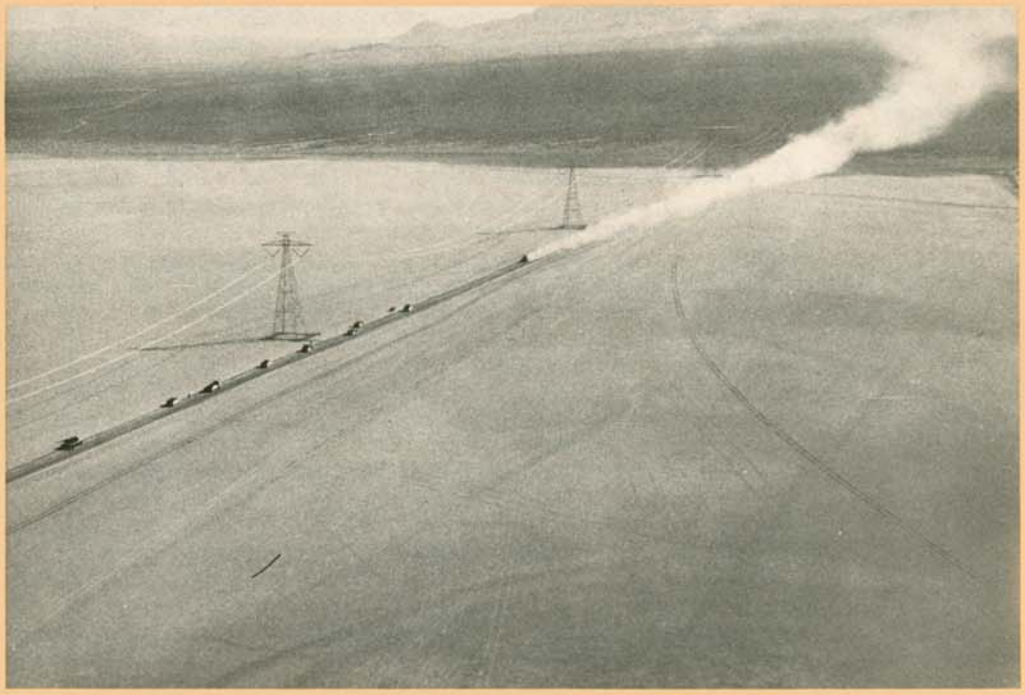
ARMOR

The Magazine of Mobile Warfare



The Hot Ones

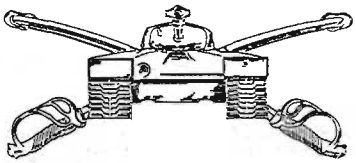
A National Guard Unit
Road Marches to the NTC

Battle of the Cold

The Lessons of
Reforger 1985

September-October 1985

SCHWERPUNKT



I take great pleasure in assuming the duties and responsibilities as the Editor-in-Chief of *ARMOR: The Magazine of Mobile Warfare.* As the thirty-fifth editor-in-chief of the oldest professional military journal in the Army, I promise you that I will take those duties and responsibilities very seriously.

This journal serves a readership that is incredibly diverse: our readers range from the accomplished academicians to the professional tanker and cavalryman. Producing a journal that both meets their professional needs and remains enjoyable reading is a demanding job. However, since 1888, this periodical has been doing just that, first as *The Journal of the U.S. Cavalry Association* and now as *ARMOR: The Magazine of Mobile Warfare.* We do not intend to stop.

This issue goes far to meet that mission. **Major Richard Geier's** article, "Battalion Command and Control," illustrates the difficulties of command and control on the battlefield and how one armor battalion sought to solve those difficulties. "Employing Tank Mine Rollers and Ploughs" by **Major Roy Thomas** explores both the tactical and technical aspects of obstacle breaching and maintaining the mobility so necessary for success in close combat heavy operations.

As we in the U.S. Army go through our transition to the Army of Excellence organizations, the article by **Lieutenant Colonel Oliver Holder** and **Major Frederick Lee** on "The Armoured Regiment of the RAC" gives us important insight into the organization, equipment, and tasks of one of our partners on the potential NATO battlefield.

In the two pieces illustrated by our cover on this issue, "The Hot Ones" by **Robert Rogge** and "The Battle of the Cold" by **by Colonel William Crouch** and **Major Thomas Taylor,** we experience the trials and successes of a National Guard Armor Battalion (the 1-221 Armor) as it conducted a 130-mile road march to the desert at the NTC, and we discover the cold weather lessons learned by the 2d Armored Cavalry Regiment on the plains of Central Europe, both of which serve to remind us that we must train to fight in all sorts of environments.

The absolutely superb historical article, "Return to Singling" by **A. Harding Ganz,** shows us what fighting in one of those environments was like for the soldiers of Colonel (then Captain) Jimmie Leach's Team B, 37th Tank Battalion of CCA, 4th Armored Division and B/51st Infantry during World War II.

Captain James Warford's piece, "T-64, IT-122, and IT-130: The Soviet Advantage," is an intriguing article about how the Soviets have seen a need for new armored vehicles and then developed them to meet that need. It also introduces us to the IT-130, a potential significant threat.

