERS as of Dec 77

COL John M. Kirk
1st Bde, 1st Armored Div

COL Roger J. Price
2d Bde, 1st Armored Div

COL Lee Brown
1st Bde, 3d Armored Div

COL Thomas E. Carpenter
3d Bde, 3d Armored Div

COL Douglas S. Smith
1st Bde, 3d Infantry Div

COL Richard G. Graves
3d Bde, 8th Infantry Div

COL Harold R. Page
2d Armored Cavalry Regiment

COL Crosbie E. Saint
11th Armored Cavalry Regiment

COL Thomas W. Kelly
194th Armor Bde, Ft Knox

COL Harry E.B. Sullivan
The Lightning Brigade

COL Dave R. Palmer
1st Bde, 2d Armored Div

COL James L. Dozier
2d Bde, 2d Armored Div

COL Gerald T. Bartlett
1st Bde, 1st Cavalry Div

COL Joseph C. Lutz
3d Armored Cavalry Regiment

COL Marvin G. O'Connell
2d Bde, 1st Cavalry Div

COL Bobby J. Maddox
6th Air Cavalry Bde

COL Leslie A. Layne
3d Bde, 4th Infantry Div (M)

COL Thomas E. Williams
1st Training Bde, Ft Knox

ARMOR BATTALION/SQUADRON COMMANDERS as of Dec 77

LTC Richard C. Edwards
1st Squadron, 2d ACR

LTC John H. Getgood
2d Squadron, 2d ACR

LTC John R. Landry
3d Squadron, 2d ACR

LTC James B. Taylor
1st Squadron, 11th ACR

LTC Joseph C. Conrad
2d Squadron, 11th ACR

LTC Thomas J. Haycraft
3d Squadron, 11th ACR

LTC William G. Yarborough
1st Squadron, 1st Cavalry

LTC Kenneth A. Evans
1st Battalion, 35th Armor

LTC James R. Harding
3d Battalion, 35th Armor

LTC William S. Graf
1st Battalion, 13th Armor

LTC Philip H. Mallory
1st Battalion, 37th Armor

LTC Richard D. Benson
2d Battalion, 37th Armor

LTC Richard Griffitts
2d Battalion, 81st Armor

LTC Stanley M. Kanarowski, Jr.
3d Battalion, 63d Armor

LTC Richard Kolasheski
4th Battalion, 73d Armor

LTC William B. Blake
3d Squadron, 12th Cavalry

LTC Ronald H. Griffith
1st Battalion, 32d Armor

LTC Victor T. Letonoff
2d Battalion, 32d Armor

LTC Edward D. Line
3d Battalion, 32d Armor

LTC Dudley M. Andres
1st Battalion, 33d Armor

LTC Dennis V. Crumley
2d Battalion, 33d Armor

LTC Charles B. Fegan
3d Battalion, 33d Armor

LTC Kent E. Harrison
3d Squadron, 7th Cavalry

LTC Peter F. Scott
1st Battalion, 64th Armor

LTC James E. Dierickx
2d Battalion, 64th Armor

LTC George P. Miller
4th Battalion, 64th Armor

LTC Timothy H. Donovan
3d Battalion, 64th Armor

LTC Benjamin Covington
4th Battalion, 69th Armor

LTC Jonathan Searles
3d Aquadron, 8th Cavalry

LTC Gordon T. Bratz
1st Battalion, 68th Armor

LTC Jerome L. Haupt
2d Battalion, 68th Armor

LTC Fred W. Greene
3d Battalion, 68th Armor

LTC William Lozano
5th Battalion, 68th Armor

LTC Edward W. Shaw
1st Battalion, 72d Armor

LTC Richard D. Whitsett
1st Battalion, 40th Armor

LTC Rodney W. Symons
3d Battalion, 77th Armor

LTC Robert L. Sloane
4th Squadron, 12th Cavalry

LTC Frederick Stanley
1st Battalion, 5th Brigade

LTC Vernon B. Starley
6th Battalion, 3d Brigade

LTC William Ward
12th Battalion, 4th Brigade

LTC Charles G. Ramsey
1st Battalion, 1st Brigade

LTC William Hill
2d Battalion, 1st Brigade

LTC Stanley A. Maxson
3d Battalion, 1st Brigade

LTC James G. Garvey
5th Recon Squadron, 1st Bde

LTC Robert W. Demont
15th Battalion, 4th Brigade

LTC Wilson Barnes
18th Battalion, 4th Brigade

LTC Raoul H. Alcala
2d Squadron, 1st Cavalry

LTC Julian C. Simerly
1st Battalion, 66th Armor

LTC Richard V. Doty
2d Battalion, 66th Armor

LTC Jimmy B. Sloan
1st Battalion, 67th Armor

LTC Robert G. Laabs
2d Battalion, 67th Armor

LTC Thomas A. Horner
3d Battalion, 67th Armor

LTC Richard Betters
2d Squadron, 6th Cavalry

LTC Dee E. Cuttell
4th Battalion, 37th Armor

LTC William Schweitzer
1st Battalion, School Troops

LTC Arthur T. Carey
2d Battalion, School Troops

LTC Paul E. Funk
5th Battalion, 33d Armor

LTC William Gunter
2d Battalion, 77th Armor

LTC Edward Halbert
1st Squadron, 4th Cavalry

LTC Corless W. Mitchell
1st Battalion, 63d Armor

LTC Charles A. Woodbeck
2d Battalion, 63d Armor

LTC Arthur T. Fintel
4th Battalion, 63d Armor

LTC Herman V. Ivey
2d Battalion, 69th Armor

LTC William W. Crouch
1st Squadron, 3d ACR

LTC Samuel D. Wilder
2d Squadron, 3d ACR

LTC John B. Dahill
3d Squadron, 3d ACR

LTC David G. Moore
4th Battalion, 68th Armor

LTC William L. Stockman
1st Squadron, 10th Cavalry

LTC Felix M. Delumpa
6th Battalion, 32d Armor

LTC William Boice
2d Battalion, 34th Armor

LTC Richard Goldsmith
1st Battalion, 70th Armor

LTC Douglas R. Burgess
1st Battalion, 77th Armor

LTC Eliot V. Parker
4th Battalion, 40th Armor

LTC John R. Archer
1st Squadron, 9th Cavalry

LTC Kimbal Stuhlmuller
1st Battalion, 7th Cavalry

LTC Dyson R. Miller
2d Battalion, 5th Cavalry

LTC George A. Hamilton
2d Battalion, 8th Cavalry

LTC Chandler Robbins
1st Battalion, 8th Cavalry

LTC James H. Sangster
4th Battalion, 1st Brigade

LTC Stanley Bacon, Jr.
8th Battalion, 1st Cavalry

LTC John R. Kane
3d Battalion, 10th Cavalry

LTC Phillip Medenbach
Command/Control Squadron, 11th ACR

LTC James E. Glaze
3d Battalion, 70th Armor

LTC Joseph G. Felber
2d Battalion, 70th Armor

LTC Karl F. Nehammer
19th Battalion, 4th Brigade

LTC Phillip G. Sheaffer
503d Aviation Battalion

LTC John D. Robinson
2d Squadron, 10th Air Cavalry

LTC Donald Fritsche
4th Squadron, 9th Air Cavalry

LTC Arthur S. Dervaes
7th Squadron, 17th Air Cavalry (Attack Helicopter)

LTC John Burden
4th Squadron, 7th Air Cavalry

LTC Hilbert Chole
1st Squadron, 17th Air Cavalry

LTC James Longhofer
2d Squadron, 9th Cavalry

LTC Roger T. MacCleod
5th Battalion, 70th Armor

NEW ERA OF ARMOR LIEUTENANT TRAINING

A new era in Armor training will begin when the Armor Officer Basic Course (AOBC) convenes at Fort Knox on 12 January 1978. Class 3-78 will be the first contingent of newly commissioned Armor officers to undergo the Weapons System Specific Basic Course recommended by the DA Tank Force Management Group (TFMG).

Under the new program, the U.S. Army Armor School will conduct four separate and distinct courses of instruction, each oriented on a specific weapons system: *M-60A1* tank, Armor; *M-60A2* tank, Armor; *M-60A1* tank, Cavalry; *M-551* armored reconnaissance vehicle, Cavalry. Each officer class will be smaller than previous Armor Officer Basic classes—varying from 20 to 60 students, yet longer—15 to 16 weeks in duration. The smaller class size and extended course length will be necessary because of the intense and complex instruction. Platoon leader graduates will be trained to "combat-level proficiency" on a specific weapons system. The next issue of *ARMOR* will carry details of the Armor officer classification system.

SERVICE OBLIGATIONS

Armor Branch receives numerous phone calls and letters from officers who seek information on their eligiblity to resign or request release from active duty. Current policy on service obligations is that soldiers with promotion and/or service obligations can expect to complete such obligations prior to separation/retirement except for fully-defined hardship or compassionate circumstances.

Department of the Army policy has continuously required soldiers to complete periods of obligated service prior to separation. However, during the recent periods of force reduction, a liberal waiver policy was used. The relative stabilization of Army end strength no longer requires this liberal waiver policy. Compassionate or hardship circumstances must be fully defined and documented establishing that the circumstances did not exist when the obligation was incurred and will be clearly assisted by the soldier's release.

CIVILIAN SCHOOLING

The following is an update of the civilian schooling program for Fiscal Year 1978. Selection for full-time graduate study is designed to meet specific Army requirements. Officers must study in disciplines that support OPMS specialties. The disciplines must also be in a shortage status. Normal prerequisites for selection are an oustanding performance record, completion of the Advanced Course, and full qualification in the primary specialty at the company grade level.

Undergraduate degree schooling is available to officers who have attended the Advanced Course, possess records that support promotion and retainability, and are available for reassignment. Priority is given to those who can complete degrees in less than 12 months.

Civil school applications are accepted any time and will remain active in your management file until you are selected or otherwise become ineligible. Get your application in now! Contact Major Bryan or Miss Campbell at AUTOVON 221-7818/7819, or write U.S. Army MILPERCEN, ATTN: DAPC-OPE-P, 200 Stovall Street, Alexandria, Virginia 22332.

FULLY-FUNDED SCHOOLING

Combat Arms Division has 84 openings for captains in the following disciplines for fully-funded advanced civil schooling during Fiscal Year 1978. Selected officers study for up to 18 months and are required to serve a 3-year utilization tour immediately following graduation. If interested, apply under the provisions of AR 621-1, Chapter 4, dated 6 May 1974.

Journalism
Operations Research/ Systems Analysis (Engineering)
Operations Research/ Systems Analysis (Business)
Comptrollership
Automatic Data Processing (Engineering)
Automatic Data Processing (Business)
Electronics Engineering
Nuclear Physics
Social Psychology
Area Studies
Aeronautical Engineering
Guided Missile Engineering
Automotive Engineering
Experimental Psychology
Industrial Psychology

ADPRIP

Combat Arms Division has 95 openings for captains to attend partially-funded graduate school for up to 15 months to obtain a master's degree; the candidate in this Advance Degree Program for ROTC Instructor Duty (ADPRID) must remain at the same institution to serve a 3-year tour as an ROTC instructor. In cases where a university does not have a master's program, the graduate degree will be pursued elsewhere. Officers interested in this program must study in one of the shortage disciplines listed below and should apply under the provisions of AR 621-101, dated 15 March 1974.

Accounting/Auditing
Area Studies
Business, ADPS
Business, Comptrollership
Business, Logistics Management
Business, Management Research
Business, ORSA
Engineering, Chemical
Engineering, Communications
Engineering, Electronics
Engineering, Explosive
Engineering, Guided Missiles
Engineering, Nuclear Effects
Engineering, ORSA

Criminology, Corrections	**Engineering, Petroleum**
Education, Audio-Visual Aids	**Engineering, Textile**
Engineering, ADPS	**Engineering, Physics**
Engineering, Administration	**Food Technology**
Engineering, Aeronautical	**Geodetic Science**
Engineering, Automotive	**Hotel & Restaurant Management**
Engineering, Civil	**Journalism**
Metallurgy	**Psychometrics**
Physics-Optics	**Police Science & Administration**
Physics, Nuclear	**Procurement & Contract Management**
Psychology, Experimental	**Production, Motion Picture**
Psychology, Industrial	**Safety**
Psychology, Social	

DEGREE COMPLETION

The partially-funded Undergraduate Degree Completion Program is the only program whereby an officer can receive full-time civilian schooling to complete an undergraduate degree.

The partially-funded Degree Completion Program will allow an officer (who has completed a portion of his graduate degree requirements through off-duty study) to complete a graduate degree through a period of full-time study. A 3-year utilization assignment is required after schooling in this program.

Considering the demand for these programs, and the limited number of schooling spaces available, OPMD must give priority to those who require the least time to complete the degree requirements.

If you are interested, you should apply under the provisions of AR 621-1, Chapter 8, dated 6 May 1974.

TDY SCHOOLING UPDATE

Motor Officer Course - USAARMS

- The Motor Officer Course is an 8-week course of instruction, designed for first lieutenants and captains, teaching Bn/Sqdn level maintenance management and supervision procedures.
- Current DA policy states that student officers attending a course or courses of instruction at a single installation which exceeds 20 weeks, including the length of time between courses, will be assigned in a PCS status.
- Once the new 15-16 week Weapons System Specific Armor Officer Basic Courses (AOBC) start in January 1978, the current practice of training AOBC graduates as motor officers will be discontinued.
- Company grade Armor officers who meet the prerequisites for the course as stated in DA Pam 351-4 can request attendance in conjunction with PCS orders or through their unit training officer.

Airborne Training

Effective 1 October 1978, airborne training will be available only to those officers on assignment to airborne units, and as voluntary precommissioning training for USMA and ROTC Cadets. As an exception to policy, USMA and ROTC Cadets in classes of 1977, 1978 and 1979, and graduates of OCS classes through FY 78, will continue to be eligible for airborne training after commissioning regardless of anticipated assignment.

Ranger Training

Ranger training will be available only for officers commissioned in the Infantry, Armor, Field Artillery, Air Defense Artillery, Engineer and Signal Corps branches who are eligible for assignment to Category I units, officers scheduled for Ranger assignments, and as voluntary precommissioning training for those ROTC and USMA Cadets eligible for assignment to Category I units upon commissioning. Female officers and female cadets, are, specifically, excluded from Ranger training IAWDA policy which precludes their assignment to combat or close combat support units or duty associated with a direct combat role.

Flight Training - (AR 611-110)

- To be eligible for flight training, officers must have at least a 155 composite score on the FAST-OB test and pass a Class IA physical. ROTC and USMA flight program (participants) require only a class II physical.
- USAR and ANG officers must apply for Voluntary Indefinite (VI) Status. A 3-year aviation service obligation is incurred after completion of flight training.
- Officers must be basic course graduates with a minimum of 12 months troop duty and less than 60 months active federal commissioned service upon entry into flight training.
- An increased number of quotas is anticipated for FY 78. If you are interested, check it out. Combat Arms officers can write MILPERCEN, DAPC-OPE-P-AVN, 200 Stovall St., Alexandria, VA 22332 or call AUTOVON 221-7818/7819 or 7820 for assistance.
- Officers must have a high manner of performance and concurrence of their career branch for selection.

ALTERNATE SPECIALTY DESIGNATION

The alternate specialty designation process for Year Group 1971 started during October. Each officer in this year group should have received a specialty packet in October explaining the procedures and citing appropriate references that should be consulted in reviewing those alternate specialties available for the Armor officer. Enclosed in the packet was a specialty preference form that must be completed, indicating in priority, four specialties in which the officer has an interest. The preference form is to be returned to the Officer Personnel Management Directorate (OPMD), per instructions, not later than January 1978. Based on Army specialty requirements, the officer will be notified of his designated alternate specialty in April 1978.

Failure to provide preferences to specialty monitors in the OPMD, Combat Arms Division (CAD), could seriously influence which alternate specialty an officer receives. Without the information, those doing the designating in CAD will have no idea of what the officer really wants in the alternate specialty field. This is important! If you are in BYG 71

and have not received a packet, notify OPMD immediately. Questions on the procedures, your year group or the specialties may be addressed to Major Richard F. Timmons, 200 Stovall Street, ATTN: DAPC-OPE-P, Alexandria, VA 22332 or call AUTOVON 221-7818/7819.

ARMOR OFFICER ADVANCED COURSE CLASSES

For several years there have been two Armor Officer Advanced Course Classes (AOAC) per year. One normally started in January and another in September. Fiscal year 1978 will see a change in this routine. The forward-looking Armor School, in coordination with TRADOC and Armor Branch, OPMD, has scheduled and plans to continue a new program of four classes per year. For FY 78 the schedule is:

AOAC 1-78	**12 Jan 78 - 18 Jul 78**
AOAC 2-78	**23 Mar 78 - 27 Sep 78**
AOAC 3-78	**7 Jul 78 - 15 Dec 78**
AOAC 4-78	**22 Aug 78 - 15 Mar 79**

These four classes will each be somewhat smaller in size than the previous classes, but there will be an overall net annual increase in numbers of Armor officers able to attend AOAC.

This new schedule is great news for those of you who haven't attended yet and for Armor Branch. The net increase is obviously a real plus for all of us. The two additional classes will give Armor Branch much more flexibility in scheduling you into a class, thus making you available in a more timely and responsible manner to meet Army requirements, as well as to meet your needs and desires. The spread of start dates will distribute graduates much more satisfactorily over the entire year, rather than having the current two "humps" with "long dry spells" in between.

NO OER's PRIOR TO BASIC COURSE

Each year there are a number of newly commissioned Regular Army officers who are ordered to their first unit of assignment prior to attending the Basic Course. This occurs because of the statutory provisions that Regular Army officers are on active duty as of the time they are sworn in as a comissioned officer. There is no provision for these officers to be commissioned "not on active duty" as with the reserve officer who can be held in "inactive reserve" status prior to their active duty dates. Those Regular Army officers who cannot be scheduled for reasonably-immediate Basic Courses or other schooling are therefore ordered to their first duty assignment with a provision that Basic Officer Course attendance will be on a "TDY and return" basis as soon as a class quota is available.

In past years, these officers received Officer Evaluation Reports (OER's) for that period of time prior to the Basic Course if they were there long enough to meet the criteria of AR 623-105, Officer Evaluation Reporting System. This was not a good situation for these Regular Army officers because they were expected to perform duties as platoon leaders, as well as other jobs, without benefit of the valuable training presented in the Basic Course. Some of these officers received OER's that were not on a par with those being received by their Basic Course trained peers.

On 12 August, this inequity was corrected. DA Message 121500Z Aug 77 implemented an interim change to AR 623-105. This change states in part that "a newly commissioned officer programmed for attendance at an officer basic course will not be rated. . .prior to attendance at the Officer Basic Course. . .the period of time prior to the attending the Officer Basic Course will be non-rated time accounted for in the initial academic report."

WANTED

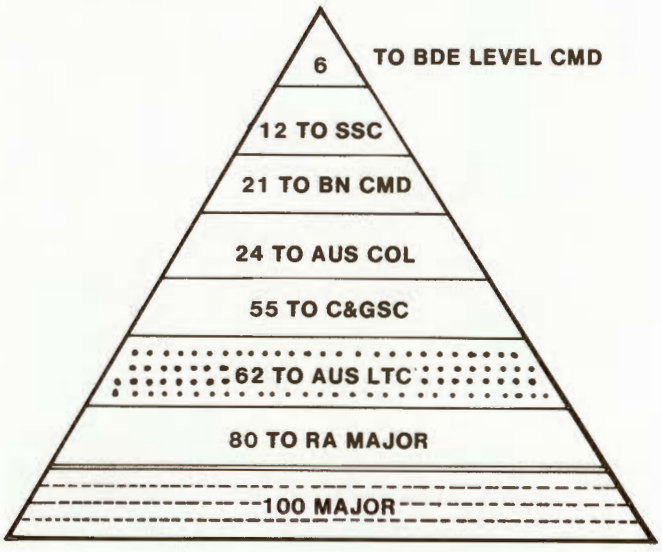
Qualified Armor Officers for Infantry & Field Artillery Officer Advanced Course Attendance

In support of the all-important Combined-Arms Team Concept, we will continue to identify and send Armor officers to both the Infantry (IOAC) and Field Artillery Advanced Courses (FAOAC). Armor Branch continuously makes a concerted effort to identify highly-qualified officers for attendance at one of these two schools. In turn, the Armor School can expect to continue training Infantry and Field Artillery officers in AOAC. If you have commanded a tank company or cavalry troop, have a strong manner of performance, a DEROS that matches up with a class start date and a desire to attend either the Infantry or Field Artillery School, call or write Armor Branch. You are needed to represent the Combat Arm of Decision among your contemporaries in the Advanced Courses of the King or Queen of Battle.