As some of you know, the reorganization of the Division Cavalry Squadron has become a "significant emotional event." **Major Peter Kindsvatter's** article, "The Division 86 Cavalry Squadron," is a rational approach to one of many sides of that issue and will serve as a starting point for a discussion on Cavalry which we will continue in future issues of *ARMOR.*

Professional Thoughts for this issue of the magazine offers us two valuable techniques in training to fight. **Lieutenant Colonel Paul Baerman's** article, "Terrain Visualization by Strip Map," demonstrates a land navigation technique that I'm sure many Cavalry and Armor leaders will want to try. **Sergeant First Class Michael L. Collis** of the 2d Battalion, 124th Infantry gives us an excellent way to conduct CTT, a recurring and vitally important event in all of our units.

A prior editor-in-chief of *ARMOR,* and a man I have come to respect highly, recently told me to remember that "No man is more important than the magazine." *ARMOR* is not *my* magazine as its editor-in-chief, nor is it any single person's chance to speak his mind. Rather this periodical, which has served both the Cavalry and Armor Community for nearly 100 years, belongs to that community. We intend to maintain that "ownership." With that in mind, we at *ARMOR* ask you to help us meet the purposes and accomplish the goal of the *Magazine of Mobile Warfare.* — GPR

ARMOR The Magazine of Mobile Warfare

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September-October 1985 Vol XCIV No. 5

FEATURES

DEPARTMENTS

COVER

Preparing to carry out its mission in any climate, the Army trains as it will fight. On page 25, Robert E. Rogge describes an unusual 130-mile road march in 100-degree temperatures...unusual because it was a National Guard unit on its way to the NTC. On page 28, two participants in the 1984-85 Reforger exercise discuss the lessons of last winter's record cold snap in Europe.

LETTERS

More on Helo Air-to-Air

Dear Sir,

Your article, "The Deep Attack Helicopter Raid," (March-April *ARMOR*) by Captain Ralph Peters presents a point of view regarding air-to-air helo operations in which the writer expresses the opinion that, first, the Soviet helo pilot will not turn from his assigned mission, and second, that U.S. helo pilots must not engage in individual air combats (at the expense of breaking up the raid force).

Examining those two remarks, I would point out to the reader the Soviets are extremely cognizant of the use of all resources in countering our heliborne forces and, indeed, have a dedicated air-to-air doctrine which insures the Soviets will counter the raid when detected with his air-to-air capable helos and the assigned task of such assets will be the destruction of the raid force. You can be assured the Soviet pilot will pursue this with as much lethality as possible and the only counter is, of course, to defend the raid force with its assets, which subtracts from the overall force availability. To not do so subtracts at a faster rate as the Pk (Kill Factor) goes up for the Red Force.

Raid planning must project the air-to-air probability and include enough assets to deny the enemy the ability to frustrate the attacking forces, and therefore must provide a dedicated air-to-air element to close with an attacker, kill him, and allow the main force to proceed.

The statement that there is no room for helicopter aces in the ALB is quite out of date and will continue to be so as long as the projection of the ALB encompasses the use of attack helicopters by both sides.

ROBERT L. BAIRD
CW4 (AVN)
Ramona, CA.

Birth of the FAV

Dear Sir,

It was with a great deal of interest that I read the article "The Pros and Cons of the New Ultralights," by Edwin W. Besch, in your March-April issue. One of the vehicles discussed in his text as the Fast-V is the end product of a concept which I had originated during the formulative stages of the High-Technology-Test-Bed project which is today the Army Development and Employment Agency (ADEA).

I was, at that time, an illustrator working in the headquarters graphics branch of the 9ID. As such, I had been preparing large volumes of briefing materials for Major General Howard Stone who was the 9ID and Fort Lewis commander and the HTTB project officer. Working closely with Colonel Joe Felter, the chief of staff, and Captain Tom Harvey, we prepared briefings which were used to explain the concept to Congress, OMB, and HQDA staff officers.

One day, early on in the program, Captain Harvey asked me to report to Colonel Felter's office. When I arrived, they explained a concept for a high-speed, all-terrain vehicle which could mount weapons adequate to defeat targets in the range of infantry through armor. It had to be extremely small and light and deployable by air in large numbers. I was asked to provide a concept illustration of such a system which would be the basis for a potential design and production contract to produce the vehicle.

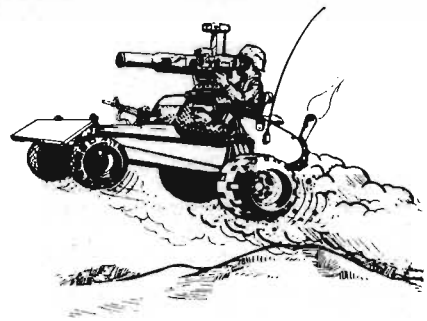
One of the key factors in the accelerated HTTB program was to make maximum usage of off-the-shelf technology by adapting to military use those items which were already in commercial use. With this in mind, I suggested that the "Baja-racer" type dune-buggy seemed to be the ideal chassis since it had been developed to run 1,000 mile races at high speed through harsh desert terrain. It had also undergone the benefits of over 20 years of design optimization in the hands of the American hot-rodder, a unique breed of inventive genius.