Class	Start Date
IOAC 2-78	**8 Jan 78**
3-78	**30 Apr 78**
4-78	**11 Jun 78**
5-78	**20 Aug 78**
FAOAC 1-78	**19 Mar 78**
2-78	**11 Oct 78**

PROGRESSION PYRAMID

The pyramid shown below is a model based on current selection rates. Although only a statistical generalization, it



demonstrates some significant comparative selection rates, e.g.,

RA MAJ vs C&GSC vs AUS LTC
BN CMD vs C&GSC vs AUS LTC

The 100 base majors represent a cross-section of all branches whereas the battalion command selection rate is narrowed to those branches containing command billets. Each level of the pyramid is independent of the level below, i.e., of the 100 majors you start with, 21 will be battalion commanders, 12 of the 100 will go to SSC, etc. Do *not* read, of the 100 majors, 21 will command battalions and of that 21 battalion commanders 12 will go to SSC, etc.

EPMD

ARMOR CAREER MANAGEMENT INDIVIDUAL FILES

Your career branch maintains a Career Management Individual File (CMIF) at MILPERCEN for each individual in pay grades E6 through E9. Noncommissioned officers are encouraged to check with their military personnel office (MILPO) to insure that documents required in accordance with paragraph 1-9, AR 614-200, are forwarded to Infantry/Armor Branch, Enlisted Personnel Management Directorate for grades E6 through E8, and to CSM/SGM office for grade E9.

This reminder especially applies to soldiers being promoted from E5 to E6.

ASSIGNMENT INSTRUCTIONS

Each day many hopeful soldiers visit MILPERCEN to have their assignment instructions changed. Most of them are enroute to their new duty stations, and most leave disappointed and continue to their original destinations.

"I own a home there," "My wife has a job there," "The Army owes me this assignment." These and many similar reasons for requesting a diversion are advanced. Important as they may seem to the soldier, such grounds cannot justify a change of assignment.

The soldier's preferences, his career development, and the needs of the services are considered before an assignment is made. Diversions are strictly controlled by AR 614-200; and once assignment instructions are issued, diversions are rarely made; however, the Infantry/Armor Branch Chief will consider diversions on a case-by-case basis and approve or disapprove requests based on the assignment priority and needs of the Army. In a few cases of a compassionate nature involving severe illness or extreme hardship, which can be resolved in a reasonable time (usually one year), a diversion may be allowed after consideration by the Compassionate Review Board.

There are good reasons for this strict control. A soldier's diversion from one assignment to another causes the original requisition to go unfilled for several months because of the built-in lead time in the assignment system. If your unit is already critically short of personnel, you can readily see the problem this would present. You, or someone like you, would have to continue to do the job of two people.

Assignments are made as far in advance as possible and instructions are sent to the field in sufficient time to insure that the soldier has approximately 90-120 days lead time to prepare himself and his family for the move.

The soldier can save time and money by visiting his personnel officer to determine whether his circumstances qualify him for a consideration for a change of assignment instructions for compassionate reasons. Then, if he does qualify, the proper paperwork must be initiated at the unit level far enough in advance to insure completion of necessary action before his scheduled departure date.

Once the soldier is enroute to his new duty station, only an unforeseen emergency of a compassionate nature can effect a change of assignment.

Soldiers at all levels should understand that an oral request, either by telephone or in person, cannot be acted upon. Complete documentation of the circumstances is necessary before any decision can be made.

Your local MILPO is in daily contact with DA MILPERCEN and therefore is in the best position to advise you. You can get the quickest results by making your MILPO your first stop.

DMOS EQUALS PMOS

In many cases throughout the Army, a soldier's Primary Military Occupational Specialty (PMOS) does not correspond with his duty MOS. Although each soldier does not assign himself to any given assignment or job, he should make an effort to work in his PMOS. Very few soldiers have shown that they can maintain a high state of proficiency in their PMOS while working in another MOS.

When being considered for promotion by DA Selection Boards, this could be a deciding factor. (For example: A soldier in the grade of E6, PMOS 11E, is working as a Unit Supply Sergeant, 76Y and doing an outstanding job, as reflected by his Senior Enlisted Evaluation Report (SEER). When he is considered by the DA Selection Board for promotion to grade E7 as an 11E Platoon Sergeant, he is competing with other E6 11E's with outstanding SEER's, but who are working as 11E. When the board screens his record, they will see he is an outstanding Supply Sergeant, but they will have to speculate as to his ability to be an 11E Platoon Sergeant. This does not prevent him for being recommended for promotion, but it does lessen his chances.)

Each soldier should make an effort to express his desire to work in his PMOS when selected by his superiors to work in another MOS, as it is his career. It should also be considered by each soldier, as to the effect working in another MOS will have on his PMOSE/SQT score. Again, only a small number of soldiers can maintain a high degree of proficiency in their PMOS job skills without actually working in them from day to day. These skills also change from time to time and unless constantly monitored and practiced, a competitive degree of proficiency will be hard to maintain.

These factors should be considered by commanders when considering a soldier to work out of his PMOS, but it should also be the soldier's responsibility to bring it to his commander's attention. ▲

ATTACK HELICOPTER GUNNERY

by Major Joseph Laehu and
Chief Warrant Officer 3 Albert R. Trevino

The following is an overview of an attack helicoper gunnery program which was planned and conducted under Training Circular (TC) 17-17. Hopefully, it provides some insights into methods that will be helpful in developing other attack helicopter gunnery programs, and provides a basis for professional discussion on better ways for all attack helicopter units to accomplish their training and tactical missions.

The 7th Squadron (Attack Helicopter), 17th Cavalry, 6th Cavalry Brigade (Air Combat), III Corps at Fort Hood presently conducts one of the most realistic gunnery training programs in the U.S. Army Aviation Program. In order for the U.S. Army to win the first battle in the next war, all units will have to be at the maximum level of training. The mission of an attack unit such as ours is to destroy enemy armor by aerial combat power. Thus, to successfully accomplish this mission, our training must be of the "highest" caliber.

TC 17-17 governs a continuing gunnery program conducted by the 7-17th at Fort Hood which uses a quarterly gunnery system that progresses from individual qualification, through crew and team coordination firing, to the troop level. In addition to preparing for the gunnery-skills test, a tactical scenario is injected and the entire gunnery program is combined into a field training exercise utilizing all assets of the troop.

Prior to physically occupying the gunnery range, detailed planning and support is provided by the squadron. The squadron S-3 and S-4 are responsible for securing the range, and for providing medical and communications support. They also review and insure that the appropriate ammunition is requested and onhand for the gunnery exercise. By accomplishing the various supply and administrative details, the squadron relieves the attack troop from this extra responsibility, thereby permitting them to use all available time for training.

Before any troop planning is initiated a letter of instruction is issued by the squadron. This letter outlines instructions and responsibilities. The attack troop in turn analyzes and develops its own plan, and provides the platoon leaders with guidance for specific training and responsibilities.

The first phase in the training progression is a pregunnery training program that is followed by an aerial gunnery skills test (AGST). This pregunnery training is accomplished in approximately 10 days, and covers the following subjects in both the classroom and during practical exercises:

- **Flight proficiency.** All pilots who participate in the gunnery exercise establish currency and proficiency in their respective aircraft, including a minimum of 1 hour of night tactical operations.
- **Map Reading and Navigation:**

Map Reconnaissance. Routes into and out of operational areas are established.

Terrain Analysis. This analysis determines attack and firing positions.

Terrain Utilization. All available masking terrain is utilized to move from one area to another.

NOE Navigation. This skill has to be continually practiced. This technique is applied to get into the battle area without being exposed. The authors feel that terrain familiarity breeds complacency and that when an untrained crew is thrust into unfamiliar terrain, disorientation will soon follow.

- **Armament Training:**

Armament controls. All pilots attend classes on *switchology* and technical terms followed by a hands-on training period.

Pre-Flight inspection of armament subsystems. The platoon instructor-pilots teach platoon crews to load various types of weaponry used in aerial gunnery training.

Turret loading classes. Utilizing dummy ammunition, the crews load and unload the turret under the supervision of the platoon instructor-pilot.

Trouble shooting of armament systems. Immediate action drills and problem areas are discussed by the instructor pilots and practical exercises are conducted.

- **Ammunition Training:**

Identification and inspection of ammunition. All types of ammunition are covered in class and the color-code system is explained.

Care and handling. Transportation and handling methods are discussed, with safeguards being clearly defined.

Selection of ammunition. The characteristics of Threat vehicles are discussed and selection of the appropriate ammunition to be used against them is explained.

Target effect of ammunition. Various types of target arrays, as well as the desired type of ammunition selected, are discussed.