With this letter, I'm sending a copy of the first picture of a Fast Attack Vehicle, the one that I produced for Colonel Felter and General Stone. Based on a Chenowth two-seat design, I sketched it up in about an hour. I also provided the address and phone number of Tacoma Off-Road Accessories Distributors who were contacted to provide the first chassis. These were then modified at the Fort Lewis Logistics Center Maintenance Branch into a FAV configuration. The rest is history...

The current FAV should be recognized as a surrogate and a prototype used to set contract specifications and to develop tactics and training standards. Mr. Besch was more than correct in noting that these kinds of weapons systems will not replace armor, but rather augment and enhance the force. Like any other piece of equipment, it cannot stand alone but must be employed as an integral piece of the combined arms concept.

I personally see it as a return to the original role of the old-time cavalry tactics. Aviation notwithstanding, the FAV can outmaneuver all other battle elements on the map, providing lightning strikes at flanks of attacking columns, hitting priority targets and withdrawing intact, and giving the commander a fast moving pair of reconnaissance eyeballs where he wants them.

Some of the more current tactics which the FAV epitomizes are in rear area and deep-strike roles. The Rapid Deployment



Force can use it to hold ground and buy time until the "heavies" arrive. At Fort Lewis, the military police have found it very effective when used to patrol our vast training areas.

Since my original sketch, the FAV has grown into an entire Light Attack Battalion, the 2/1, which is unique in the world. Thousands of soldiers and civilians have worked years to put it all together and the future looks promising. It gives me a great deal of satisfaction to know that it sprang from one good idea of mine and one simple sketch I drew.

BOB ROSENBURGH
Command Information Officer
I Corps & Fort Lewis, WA

Art Critique

Dear Sir,

I enjoyed the May-June 1985 "Annals of Armor Leadership" issue of ARMOR. I am writing, however, to critique the selection of vehicles and aircraft used to depict the history of the Combat Arm of Decision on the cover of the issue.

The Renault FT Light Tank and British Heavy accurately represent the World War I and interwar periods. World War II, however, is poorly portrayed. The M3 "Lee" medium and M24 "Chaffee" light tanks only saw limited combat during the war. They should be replaced by: the M5A1 "Stuart" light tank, standard light tank of mechanized cavalry and armor units for most of the war; an early version of the M4 "Sherman" medium tank armed with the short 75-mm gun, the mainstay of tank units for much of the war; the M8 "Greyhound" armored car, standard mount of the mechanized cavalry; and one of the many tank destroyers employed by the Tank Destroyer Command, presumably the M36 with 90-mm gun, although either the M10 "Wolverine" or M18 "Hellcat" would also be appropriate. Although not officially part of Armor, most tank destroyer units were redesignated as tank

battalions after the war, and Armor adopted the TD Command's former mission of countering enemy tanks. The M4A3E8 "Sherman" with 76-mm gun should be moved forward to represent its extensive service in World War II, Korea, and the peacetime Army till the late 1950s.

The 1960s/70s period is inadequately represented by the M48 "Patton" and M60A1 tanks. The M113 Armored Cavalry Assault Vehicle, AH-1 "Cobra" attack helicopters, and either the OH-6 "Cayuse" or OH-58 "Kiowa" observation helicopters should be added to round out the scene. The present/future is, of course, well represented by the M1 "Abrams", M2/M3 "Bradley" and AH-64 "Apache".

As the May-June issue demonstrates, the lessons of the past should serve us well in facing the trials of the future. Let us ensure that today's Armor officer has an accurate understanding of the weapons his predecessors used to preserve this nation's freedom.

THOMAS D. DINACKUS
CPT, Armor
Ithaca, NY

Correction

The article, "Mounting the Deep Counterattack," that appeared in the March-April issue of *Armor* Magazine, was co-authored by Lieutenant Colonel Charles J. O'Brien and Major Stephen J. Broussard.

An editorial error gave the by-line credit to Major Broussard and included only the biographical sketch of Colonel O'Brien.

Our apologies to all concerned.

The Bareback Cav, Circa 1945

Dear Sir,

Advocates of horse cavalry can take heart. Although their numbers may be dwindling, new evidence has come to light that the horse retains some relevance, even in modern warfare. Here in the 2d Squadron, 3d Armored Cavalry Regiment — most definitely an armored unit, but proud of its mounted heritage — we've come across the following entry in our regiment's battle diary from World War II. The time is early 1945; the place the Saar River:

"Twenty-five saddles and 10 bridles were received on the 8th of February. These were divided between the squadrons which were operating horse patrols in wooded areas in their sectors. These proved beneficial to the riders who were up to this time, riding bareback with full combat equipment. The use of horse patrols in these wooded sectors of the squadron's (area) were very excellent because of existing enemy minefields..."

A. J. Bacevich
LTC, Armor
Fort Bliss, TX

A Call for Help

Dear Sir,

The Command and Staff Department of the U.S. Army Armor School is in the process of writing a publication to be titled *Armor in Battle*. *Armor in Battle* will be a series of operational recaps of armor actions at the battalion level or lower with the emphasis being on operations as seen through the eyes of the combat armor platoon leader and company commander. The Armor School wishes to impart to our company grade officers going through their basic and advanced courses what it is like to fight tanks and their crews, to perform route recon, etc. using the vehicle of former armor combat leaders' recollections. The Armor School's objective in this is to teach young armor officers both the mistakes and successes of combat armor veterans, to learn from their experiences how the "fog of war" impacts an operation at the company and platoon level.

Therefore, we are asking armor combat veterans to help us accomplish our mission of best preparing the Army's future battle leadership by sending in examples of combat armor leadership that they themselves have experienced. The Armor School would be greatly thankful for the assistance of the readers of *ARMOR Magazine* in this endeavor which will eventually save many lives through the experience you armor combat veterans have gained at such a terrible price.

Please send all written contributions — 2-5 pages — with a written and signed release-for-publishing statement to:

Director
Command and Staff Department
U.S. Army Armor School
ATTN: ATSB-CS-LL
Fort Knox, KY 40121

Please direct all telephone inquiries to Captain Hilario Ochoa, (502)624-5450, (Autovon) 464-5450.

HILARIO OCHOA
Captain
Command and Staff Department
USAARMS, Ft. Knox, KY

Colonel Claude O. Burch (Ret.), former editor of *ARMOR* Magazine and secretary-treasurer of the U.S. Armor Association from 1948 to 1950, died at his home in Washington, D.C., on July 27, 1985. He was 93 years old. He first joined the Army in 1917 and served on the Mexican Border in WW I.

Colonel Burch served in Europe and North Africa during WW II and was a member of the war crimes tribunal in Germany following the war. He retired in 1950 and is survived by his wife, Lorie.

Cavalry Trainers Update

Tentative Agenda

The Chief of Cavalry Branch, Command and Staff Department, has announced a tentative agenda for the Cavalry Trainers UPDATE to be held on 1 November 1985 as part of the Armor Trainers UPDATE to be held at Fort Knox during the period 29 October through 2 November.

1 November 1985

0800-0815	Welcome
0815-0900	Cavalry Today
0900-0915	Break
0915-1000	Doctrine Into Practice
1000-1015	Break
1015-1100	Bradley Combat Tables
1100-1115	Break
1115-1200	Scout Training at Knox
1200-1300	Lunch
1300-1345	Logistical Support of the Heavy Division Cavalry Squadron
1345-1400	Break
1400-1445	Update M1/M3 Master Gunner
1445-1500	Break
1500-1600	Trooper/NCO Professional Development
1600-1700	*Cavalry Seminars

*Cavalry Seminars

Group	Composition
I	Regimental Commanders
II	Squadron Commanders
III	Noncommissioned Officers

The Commander's Need for Positive Control

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

We in Close Combat Heavy forces have a problem: command and control of our heavy maneuver forces has not progressed in step with changes in our doctrine and the new generation of faster, more lethal weapon systems we plan to employ in making that doctrine work. The problem, in a nutshell, is that we need to move information around much more quickly.

I want to discuss this problem and the impact it will have, give you a preview of the over-the-horizon solutions technology may offer, and finally, suggest some here-and-now fixes that will help carry us through the near term.

A core concept of AirLand Battle doctrine is speed, not so much in the narrow sense of maneuver speed, but speed of decision-making. We plan to get inside the enemy's decision loop, seize the initiative before he can react, and maintain this initiative so that his reactions are always inappropriate and too slow. We want to become a pro-active maneuver force, leaving the enemy no choice but to react to our initiative.

In order to operate successfully at this tempo, small unit commanders will have to use *their* initiative to an unprecedented extent. Realizing this, our doctrine accommodates the change by adopting the concept of mission orders. Under this concept, the commander does not attempt to orchestrate all the details of the battle before it begins. Instead, we will tell our leaders the overall concept of the operation and allow them latitude to use their initiative in choosing the best method as the fight develops — all within the intent of the senior commander.

But to do this well, the leader needs information. And we cannot give him enough information — at least right now — to allow him to act within the enemy's decision loop.

For example, consider the task of a tank platoon leader given the AirLand Battle mission of striking deep. As the attack develops, the leader is tasked to adjust to the changing situation, examining his options like a quarterback, but a quarterback on a team that seldom gets the time to huddle. Often, his "calls" will have to be a lot like the pro quarterback's "automatics," sudden decisions aimed at capitalizing on an enemy weak spot, perhaps a weakness revealed for only a few moments.

Add to this tough task the normal frictions of the battlefield, the time pressure, the fear and sensory overload of combat, the complication of fighting cut off on a disjointed, possibly contaminated battlefield.

Can we carry this off? Can we expect our young leaders to carry it off equipped with paper maps and grease pencils and acetate overlays, voice radios that don't always work, and the typical human inaccuracies of land navigation?

No, I don't think so. We have far to go on command-control improvements — the NTC experience is clear enough on this point. There is a serious deficiency here.