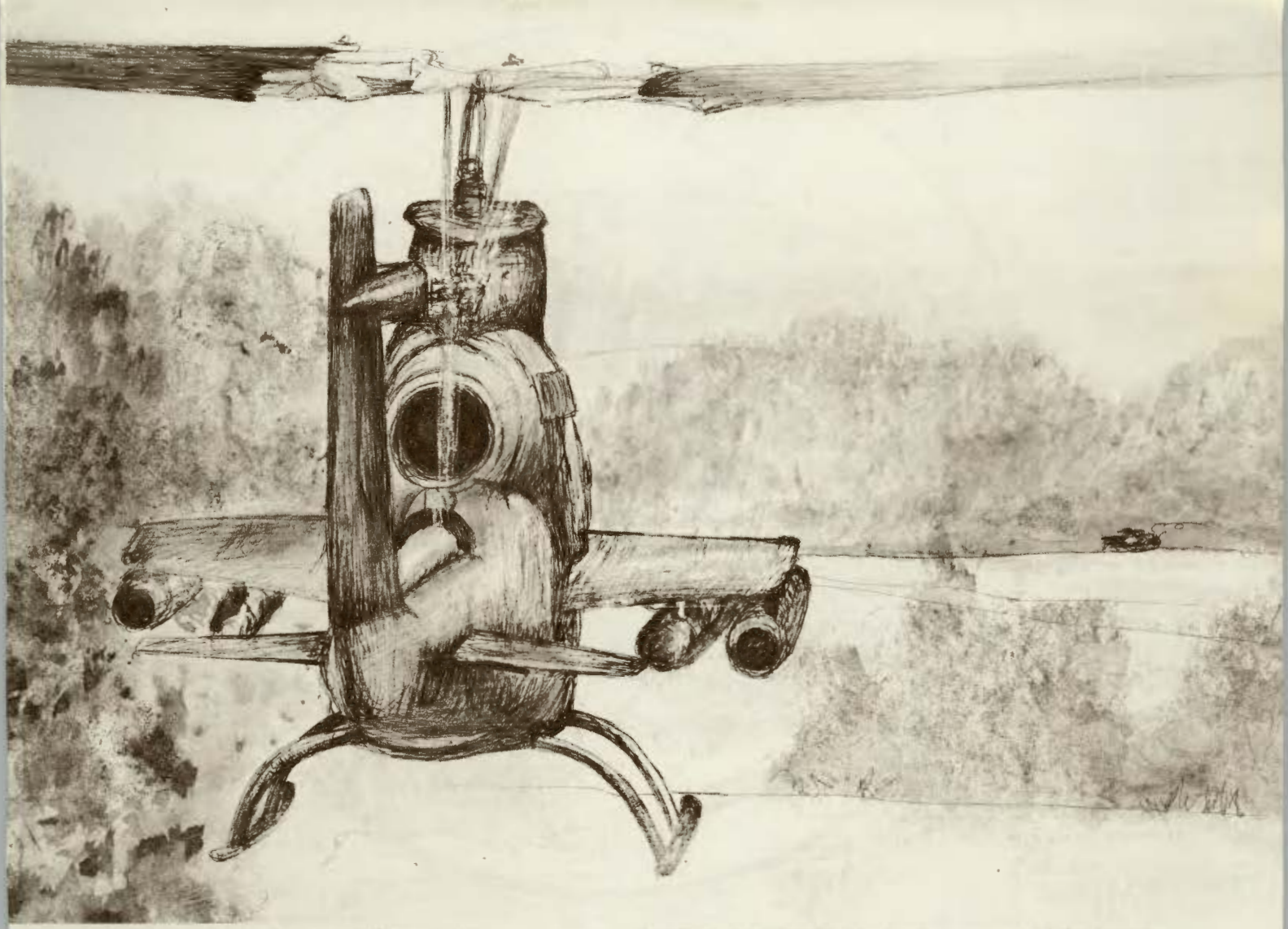
- **Crew Duties:**

Principles of aerial gunnery. The instruction for this period covers all the basic principles of aerial gunnery. All techniques which may be pertinent to the gunnery exercise also are considered.

Target hand-off procedures. This is one of the most important procedures in the 7-17th and the primary method used is hand-and-arm signals. Alternate means include written instructions from the "Battle Captain" which can be read through the 13X-scope in the target sight unit (TSU) and the multiplicity of radios (FM, UHF, VHF) which are available. However, radio communications are kept to a minimum. It has been found that by using these techniques, the electronic warfare (EW) threat can be effectively eliminated or overcome.

Team and section employment. The attack team is the principle means of engaging enemy armor during the gunnery exercise.

Trouble shooting of armament systems. Immediate action drills and problem areas are discussed by the instructor pilots



and are supplemented by practical exercises.

- **Target Acquisition and Indentification Training:**

Observation techniques. Scout aircraft lead the attack teams into the firing positions; then, using "hand-off" procedures, they remain to observe attack aircraft techniques and each attack crew is graded on its performance.

Target identification—Threat Capabilities and Limitations. This is a continuing educational process for the 7-17th. Threat weapons identification is taught through the use of slides and training is conducted on virtually a daily basis. During the gunnery exercise, stand-off distances are utilized for all target engagements.

- **Mission Planning:**

Operations and intelligence briefings. The tactical enemy situation is furnished by the squadron S-2 and update briefings are conducted daily.

Planning and conducting a mission. Various load configurations, weather factors, and a detailed explanation of expected objectives are some of the primary considerations of this phase of the program.

- **Range Operation and Safety Training:**

Range safety. A layout of the aerial gunnery range is essential. Location and terrain features; range markings such as start and cease fire lines, azimuth restrictions, test-fire pads, and hover fire points (night lighting as applicable); and range limitations must be clearly understood.

Targets. Targets are arrayed in the formations employed by the Soviets and the cruciality of various types of targets is discussed. Additionally, the exact placement of the targets on the range is determined so that effective, timely fires from the rest of the combined-arms team (tactical air, artillery, and ground fires) can be placed on the targets.

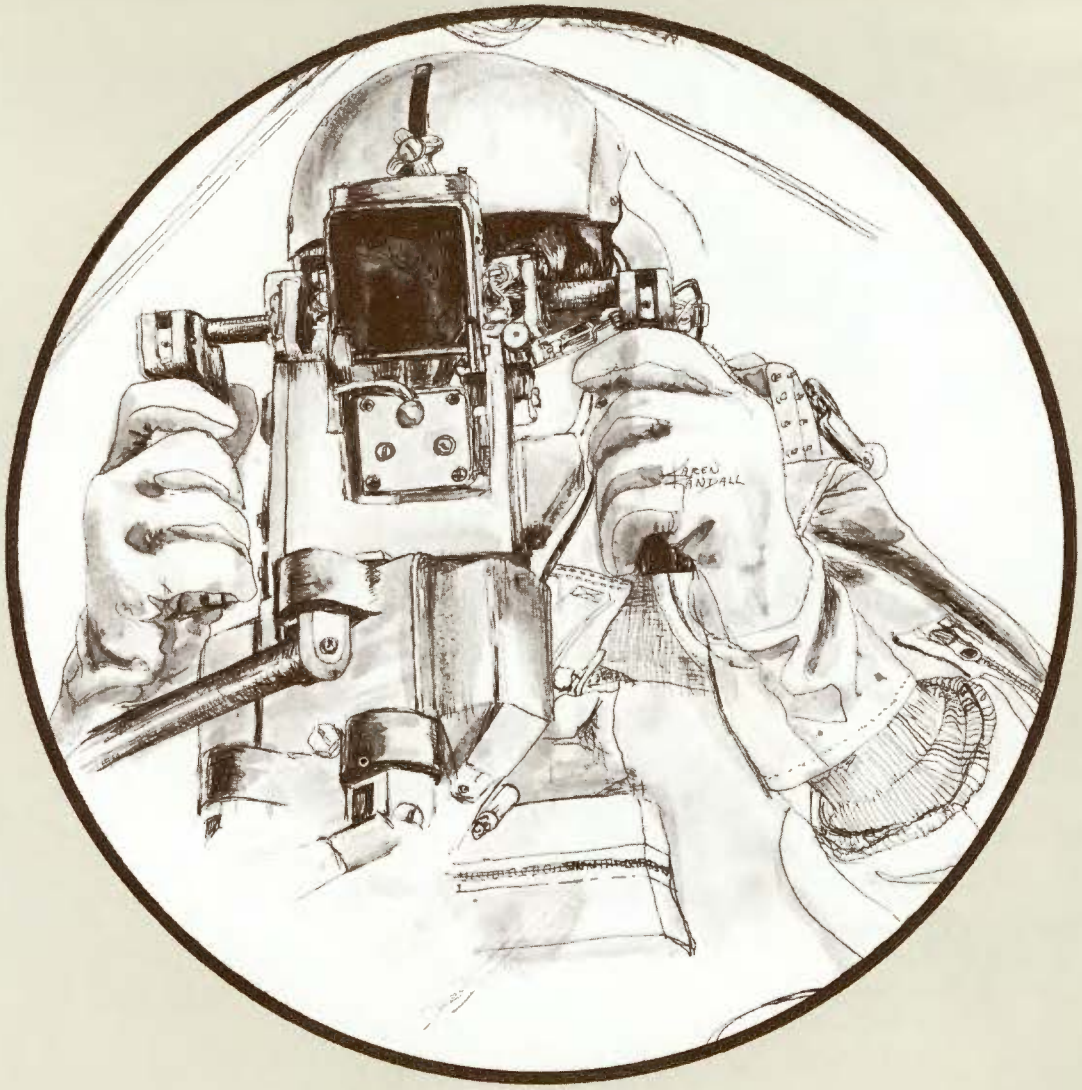
Facilities. This area of the program covers control tower frequencies and location; and helicopter rearming, refueling and parking areas. Ammunition and vehicle parking are also pointed out to prevent overflight.

Traffic pattern. The safety control plan, including the firing course, firing traffic, traffic patterns, adjacent ranges, hazards, orbit and standby areas, and other areas to be avoided are clearly defined and thoroughly discussed with all pilots.

Safety briefing. The safety portion of the training also outlines areas of responsibility for ground safety, the pre-accident plan, crash rescue and malfunctions (for example, pedal control on 2.75-in. FFAR, fire, runaway guns, and dud ammunition).

Upon completion of the pregunnery training program, all pilots are required to successfully complete the aerial gunnery skill test (AGST). The test consists of two parts: a written test and a practical exercise utilizing the station-training method and each part is assessed a value of 50 percent.

Concurrent with the pre-gunnery training, the operations officer (with input from the platoon leaders) determines which personnel will fire the appropriate firing tables. The day before the move to the range, a detailed briefing is conducted by the unit operations officer, including intelligence,



tactical considerations, route of flight, tactical road march route, and conduct of the gunnery program.

During pre-gunnery training, all areas of the troop (maintenance, supply, armament, POL, motor pool, and communications) are engaged in preparation for the gunnery exercise.

Day "One" of gunnery begins with the issue of protective masks and individual weapons. Flight crews are briefed again on the current weather and any last-minute changes. The ground element departs in a tactical road march and attack platoons infiltrate into the operational area.

Upon closing the gunnery range complex, only the aircraft designated to fire are placed on the firing line. All other aircraft and vehicles are dispersed throughout the area and camouflaged. The unit operations section, with the tactical operations center (TOC) in operation, begins the exercise within 1 hour of arrival if safety considerations permit. The ability to be operational so quickly is largely the result of coordination, preparation, and staff support from the squadron. All the mission-essential elements are on hand prior to the attack troop arriving on the range.

The range is set up by the squadron staff; the troop is responsible for their own forward area rearm/refuel point (FARRP) and normally it is operational the day before range occupation. All weapons and ammunition are on hand, and ready for installation and loading upon arrival at the range.