The information gap affects the whole force, not just the fighters. It would certainly affect the company/team log pack charged with fueling and supplying this platoon leader. The logistics people will have to know where he is in order to deliver the fuel and ammo. Can they find out in time to be there with the crucial supplies? This will be a serious limitation if they cannot. What use is finding an opening if we cannot support the attacker's exploitation?

Further back on the battlefield, the maneuver commander needs more information more quickly, too. In mobile combat, windows of opportunity — both tactically and operationally — are often measured in seconds and minutes. Can the battalion task force commander get the information he needs in time to maintain the initiative and shape the battle?

Over-the-Horizon Solutions

The long-term solution to many of these deficiencies is the Battlefield Management System. BMS is the umbrella concept that describes the automated command and control systems that will support the battalion maneuver force. BMS is now at the stage of identifying the kinds of information that will be available, how we will integrate this information so that it is usable at various levels of command, and the equipment we will need to make it work.

Much of the information will come from traditional sources, like the tank platoon's reports as it penetrates behind the FEBA. Battlefield sensors will be integrated into the information flow, as will navigation data from the Position Locating and Reporting System (PLRS), scout reports, and the observations of the other members of the combined arms force that are being synchronized by the system. Often, this will be information we've had all along, but the advantage of BMS will be its capability to process this data overload and distribute it to those who need it in time to make a difference.

The system hardware would be capable of sifting the information gathered and processing it in a manner

tailored to each participant's level of interest and need to know. In general, however, we think less information, not more, is better.

At the battalion command level, the information displayed by BMS should be tailored to the commander's need for facts that will help him plan fire distribution and the maneuver of forces. At the tank crew level, BMS could supply more immediate tactical information — perhaps intelligence gathered by sensors concerning what lies ahead, or target reference points fed in by the TC's Commander's Independent Thermal Viewer and stored in the gunner's "target file" with priorities. The issue is to provide enough information to help, and not so much information that it confuses or distracts the commander, particularly in the heat of battle.

In the eventual BMS configuration, individual vehicles could be "netted" to share information with other vehicles.

We're not taking this technological leap without some measure of insurance against its failure. Where critical combat functions are concerned, there will be redundancy; for example, a gunner must still be able to use his hard optical sights and fire control system to acquire and service targets, just as he does today. Radios will be able to revert to voice communication if data links break down. Failure of any subsystem cannot be permitted to render the greater system inoperable. And the vehicle must be "fightable" despite a loss of power.

BMS will have the potential for growth, too. As breakthroughs develop in what are called Very High Speed Integrated Circuits (VHSIC), it will be possible to make the hardware do more while reducing its size and making it more rugged. The software that drives the system, too, will be flexible and capable of relatively quick upgrading as capabilities grow.

Artificial Intelligence (AI) also promises enhancement to the BMS. It's not unthinkable to imagine — in the mid-term — the development of "expert systems" software which will help staffs develop intelligence estimates and courses of action. A commander might be able to consult his BMS display and get a prioritized summary of critical changes as they occur, with recommendations and suggestions.

BMS offers another intriguing possibility for better training before we reach the battlefield. Just as it processes real-world information, it could also be programmed with software to *simulate* what is likely to happen in the real world. The software would drive the displays seen by a tank crew, for example, and they would be able to train right on the system they will fight.

In a similar manner, platoon leaders, team commanders and task force commanders could practice their phases of the real-world battle by reacting to simulated scenarios on the BMS System.

In a world changing rapidly, it is easy to become numbed to these almost incredible predictions of the future, but BMS is an operational innovation, a development perhaps with the same potential in battle as the internal combustion engine.

But while we wait for its arrival, there are useful, more immediate solutions to our needs for improved command and control.

The C & C Vehicle

Traditionally, unit commanders have had difficulty commanding from fighting vehicles which were not, after all, designed as command and control vehicles. They've solved this in two ways, both of which present problems: either the commander leads from another type of vehicle that provides too little protection or —worse yet — he presses into service a large group of vehicles and gives up his ability to blend in with his combat force.

USAARMS took on the Command and Control Vehicle Program in the hope of being able to provide the field with a standardized package of improvements that could enhance the commander's ability to command and control. These C^2 enhancements were installed on *M113, M577, M60A3, M1, M2,* and *CUCV* vehicles and evaluated by three brigades in 1984 during NTC rotations.

We've come up with a package of improvements that can be installed at unit level with some minor assistance from direct support. The next step will be to get these tested improvements into the field.

If we pursue the product improvement route, it will take two or three years to accomplish this, so we need a short-term plan. On request, we will send senior commanders a complete C^2V briefing packet with construction blueprints so that these modifications can be adopted and installed at local expense. This will allow the field to use the C^2V enhancements they desire while the formal process of product improvement continues.

Improved Radio Communications

Voice radios over line-of-sight FM frequencies can be jammed, are subject to topographical and atmospheric interference, and are vulnerable to enemy direction-finding. Yet they are critical; voice radios are the primary systems used by lower echelons to report position, enemy status, logistics, and orders.