The tactical play requires each platoon to properly disperse and establish communication with the TOC. During this phase of the problem, platoons are placed on alert status. The alert condition levels are as follows:

- Condition I: Aircraft are at flight idle, radios are operational, and camouflage is removed.
- Condition II: Aircraft can depart within 5 minutes; pilots are in the aircraft and the pre-flight checklist is complete up to "Battery on." The flight lead monitors, a *PRC 77* radio or telephone are operational, and camouflage is used only to break up the aircraft's outline. At night, all camouflage is removed.
- Condition III: Aircraft can leave within 30 minutes; pilots are in a briefing or in close proximity to the aircraft; checklists are complete up to "Battery on," and the flight leader or representative monitors a *PRC 77* radio or telephone. The aircraft are completely camouflaged except at night when all camouflage is removed.
- Condition IV: This is the routine condition; aircraft can leave within 60 minutes and are camouflaged to the maximum extent possible.

The first personnel to fire are those crew members who will receive individual and annual qualification. Gunnery Table I is utilized and these personnel are required to fly with an instructor pilot, who will qualify them to fly in the crew/section firing.

After the individual and annual qualifications are finished, the crew and section coordination exercises start.

Tables VII-A and XI-B respectively are utilized. The purpose of crew-coordination exercises, utilizing Tables VIII-A of TC 17-17, is to familiarize crews with the employment of turret weaponry and wing stores (except TOW) during daylight hours.

The conduct of firing is accomplished in the following sequence:

- Mission briefing
- Preflight
- Loading of the armament systems
- Operational checklists
- Test fire weapons
- Targets emplaced briefing: light armor vehicle silhouettes for the turret firing and armor targets are arrayed in a typical Soviet attack formation.

The section coordination firing is conducted in the same sequence of events as the crew coordination. The targets for this exercise are also light armor vehicle silhouettes for turret firing or targets for TOW simulation. Targets for 2.75-in. FFAR suppressive fires are arrayed to portray the tactical situation and are grouped in Soviet attack formations.

The actual firing of an attack section starts with the entire section receiving a briefing on the tactical situation, and at this point coordination with the scout is initiated. The scout briefs the attack section on routes to be used for moving into the attack positions.

All attack aircraft are on the ready line and loaded when the scout lead requests permission to go down range. When permission is granted, the scout lead calls the attack team leader and they proceed down range. The attack section flies into the preplanned attack position and waits for further instructions from the scouts.

Once in the firing position, the attack section leader gives the attack command or fires on a prearranged signal. If no TOW missiles are to be fired, one or two of the attack section aircraft will provide suppressive 2.75-in. FFAR fires while one attack aircraft simulates firing a TOW missile. The scout aircraft, once they complete the scouting phase, revert to a safety/grading role and insure that no unsafe conditions are permitted. The firers are graded as to their NOE flight, firing techniques, target coverage, target hits, communication, and all other principles of engagement.

Enroute to another firing position in the NOE flight mode, the scout will report "receiving fire from your two o'clock position" to one of the attack aircraft. The gunner engages silhouette targets at an approximate range of 1,000 meters. Also at another point, a scout will announce "gas!" The pilot of the attack aircraft will have to don his protective mask in less than 10 seconds. He accomplishes this by having his gunner take control of the aircraft. The pilot will then take control of the aircraft and the gunner dons his mask. The pilot and gunner then fire a suppressive fire mission and remain masked until the scout informs them that the aircraft is clear of the contaminated area.

This sequence is repeated for all three attack aircraft as they move to alternate firing positions. Strict control is a must in this situation and the scout aircraft must perform this important function.

Upon completion of the firing table, the aircraft arrive at the ceasefire line where all switches and circuit breakers of the armament systems are checked and placed in the "off" position. After landing at the firing line, all weapons systems are cleared and visually checked to insure that there is no ammunition in them. The aircraft are then refueled at the unit forward area refueling/rearm point and maintain a readiness condition for the next firing event.

The integration of scout aircraft, field maintenance, and the tactical scenario provide a realistic training situation. Using this format, the unit has progressed from 2.75-in. FFAR rocket firing to the firing of the TOW missile in the new *AH-1S*. Night firing is accomplished in the same manner with some modifications due to safety requirements.

In the previously mentioned training sequence, the 7-17th Cavalry completed fourth quarter gunnery, during which each troop was allocated 15 TOW missiles to be fired at ranges of up to 3,000 meters. Daylight targets were *T-62* silhouettes which were moving at approximately 12 kilometers per hour. Compared with 100 percent hits with the previously immobile targets, only 85 percent hits were achieved with the moving targets. It is anticipated that these percentage figures will improve with future training.

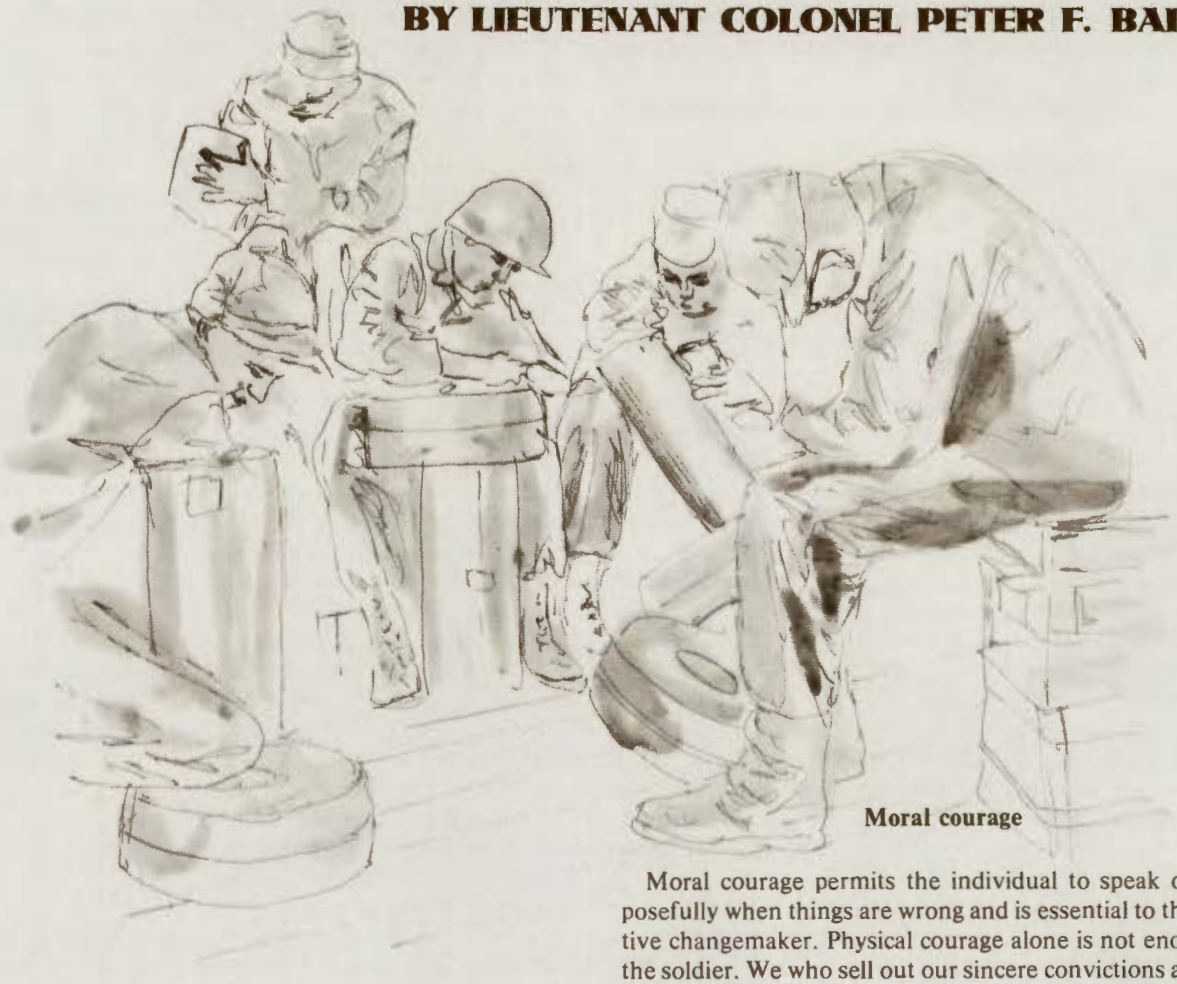
That's how one Cav unit conducts aerial gunnery. If you've got a better way to do it, share your ideas with all of us in the combined-arms team through *ARMOR*.

MAJOR JOSEPH LAEHU was commissioned in Armor in 1966. After completion of flight school his assignments were: 2-17th Cav, 101st Airborne, Fort Campbell, KY; 7-17th Air Cav, Vietnam; 8-1st Air Cav, Fort Knox, KY; 1st Bde, 1st Armored Div, Germany; and 7-17th Atk Hel Sqd, 6th Air Cav Cbt Bde, Fort Hood, TX, where he is currently serving as commander of Trp A. Major Laehu holds a BS in Business Administration from the University of Tampa and is a graduate of the Armor Officer Advance Course.

CW3 ALBERT R. TREVINO was appointed a Warrant Officer 26 September 1967. Upon completion of Warrant Officer Rotary Wing Course his assignments were: D Trp, 2-1st Cav; 55th Avn Bn; D Trp, 2-1st Cav, 173rd Abn Bde; Dept of Tng, Warrant Officer Development; 238 Aerial Wpns Co, 268th CAB; 17th Cbt Avn Grp; and A Trp, 7-17th Cav, where he has been assigned since 1972. CW3 Trevino has attended the Warrant Officer Advance Course, and Bootstrap for completion of his civilian schooling.

IMPROVING THE ARMY

BY LIEUTENANT COLONEL PETER F. BAHNSEN



Moral courage

Reluctance to attack obvious errors and inequities in the Army is a mental and moral failure that seems endemic—from private to general officer. We are prone to blame this reluctance and failure on the hardheadedness of higher ups or societal limitations. Our failures, however, stem from more basic causes!

- We lack a belief that individuals can do something to change the Army for the better (even our general officers suffer from this thought).
- We lack knowledge of methodical procedures and tactics.
- We lack moral courage.
- We lack tenacity.

These inhibitors to change can be corrected. The basic purpose of this article is to review methods and tactics by which you can change the Army. Belief will come after you have exerted yourself a few times and have found that you really can affect and improve the Army. Change does not equate with improvement, but change is, however, preliminary to improvement. In my experience, the more competition there is in changes/improvements the more likely the result will be improvement, not mindless change. This article does *not* enshrine *change*. It encourages attainment of improved individual ability in the techniques of effecting change so that belief in the possibility of Army change and improvement can be maintained and even expanded.

Moral courage permits the individual to speak out purposefully when things are wrong and is essential to the effective changemaker. Physical courage alone is not enough for the soldier. We who sell out our sincere convictions and concerns for temporary peace by self-deluding promises of saving ourselves for bigger, more significant fights will find that our stomach for confrontations has not improved by abstinence. The moral courage which could have been strengthened in small skirmishes becomes weaker than before. Moral courage does not mean, however, that we must fight every inequity that catches our eye, for to do so is impossible. We should, however, be willing to select and engage one problem at a time.

Tenacity is a tactic as well as a character requirement

Tenacity is a fundamental requirement for effective changemakers. The tenacious person, convinced of his cause and the need for improvement, has an advantage in our Army and society which are accustomed to immediate gratification. The change /"improvement" resister stands, in our society, on a sandbank which tenacity can easily undermine. The tenacious changemaker carries the popular torch of "inexorable progress" and is supported as well by the multiplication factor of a mobile military society. This mobility insures that he will eventually outlast most, if not all, of his potential opponents, and at some time be the resident expert. Positive tenacious action is a powerful force and a tool for the effective changemaker. Tenacity at the national level where change must come through Congress, the Joint

Staff, or the Department of Defense, most of whom have more longevity, must be based on fundamental planning, tenaciously followed.

Select your problem areas carefully

Many young leaders look about and see enormous Army problems combined with the inanities of their current local situation. Impelled by idealism or the heroics of youth, they sometimes follow one of two errant paths. They lower their heads and charge, ill prepared and ill supported by facts, at large Army problems beyond their scope; or they strike out and attack all the stupidities in sight, large and small. Due to superior force, they fail in their grand attack and become discouraged and resign, blaming "the Army" for a total lack of flexibility. Unfortunately, little do they realize that they, not the Army, were at fault. Even more unfortunate, many of these officer failures do not resign, but remain with us and remain convinced that individual effort will be futile until they reach some magic level where they will have the *power* to set things right. Years later, they eventually and disgustedly depart, never having realized that the level for effective change depends on the character of the person, not the position. To change any bureaucracy or problem, **selectivity** is the first order. Look for those things you *can* change and bigger opportunities will rapidly come your way.

A simple rule will serve to narrow the field for you. Select those things about which you can reasonably expect to become more knowledgeable than the others who will be asked to respond to the problem you present. While desirable, you need not become an absolute expert. Never mind those who *could* address the problem. It is not a question of *can* your "opponents" bring up bigger guns but, *will* they? This approach will initially narrow your problems to a more modest range. Confidence and knowledge gained from small successes, combined with your long-term interest in specific areas, will make future selectivity easier and will result in opportunities to solve even larger problems. Intelligent, resourceful leaders are forever on the lookout for young men who know how to select and effectively attack small problems. They soon give them larger problems.

Correctly identify the problem

This is not the easiest task. We frequently perceive things which are wrong, but are unable to correctly identify exactly what and why. At the start of your campaign, try to get the problem down on paper as a statement in as succinct a form as possible. As your knowledge and expertise in the area grow during your investigation, keep reviewing your original statement. You may need to redefine your concept so as to limit your attack to a manageable area. With increased knowledge, you may find your problem definition completely changed. The effective changemaker is dedicated and prepared for constant reworking and rethinking of his original problem estimate.

Identify all the potential actors and their interest

An obvious first choice is the chain of command, and for many actions the wrong one, at least for the initial effort. The fundamental questions are; will your problem/solution:

- Solve a problem the commander can or will perceive as affecting his command?
- Present a program or change that will reflect well on him and his command?
- Demonstrate a problem and a required solution that cannot be denied?

Even meeting these criteria, consider that in starting here, if you lose, you lose all. Many myopic, would-be changemakers never consider that many problems do not deserve chain of command attention and alternately, more appropriate avenues to change can and should be considered.

Responsible staff as changemakers

Good staff officers, at all levels, are always looking for good ideas in the problem areas directly related to them. If the problem is not of immediate command interest to intervening commanders, there are numerous regulations and ethically valid ways to float your idea up to the staff level capable of solving the problem you have identified.

In your approach to the staff, insure that your facts are correct, then try to provide a completed study or proposal to the staff officer that will make *him* look good. If you can do that your battle is three-quarters won. Many of us, interested more in ego than in improving the Army, dislike this approach to change. Consider your goal, and in helping to row your friendly staff officer across the river, you will find yourself on the other side as well.

Select your staff action officer well. There are numerous facets to every problem and you can frequently find a way to shift the action into an area in which he can reasonably work. By all means, avoid the staff "dud" who may never get the commander's ear and, even if he did, his credibility rating will be low. The more influential staff members are frequently change-orientated and acknowledged by their fellow staffers who go to them for advice or to receive concurrences on their staff papers. This type of person frequently can and will work on papers outside his primary area, particularly if you will do the ground work.

Special staff

The Inspector General (IG), the Staff Judge Advocate (SJA), and many other special staff members may be able to influence or rectify the problem. If nothing else, they may

give their blessings. In the Pentagon, the smart action officer with a difficult action, lines up all the easy "Chops" from the special staff or others with peripheral interest. In some senses it's like voting; few people want to go against the multitude and the harder "Chops" find the previous votes persuasive. You can use the same techniques.

The press

Never forget professional journals, or the military, special, local, or national press. A well-directed or analytical article may do the trick, or letters to the editor may be worth a try. Careful consideration of "in-house" remedies should be considered before you turn to the local or the national press.

Congress as changemakers

No discussion of change and improvement in the Army would be complete without consideration of this powerful source to which all of us have direct access. This route to change serves as the "court of last resort" for the personal affairs of soldiers who feel that the chain of command has not been responsive. It also serves for generals who feel that the Executive Branch is seriously in error on a matter of principle. In recent years, appeals to Congress on matters of principle seem to be reserved until after retirement. If you are truly interested in improving the Army, you should not completely discount this avenue. While Army leadership is not likely to encourage you to "write your congressman" on any issue, no one will frown on a letter supporting a general issue that affects the Army. Your well expressed and supported ideas on pay, morale and other similar items can have a tremendous, positive impact. Just like our "getting out and talking to the troops," congressmen depend on letters and telegrams from constituents for their "feel" of the situation. While you are sitting there mentally berating Army leadership, for failure to protest loss of your benefits and rights, consider that you, as an individual, have the potential for more impact in this area than the "higher-ups." The Chief of Staff can make an impersonal presentation. Your letter brings it to the personal level that a congressman, with feelings just like you and I, feels he can trust.

Before you use the "court of last resort" approach to Congress, consider two questions that will bear on interpretation of your good faith. Have you exhausted your Army remedies? Have you collected and presented the best facts available? If you can say "yes" to these questions, then *DRIVE ON!* Let the devil take the hindmost!

Give people a package they can run with

When you present your recommendation, provide a completed staff action. If your "package" is so complete that all the person responsible has to do is sign it, your chance for success is that much greater. It's on this point that most would-be changemakers fail. They think a suggestion is sufficient. A suggestion that requires much work to assemble for presentation at another higher level normally dies a natural dealth. Give the responsible person a package *READY TO GO* and he'll find it difficult to refuse.

Recon and be prepared to fall-back

In presenting your recommendation, plan your "attack," but also have a fall-back position prepared. Some people are gamblers and make an "all or nothing" approach to the heart of the matter without considering all issues. For example, they hit the commander with a recommended change. "It's obviously good—let him institute it." The difficulty with this approach is, if the recommendation is rejected, the case is closed. A good fall-back position will allow you to either hold some of the ground or to marshall more facts for an attack from a different direction. In reconning you might, for example, ask your commander what he thinks about a situation which you think needs changing, without indicating your thoughts. You can then construct your argument so as to consider your commander's concerns.

The big change motivator

Throughout your efforts, recognize that money talks in the military just as well as in other places. Consider what any change will cost in people and time and reduce it to dollars so as to show a savings. If you can "boil it down" to dollar savings, you'll have a winner, because MONEY TALKS VERY LOUDLY IN PEACETIME.

Avoid a direct attack on "sacred cows"

Direct attacks on current, established policies will bring defenders and special interest parties from all quarters, that

perhaps you may or may not want. Are you really interested in going head on with the Commanding General (CG) and his G-3 on his "Grand athletes plan?" Sometimes the right enemy is worth a hundred friends and vice versa. Good timing can make even "sacred cows" vulnerable. The energy crisis, for example, permitted a radical change in a local 0630 PT program that many soldiers hated. Timing made attack on this "sacred cow" possible.

Substitution instead of direct attack

Substitution or modification of current policy won't hurt anybody's feelings. Aside from that, it often reflects well upon the old policy. This method can effect change in a commander's favorite program. You might for instance, align a commander's favorite command inspection with another mandatory alert and save half the time. The change effected may actually be a radical reversal if done properly.

Use of Allies and Psychological Warfare

For those problems which attract your attention, but for which you lack time, these tactics warrant a try.

Examples: Plant an idea in someone else's mind. Let him do the work and get the glory. Find people with a particular special interest. Beat the drum to get them excited, but let them carry the ball. It's a weak reed, but worth the effort of a persuasive person.

Attacking the Flanks

The main attack, with ideas/solutions, is the direct personal approach to the next higher commander. The main attack involves both the ego and the problem/solution. Sometimes it's the only way to go. More frequently, however, a flank attack which divorces ego from the problem/solution is the more effective tactic. Can you show someone the way by artfull question? Could the person responsible for the problem get your idea and the credit? After you develop your tactics and methods, ask yourself one last question, "Do I want ego gratification or change?" The answer will determine your course. Keep in mind that, in our Army society, people will eventually know the real mover. The word gets out. Can your ego wait?

The creative assault, as well as the combat assault, must be correctly timed. There is the short-term timing that must take into consideration the daily system of the person to whom the ideas must be sold. Then, there is the longer term approval. You may be pushing solutions directly opposed to the direction of policies against the guy who must say "yes," at the wrong time in his personal cycle. When is he most receptive? When is his mind closed? Has an unfortunate incident occured that would argue for a delay in your presentation? Don't waste hard weeks of effort by poor timing. The best ideas in the world can't be sold to minds temporarily closed.