The SINCGARS program is a way to overcome the weaknesses and vulnerabilities of voice radios. SINCGARS, short for Single Channel Ground and Airborne Radio System, is a frequency-hopping system that protects against jamming by automatically changing operating frequency over 100 times a second. Not only can SINCGARS overcome jamming, but it can also transmit much more data — voice, graphics, and text — at up to 16,000 bits per second.

An optimistic note in the SINCGARS acquisition is that we should finally have the CSS elements of a tank battalion equipped, too. The support platoon will have a two-net capability (Bn A/L, Bn Cmd). Each log pack will have a radio. The medical platoon, aid station section, and each ambulance will have a set. The BMO, recovery vehicles, maintenance section, and tank company maintenance teams will each have a radio. Fielding by corps sets is scheduled to begin in January, 1987.

Maneuver heavy forces face a complex problem in command and control, especially in light of new doctrine that requires our fighter-leaders to influence the battle through their personal involvement. Lessons of the NTC support, in detail, the requirement for improved command and control. We believe our developmental programs are timely and dynamic tools to get a leap ahead in maneuver C^2, but as we progress, you — the user — must become involved in the concept and materiel development process. Your experiences, frustrations, and suggestions are not only welcomed, they are critically necessary.

Let us know your thoughts.

Forge the Thunderbolt!

DRIVER'S SEAT

CSM John M. Stephens
Command Sergeant Major
U.S. Army Armor Center

Tank Crew Training: It Has Changed!

Over the years, there has been a lot of debate concerning the true requirements of a tank crew. Tied into those requirements are training and standards: how much training is needed and to what standards?

Let's back up a few years — about 25, to be exact. The *M48*-series tank was a pretty good tank. The *M48* required a lot of maintenance for many reasons, mostly due to age and the inability to obtain parts. However, the age of the vehicle only increased the concern for maintenance. Before-, during-, and after-operations checks were automatic crew functions. When a crew member was absent, the remainder of the crew performed the required tasks. During maintenance halts on road marches, emphasis was on the suspension system and oil levels. Every vehicle had extra end connectors, center guides, and occasionally a track block, if you could find one.

Training was a very simple task for the commander, the platoon, and the crew. It was all set forth in the Army Training Program for Armor. As a minimum, there were subjects to be taught and tests passed before you began firing. The commander could require extra training, if needed. Most of the extra training was performed as hands-on training, and many hours were spent on conduct of fire, boresight, range cards, etc. Very little training was performed on the rangefinder; I don't recall too many crewmen who were proficient on it anyway. Every crewman attended the training; every crewman performed the hands-on exercise. Every crewman was required to perform to standard on the Preliminary Gunner's Exam (PGE) prior to the gunnery tables, to include boresighting and zeroing exercises.

In Europe, tank firing was done at Bergen Hohne in northern Germany. Only the crewman who really applied the required attention to detail received recognition. That recognition was a Master Gunner's Certificate for achieving at least 385 points out of a possible 400.

Crews were, for the most part, stabilized. They were stabilized in the sense that, once assigned to a vehicle, crew members did not move except to become a TC or the assistant tank commander on the CO's, platoon leader's, or platoon sergeant's vehicle. As the *M60* series was introduced to the force, however, the maintenance and training program changed dramatically. It was not a change in regulations or requirements, but a change in attitudes and standards.

Maintenance was performed according to the manual for the first year or so. All the attention to detail required of a new system was being monitored by everyone in the chain of command. Logbooks were being inspected; unit maintenance personnel were being used to perform TIs prior to Q-service, and 2404s were being checked daily. Vehicle down-time was minimized. The equipment was new, and crews took pride in their maintenance performance records.

Training was intensified because of the new system. We received some outside formal instruction on the new tank and its communication system, but the hardcore sustainment training was performed by the noncommissioned officers in the company. The unit, through leadership of the company commander, developed a strong instruction program, and attendance at the classes was mandatory for everyone. Consequently, developing highly competent crews, who were highly competitive, did not take long. Table VIII, Range 42, became the objective, and all gunnery training concentrated on Table VIII. Crews were still training together, and with the coincidence rangefinder, TCs could actually range to the target.

As we grew smarter about the equipment, we started to develop bad habits. Maintenance was no longer scheduled on a weekly basis. We performed maintenance when we returned from the field, but somewhere, someone came up with the idea that an *M60* tank needed very little scheduled maintenance. Eventually, mostly due to personnel turbulence, other standards — especially training standards — fell by the wayside, and each crew trained its own way. The Army Training Program had disappeared, and each commander was on his own. Recommendations were there,

but the requirements were up to the commander.

We are now in a new era. Another major vehicle system has now been with us for four years. Crew turbulence is the worst it has ever been, especially the 18-month turnaround time for first-termers in Germany. New ranges are being constructed at every military installation in CONUS to support the capabilities of the *M1 Abrams,* and Europe has already completed the majority of construction on tank ranges. Now all we have left to do is to train the crews to maximize the capabilities of the vehicle. It is a lot easier said than done!

I see the challenge as one directed toward the officers and senior noncommissioned officers. First, let's address maintenance. If you have not been requiring a checklist PMCS in the past, chances are it's not going to happen in the present or in the future — even though a checklist is provided — unless it's enforced. It is "macho" to a soldier to be able to memorize tasks. Using a checklist attacks the competence and credibility of the user. Simply stated, a soldier will not use the checklist unless you make him use it. In order to change the attitude, "That's the way we did it before", we have to train maintenance. High standards need to be required, and repetitive training needs to be conducted.

I am not saying we should go back to maintenance by the numbers; however, performing proper maintenance is a mindset, and if the only way you can change a soldier or unit's attitude is by performing PMCS in a platoon- or company-size class, then we need to do it until we learn what the standards are.

Once the standards have been drilled, then the time must be made available to the crews for PMCS. That includes time in garrison and time in the field, ARTEPs, FTXs, Reforger exercises, corps exercises, etc. Operations conducted in a field environment, without maintenance time allocated, causes soldiers to neglect maintenance all the time.

You can't evaluate *M1* maintenance by comparing it to an *M60A1;* the crew requirement for maintenance has changed. Performing well-executed maintenance all the time is an absolute requirement!

Second, what has caused the tank crew training requirements to change is the training needed to fight the system effectively and survive. Here is where the officers and NCOs must understand that you cannot reflect just on *M60A1* standards to achieve *M1* standards. Because of increased training requirements, tougher test standards, short tour requirements for first-termers, tank commander and gunner stabilization is not the answer. The real answer to achieve any continuing success is full crew stabilization. The other answer to achieving success is demonstrated tank commander proficiency at all stations.

The tank commander must be required to demonstrate total vehicle proficiency through the use of the TCGST — soon to be TCCT-I — within 90 days after the initial assignment to the position. Total vehicle proficiency must be an exit requirement for all BNCOC graduates. Total vehicle proficiency should be required of *all* TCs who have been assigned away

from their MOS or CMF prior to returning to a TOE organization. The Tank Commander Certification Course will accomplish that requirement.

We are entering into a new era: the training devices we're getting can train and test our crews far beyond the standards. Every Armor leader or leader assigned or attached to an Armor unit needs to become thoroughly familiar with the UCOFT (Unit Conduct of Fire Trainer). Through the use of the UCOFT, you will see why *tank crew responsibilities have changed.* Why must tank commanders be totally proficient? Why must tactical tables be included in training? UCOFT assists us in achieving full use of the vehicle. You don't just simply accomplish steel on target; you also gain the advantages of training in all types of weather conditions, using of the vehicle's mobility, and training to survive, all in one. The only shortfall is the inability to train with the full crew. I believe we make a mistake when we don't train as a crew.

A sound training program, tank commander proficiency, TCCT-I, full crew stabilization, with UCOFT will give us the program that will develop crews of excellence. However, the leaders must know what the requirements are, what the standards are, and must develop and supervise the program to ensure the standards are met. Those programs must not only address garrison and gunnery training but be integrated into the field SOP to ensure quality sustainment programs.

Tank crew training has changed. Armor leaders must understand the problem. You can't do checklist PMCS without the checklist! Tank commanders need the gunnery manual to train their crews. Leaders must be knowledgeable about the training devices and how they influence training sessions. A tank crew that cannot pass Level I on the UCOFT is not ready for tank tables! Leaders must be able to recognize training deficiencies at the individual and crew levels and then take necessary action.

RECOGNITION QUIZ

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

(Answers on page 49)

Battalion Command and Control

by Major Richard P. Geier

Combat operations at battalion level require an experienced commander, an efficient staff and a superb organization. Army doctrine for the command and control of a maneuver battalion is described in general terms in *FM 17-17, Coordinating Draft of the Division 86 Tank Battalion Task Force.* Building upon the manual, the 1st Battalion, 13th Armor, 1st Armored Division, has developed a set of operational procedures that has proven effective in the command and control of a tank battalion during command post exercises (CPXs) and an externally evaluated army training evaluation program (ARTEP). This article will describe these procedures by detailing the organization and operation of the battalion tactical action center (TAC), tactical operations center (TOC), combat trains and field trains.

The commander of the 13th Armor commands from his tank. The tank has been modified to meet the requirements of a command and control vehicle by adding an extra radio and secure device and removing the turret ammunition rack thus creating an additional storage area, covered by a map board (see photo #1). The tank also has a small desk mounted over the ready rack for writing and dome lights have been moved to provide proper lighting (see photo #2). The map board uses Velcro fasteners on the board itself and on individual map sheets. The map sheets were cut and mounted on a thin Masonite board and covered with adhesive acetate (see photo #3). The map sheets are pieced together like a checkerboard and when units move off the map, the sheets are shifted and the new map sheets are added. The unused maps are stored upright in an empty Hoffman charge ammo box. These boxes are large enough to store all the 1:50,000 map sheets required for operations in Southern Germany. This system, used by all command and control elements in the battalion, makes operations on an extended battlefield (which require many map sheets) easy.