Let your subordinates practice carrying the ball

As a leader, one of your fundamental responsibilities in improving the Army is the creation of a climate that encourages subordinates to select and solve Army problems. Unfortunately, as leaders, our mission orientation and ego problems discourage subordinates from attacking problems that must affect their morale. We are not particularly receptive or impressed when subordinates become incensed enough to take on some part of the bureaucracy not directly associated with our unit mission. If we are truly interested in improving the Army, we will encourage them to properly select and follow through on problems that actually affect us all. These efforts at problem-solving help the Army, as well as give confidence to the individual in methods of improving the Army. When we discourage these attempts, we let our selfish motivation, frequently hidden in terms of mission orientation, hurt the individual as well as the Army. We thereby create a climate of despair.

If you are truly serious in your endeavors to improve the Army, you will encourage your subordinates to constantly be in preparation for attack/solutions on Army problems that seriously affect and aggravate them. Such problems might range from unit to DA, and from mission to morale items. Your encouragement should include awards, as well as comments about initiative on their efficiency reports. While their efforts will not all be successful, the efforts that are successful will move us all forward. At the very least, your program should engender the important idea that *we* as individuals are all responsible for improving the Army. With luck, we will recognize that the block to Army improvement stems from the situation so well stated by Pogo, "We have met the enemy and they is us." The "they" out there who have bungled the Army so badly are people just like us, who don't know how to induce change, who lack moral courage, who lack tenacity, or who don't believe they can effect change. You, the leader, can play your part in creating conditions that lead to improving the Army.

The most important tactic

Good bosses want effective change and improvement. Poor ones are afraid of it. The Army is an internally mobile society. Find good bosses and work for them. In walking away from the poor leaders, you help to clean the system. Good NCO's and officers search out and work for good bosses every day. They also find it easy to make improvements in the Army. Try it! It works!

LTC PETER F. BAHNSEN was commissioned in Infantry upon graduation from the U.S. Military Academy in 1958. He is also a graduate of the Command and General Staff College and the American University. In 1974 to 1976, he was an action officer on the Joint Security Assistance Plans and has been selected to participate in the Army Strategist Program. Colonel Bahnsen currently commands the 1st Psychological Operations Battalion, Fort Bragg, NC.

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 56)

Photo contributed by: SSG BARRY M. GRAVES

Photo Contributed by: SSG BARRY M. GRAVES

Photo Contributed by: SSG BARRY M. GRAVES

FM Communications In The Defense

The engagement and destruction of attacking enemy armor and its support echelons has a single imperative. The defenders must mass firepower at the point of the enemy's main thrust.

Maneuver battalions drawn from every major element within the corps will conduct independent coordinated movements to the focal point of the battle. The imperative to massing firepower will be positive command and control of the battlefield by the brigade commander.

The brigade commander will have to lead men he has never met and command units with which he has never served. The presumptions that reinforcements will arrive on time, in place, and as a cohesive fighting force depend upon the brigade commander's ability to communicate.

Communications will have already become stretched to the maximum by distance and use, and will be further disrupted by the extensive cross-attachment and lateral movement across brigade boundaries.

There are several aspects of command and control in an antiarmor situation which warrant examination:

- *The brigade commander will rely upon his FM radio nets to issue orders and for all follow-on two-way information required to maneuver units, gain and disseminate operational and intelligence data, and concentrate firepower.*
- *His combat support and service support elements will use FM communications to orchestrate the logistics support critical to the maintenance of combat power.*
- *Radio teletypewriter and the division multichannel systems will be available from brigade to division, but they do not offer the inherent flexibility, point-to-point capability, and mobility of vehicular-mounted FM equipment. Thus, the battle will be controlled using FM radios.*

One essential aspect of FM communications is the availability and method used to assign FM frequencies to the division FM communications nets. A typical armor battalion requires 20 FM frequencies. A mechanized infantry battalion requires 25 FM frequencies. A typical brigade headquarters needs five FM frequencies. Each artillery battalion in direct support to the brigade requires six frequencies. All units would share a common medical evacuation frequency.

The number of frequencies required fluctuates as units are organized into infantry-heavy or armor-heavy task forces. The FM frequency requirements of the maneuver and fire support elements represent only a portion of the available FM frequencies in use in the brigade.

Within the brigade area, frequencies will be required by the division cavalry squadron; general-support and general-support-reinforcing artillery units; elements of the division signal, maintenance, medical, supply and transportation, and engineer battalions; and the military police, military intelligence, and Army Security Agency companies.

Overflying the brigade area will be the corps and division aviation units, which have a unique FM frequency requirement. The FM frequency requirement in the brigade area is further compounded by the location of elements of the armored cavalry regiment, the attached artillery group, and other corps units. These corps units may be committed farther forward into the brigade area as a part of the total corps force necessary to fight the antiarmor battle.

At the most critical point of defense, when communications have become crucial for fighting the ongoing battle and to achieve a concentration of forces for follow-on defense, radio nets will become overloaded. The span of control of the brigade commander will have widened as more units are organized within the brigade area.

This condition can create confusion and reduce the commander's effectiveness, especially if the assignment of frequencies results in interference among a brigade command net, a battalion command net, a fire direction net, and other very critical nets.

The potential effect of friendly mutual interference on combat power is relative to the points of mutual interference and the severity. Undesired transmission (friendly interference) may not affect a platoon leader or a logistician or low-use FM net, but could fatigue pilots, disrupt battalion and brigade command post operations, and interfere with critical (fire direction, air request, or intelligence) nets which may affect the outcome of the battle.

Our present method of generating Communications-Electronics Operation Instructions (CEOI's) involves the compilation of radio net data and the manipulation of available frequencies against the net structure to assign frequencies and call signs to a net for a specified time period. CEOI's now used throughout the Army reflect the doctrinal net structure of the division and are not designed to accommodate a company team, battalion-sized task force, or the cross-attachment of units to a new brigade area. Under this situation the brigade commander will face several severe command and control problems.

- *He must rely on his FM communications net to control the battle and obtain information.*
- *At a time when the brigade commander requires a stable FM net structure, the net structure will be undergoing change.*
- *Units within his brigade area and under his com-*

mand will be using one of four different CEOI's. The ability to communicate at all levels will initially depend upon the transfer of CEOI information. This is time-consuming and requires that large numbers of spare CEOI's be kept on hand for possible distribution.

- *Units arriving in the brigade area from the other brigades within the division will begin to compound an already crowded FM frequency situation. Due to the reuse of frequencies, units arriving from outside the division and using a different CEOI will significantly increase the level of friendly mutual interference.*
- *As the number of units in the brigade area increase, commanders at all levels will experience an increased level of mutual interference with a corresponding decrease in the level of positive control.*

There are several possible solutions to the problem of mutual interference created when a division is task organized for combat and elements are laterally cross-attached:

- *Maneuver battalions within the divisions could be permanently task organized by TOE into battalions that would not require a complete internal reshuffle of units prior to battle.* This would not only permit TOE units to train together as they would be committed into combat, but would also permit the CEOI to reflect the permanent organization for combat.
- *When preparing the CEOI, brigade and division Communications-Electronics (C-E) officers can require that frequency assignments to battalion- and brigade-level nets critical to the conduct of the battle be manipulated to insure that specified nets in any battalion would not interfere with the specified nets in any other brigade area within the division.* The interference parameters would allow for the reuse of the same frequency, and they would consider adjacent channel assignments and the effects of intermodulation generated by two or more transmitters operating in the same area.
- *Another change to the CEOI that would increase its flexibility would require the grouping of the available spare frequencies with corresponding call signs into task-force-sized frequency lists.* The use of a predetermined spare list by a task force would reduce coordination requirements to the identification of a CEOI item in an existing CEOI, and an effective time or location for implementation.
- *Wartime or contingency CEOI's should be developed and maintained to support initial deployment in accordance with the current defense plan.* This CEOI should include additional frequencies which would become available during hostilities.
- *Additionally, increased CEOI standardization throughout the corps would make it an easier document to read and use by units moving from one division to another within the corps.* Why not adopt a standard index, for example, so that a common item numbering scheme is used? The intent of such standardization is to save time and avoid confusion by breeding familiarity with the CEOI.
- *Two efforts which decrease the problem of communicating on the antiarmor battlefield are the enhancement of existing FM and the employment of alternatives to FM.* The most effective command use of terrain, antenna, and power settings can significantly reduce mutual interference by manipulating radiation patterns so they beam only at desired stations. It must be implied, however, that alternative means are more readily available and appropriate at the higher headquarters where the pressure of frequency competition can be taken off the combat maneuver elements.
- *Area communication nets in the brigade area could be established to control similar combat-support and service-support functions.* Area nets would remove supporting elements from command-structured nets and place them in nets based upon tactical location and mission. As supporting units move into and out of the supported brigade area, they would enter and leave the appropriate area net. Entry into the area net would be controlled at the brigade boundary. A change in the doctrinal net structure would require that it be implemented in training prior to the organization for combat.

None of the possible solutions will stand alone, but collectively they could reduce the interference problem. However, the ultimate solution to this problem and any other brigade and division level communications problems rest with the skill, training, and expertise of division and brigade C-E officers. In an antiarmor defense situation, the ability of the brigade C-E officer to understand the tactical situation and its impact on communications will be a determining factor in the degree of success of the brigade.

Condensed from an article by Major Wesly D. Carr in the Spring 1977 issue of the Army Communicator.

RECOGNITION QUIZ ANSWERS

Numerous comments have been received here at *ARMOR* regarding the Recognition Quiz—some good, some not-so-good. We are taking into consideration many of these suggestions and will be expanding the quiz to two pages in future issues (space permitting.)

We are attempting to be more accurate in our answers, and will endeavor to provide better pictures of more and varied types of equipment, including aircraft.

The staff of *ARMOR* realizes the importance of the ability to quickly identify a piece of equipment as friend or foe; therefore, we hope the expanded Recognition Quiz will help to improve everyone's abilities.

The answers to this issue's quiz are:

1) **FRG** *Leopard I*	(rear view: note outward sloping sides of upper hull, low profile of turret rear)
2) **FRG** *Leopard I*	(note large rounded flat turret, bore evacuate 2/3 from muzzle, 7 road wheels)
3) **INDIA** *Vijayanta*	(note 6 road wheels, grooved track skirts)
4) **SOVIET** *Badger*	(twin jet bomber)
5) **U.S.** *M-60A2*	(note box-like turret and cupola, as seen from front)
6) **JAPAN** *Type 61*	(note extended bustle, 6 road wheels, bore evaculator and blast deflector at muzzle)

NOTES

"Distant Thunder"

The U.S. Cavalry Museum, Fort Riley, Kansas, is offering for sale prints of an original painting by Western artist Frank McCarthy entitled "Distant Thunder." Only a thousand prints, each measuring 21 by 30 inches, are being reproduced, and each will be individually approved, signed, and numbered by the artist. The painting is advertised as "an authentic and detailed portrayal depicting the U.S. Cavalry on patrol during the 1870 period."

FM 6-20

The final approved draft of FM 6-20, *Fire Support in Combined-Arms Operations,* the Army's capstone "How-to-Fight" manual for fire support, is now being distributed to active Army maneuver and fire-support units. This manual provides the first comprehensive treatment of the maneuver commander—fire support coordinator (FSCOORD) relationship and illustrates how to integrate all fire support into combined-arms operations. It was written by maneuver and fire-support personnel, with input from elements throughout the Army, and is designed for all members of the combined-arms team.

The doctrine contained in the final draft of the FM is approved by Headquarters, TRADOC, for instruction at TRADOC installations and for training in the MACOM's. The final approved draft will remain current until superseded by the official Department of the Army printing of the manual late in 1977. The DA printing will be announced by TRADOC message and will be sent to units, both active and reserve, through pinpoint distribution. If units do not receive the manual within 30 to 60 days from the date of the message, it may be ordered via DA Form 17, addressed through publications channels to : U.S.A. AG Publications Center, 2800 Eastern Boulevard, Baltimore, MD 21220.

FM 6-20 is not an FA tactics manual. Rather, it is the maneuver commander's and FSCOORD's total fire support manual. As such, it complements all TRADOC "How-to-Fight" FM's and is to be used in conjunction with those manuals listed in Appendix B of FM 100-5. In addition to FM 100-5, FM 6-20 specifically supports and complements information contained in FM's 101-5, 71-100, 71-101, and 71-2. FM 6-20 will be followed by FM 6-21, *FA Cannon Battalion,* and FM 6-22, *Division Artillery, FA Brigade, and FA Assigned to the Corps,* which discuss tactics and operations for internal FA organizational use. Each manual will be "product improved" as the need arises.

NEW INTERNATIONAL SYMBOL

A new international symbol that identifies laser equipment and activities is currently being put to use by the U.S. military. Because laser devices are beginning to play a more active role in both tactical and logistical units, safety precautions must be used. Although a few laser engagement simulators are eye safe, most are not and the damage to the eyes which results from improper use of the equipment is irreversible.

BOOKS

DON'T SETTLE FOR SECOND
by Cornelius C. Smith, Jr. Presidio Press. San Rafael, California. 1977. 229 pages. $14.95.

Colonel Cornelius Cole Smith, one of the last Indian campaigners serving on active duty, retired after serving 30 years in the United States Army. He served in a wide variety of assignments which included service in seven different regiments, command of three regiments, and diplomatic duties in South America in countries which were pro-German in their wartime sympathies. Enlisting in 1890 in the old Sixth Cavalry, Smith was rapidly promoted to corporal, and within a few months, earned a Medal of Honor in a fight with the Sioux Indians during the Pine Ridge Campaign. A year later, he was commissioned in the Second Cavalry where he matured into a fine cavalry officer, one whom Secretary of War Elihu Root called "the champion rider of the United States Army." He was also an indefatigable rider as he later proved when he rode alone a distance of 1,000 miles in 28 days across the arid country of New Mexico and Texas.

Following service with the regiment in Cuba, Smith was promoted to captain in the Fourteenth Cavalry. In 1903, he was transferred to the Phillipines, the first of three such tours in the Islands. This section of the book I found to be the most interesting and exciting, for the difficulties encountered by the American troops in that foreign country with its alien climate and topography is strikingly similar to conditions American soldiers of another generation experienced in Asia. The narrative of the rugged and brutal Moro campaign is alive and highly descriptive. Later Smith acted as District Governor where his duties were less demanding than but no less important than those of a campaign-hardened troop commander.

After service along the Mexican Border, Smith was ordered to attache duty in South America in 1915. His first assignment was in Colombia where the Colombians were still smarting from the United States' support for Panamanian independence and the acquisition of the canal. He later was assigned to similar duties in Venezuela where the people were somewhat friendlier, but were nonetheless entirely sympathetic to the German cause in World War I. This particular phase of his career called for extreme tact and strong self-control. The accounts of Smith trying to uncover the extent of support given to the Germans is quite descriptive and interesting.

His career reached its zenith during World War I when he commanded the newly activated 341st Infantry in Illinois, and later the recently formed 314th Cavalry in Texas. The problems and difficulties experienced by a regiment in a rapidly expanding army at a brand new post is both revealing and educational. The culmination of his career was his return to his native Arizona where he commanded the Tenth Cavalry.

Throughout his long career, Smith carefully and faithfully maintained a diary and saved copies of letters written and received. These writings reveal him to be a man of wide-ranging interests and had a definite talent to accurately record his perceptions and opinions. His son has taken these writings and effectively combined them into readable work—one that is skillfully placed into proper perspective with the events of over a half century ago. The author, a noted military historian, has added many photographs and sketches to attractively supplement this fine book. This book is well worth reading for those who like the history of the "Old Army" with a cavalry flavor.

Lieutenant Colonel David P. Perrine
HQ, 45th Inf Bde

KEEP THE LAST BULLET FOR YOURSELF
by Thomas B. Marquis. Two Continents Publishing Group, Ltd. New York 1976. 203 pages. $8.95.

Lightning struck and Custer's soldiers were all instantly killed! No? Would you believe they all went insane and mistook each other for enemies? (These are supposedly two Cheyenne theories.) Well, would you believe they all comitted suicide? Marquis would have you believe that most of them did, and he presents some very compelling evidence to support his hypothesis.

Thomas Marquis was a doctor who practiced among the Cheyenne for four years in the mid-1920's. For a number of years, he researched the Little Big Horn battle, and interviewed several Indians who had been present. After reaching his surprising conclusion, he wrote a generally unbiased argument in unusually lucid text, but was unable to find a publisher willing to print it. Now, a century after the battle, it will stimulate considerable discussion.

The first part of the book is especially well written. It is a synopsis of factual data gleaned from numerous first-hand sources. Marquis describes various criticisms of Custer, Reno, and Benteen, and quickly demolishes many of them with direct, unembellished rebuttals. He doesn't gloss over Custer's inadequacies either, but presents an objective appraisal. There are several arguable points raised in this part of the book, but they don't distract the reader particularly.

The crux of Marquis's thesis hinges on a single issue reached near the end of his work—the remarkable and unexplained fact that the U.S. Army lost over 200 men to the Indians' 30-40 (depending on which source you believe). Soldiers testified they found few or no expended cartridges among the Custer group dead. Why didn't they fight? Marquis argues effectively and with considerable substantiation that the soldiers didn't fight because: (1) they were largely new in service and untrained, (2) collectively, they had a dread fear of capture and torture, and consequently mentally prepared themselves for suicide, and (3) under fire for the first time, they panicked into a rout and committed wholesale suicide as their lines collapsed.

The reader's first impression is "Rubbish!" Yet Marquis has telling points and has done some homework. Even so, there are some big holes. His veteran Cheyenne soldier witnesses turn out to be an old woman, a boy unborn at the battle, and one old brave who might have been in the battle. His information appears to have been gleaned primarily by himself through sign language (he never learned Cheyenne during his four years with the tribe). Several key assumptions are patently fallacious, e.g., the U.S. horses panicked and ran away when they smelled the Indians! Marquis's hypothesis might well be summed up in his own words: "It is easy to get a misconception of what old Indians tell, even when a good interpreter is present." Nevertheless, this is an interesting and provocative book, well worth the cost. After all, why was there such a disparity in the casualties?

Colonel (Retired) John R. Byers ▲

Armor Magazine Index—Volume LXXXVI, 1977

TITLES

AUTHORS

BOOKS

BRIEFS

DEPARTMENTS

☆ U.S. GOVERNMENT PRINTING OFFICE: 1977—757-041/4

NOTES

PROFESSIONAL THOUGHTS

ARMOR's New Editor

Just prior to going to press Lieutenant Colonel Michael A. Vargosko came on board as 32d Editor-in-Chief. His most recent assignment was with the 2d Armored Division, where he commanded the 2d Battalion, 66th Armor, which returned from Germany in August after completing a 6-month rotational *Brigade 75* tour.

LTC Vargosko enlisted in the Army Reserve in June 1954 as a private in the 740th Tank Battalion in Connecticut. He was commissioned in the Regular Army in July 1959 as a Distinguished Military Graduate from the Virginia Military Institute. After completing the Armor Officer Basic Course and the Ranger and Airborne Schools, he was assigned to the 11th Armored Cavalry in Germany.

After graduating from the Armored Officer Career Course in 1964, LTC Vargosko commanded a tank company and was Battalion S-3 in the 1st Battalion, 66th Armor, 2d AD.

After MATA and the Language School at Monterey he was an advisor with the Vietnamese 10th Armored Cavalry in 1966 and 1967. Following that assignment he served as Chief of the only remaining Armor ROTC Detachment, which is located at the Virginia Military Institute.

LTC Vargosko attended the Command and General Staff College in 1969-1970. In 1970-1971 he served in Quang Tri Province, Republic of Vietnam with the 1st Brigade (Sep), 5th Infantry Division (Mech). Returning to CONUS, he was assigned to ODCSOPS in the Pentagon until May 1974. At the Pentagon he served as a Team Chief in the Army Operations Center and as an action officer in the Command and Control Division.

In 1974 LTC Vargosko was assigned to the University of Alabama and received a Masters Degree in Journalism.

Coming in ARMOR

"THE ADVANCED ATTACK HELICOPTER CHALLENGE"

Lieutenant Colonel David L. Funk describes the changes necessary in organization, crew selection and training, tactics, strategic deployment, and dispersal which will be required when the advanced attack helicopter (AH-64) enters the inventory.

"LEOPARD 2 AV"

The Federal Republic of Germany's newest main battle tank is described by Richard M. Ogorkiewicz in his article dealing with the tank's development and capabilities.

"NEW FRENCH WHEELED COMBAT VEHICLES"

In his article describing the A.M.X. 10 RC and the V.A.B., Lieutenant Colonel Claude deBisschop details the vehicles' characteristics.

"YOU CAN'T FORGET CANT"

Captain James D. Brown's article on one aspect of the error budget, trunnion cant, explains how to recognize cant and minimize its effect.