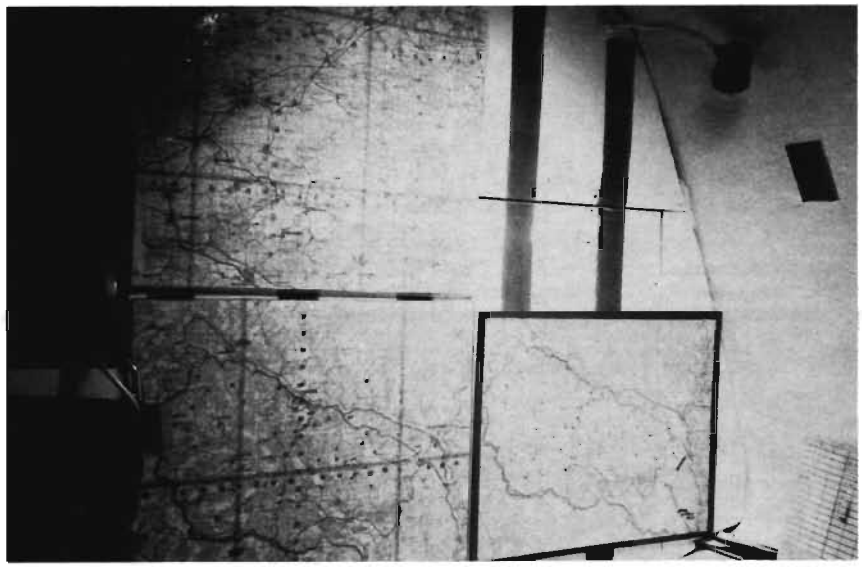


Photo 1. Modified command tank has mapboard at turret rear.

Photo 2. A small desk has been installed over the ready rack.

Both battalion headquarters tanks were identically configured. The commander and S3 ride in the HQ66 tank with the HQ65 tank acting as the wingman. If HQ66 develops maintenance problems, the S3 and commander simply shift over to the HQ65 tank and continue operations. Inside the tank, the commander occupies the tank commander's (TC's) position and the S3 the loader's position. Both monitor the battalion command frequency. The gunner monitors the brigade command frequency and informs the battalion commander of any

Photo 3. Maps are mounted on Masonite.

calls on the brigade net. We found that the VRC 12 that is authorized is not sufficient. Many times the battalion commander was required to talk to the brigade commander at the same time that the S3 was giving instructions to the companies. Also, the unreliability of the VRC 12-series radios requires the backup of an additional radio.

Our battalion S3 rides with the commander. The battalion executive officer (XO) may assume this role. It depends upon the operations experience of the S3 and the battalion XO.

The most operationally-experienced officer should be the battle captain and in charge of the TOC. The least experienced should ride with the commander. It is important, however, that the commander has either his XO or S3 with him. It gives him someone to bounce ideas off of; someone to read the fragmentary order (FRAGO) before it is transmitted; and someone to be awake while the other sleeps. If the operation requires the presence of the commander on one part of the battlefield and supervision on another part, the S3/XO will get on the wingman and move to that location.

Until the successful use of the command tank by the 13th Tank Battalion commander, there was a myth that battalion commanders cannot command from a tank. A number of years ago, a highly thought of tank battalion commander tried it and declared it unsuitable. He did not, however, reconfigure the tank and this, plus the lack of the backup wingman tank, doomed his trial to failure. Having the battalion commander and S3 in a tank gives them the protection and mobility to lead from up front where *all* successful wartime armor commanders have lead. Externally, the tank looks no different than any other tank in the battalion. Internally, the command tank gives the commander the tools he needs to command for extended periods of time. In addition, the tank thermal sights give the commander the ability to watch the battalion's maneuver during darkness and periods of limited visibility.

The commander and S3 also have a *M577A2* that acts as a TAC. This vehicle normally belongs to the S1/S4 (more on that later). The TAC is manned by a driver and the battalion master gunner. Additionally, the battalion commander's *M151* follows. The driver provides some security, acts as a courier or radio relay, and provides backup communications equipment.

The *M577* is configured with two secure radios (one on the battalion command net, the other on the brigade net, and a modular map board. The TAC is normally located on high ground, for good communications, one terrain feature behind the forward line of troops (FLOT). The TAC acts as the battalion alternate command post and a place for the commander and S3 to meet and plan during lulls in the battle. The forward air controller (FAC) and fire support officer (FSO) are normally not with the TAC or command group for reasons explained later. If the battalion receives an attached engineer platoon, experience has shown that the engineer platoon leader should stay with the command group to facilitate immediate engineer reaction to mobility/countermobility requirements.

Coordinating combat support is the responsibility of the tactical operation center (TOC) under the direction of the battalion battle captain (either the S3 or battalion XO). The TOC is composed of three *M577s* shown in figure 1. The TOC is manned by the battle captain, a day-shift of the S3 air, S2, FSO, FAC, assistant operations sergeant, intelligence NCO, and chemical NCO. The night shift is made up of the chemical officer, tactical intelligence officer, assistant FSO, senior intelligence analyst, and the operations sergeant.

The TOC's mission is to control the combat support assets, send reports to brigade, prepare intelligence estimates, plan for future operations and keep the battalion commander informed. This opera-

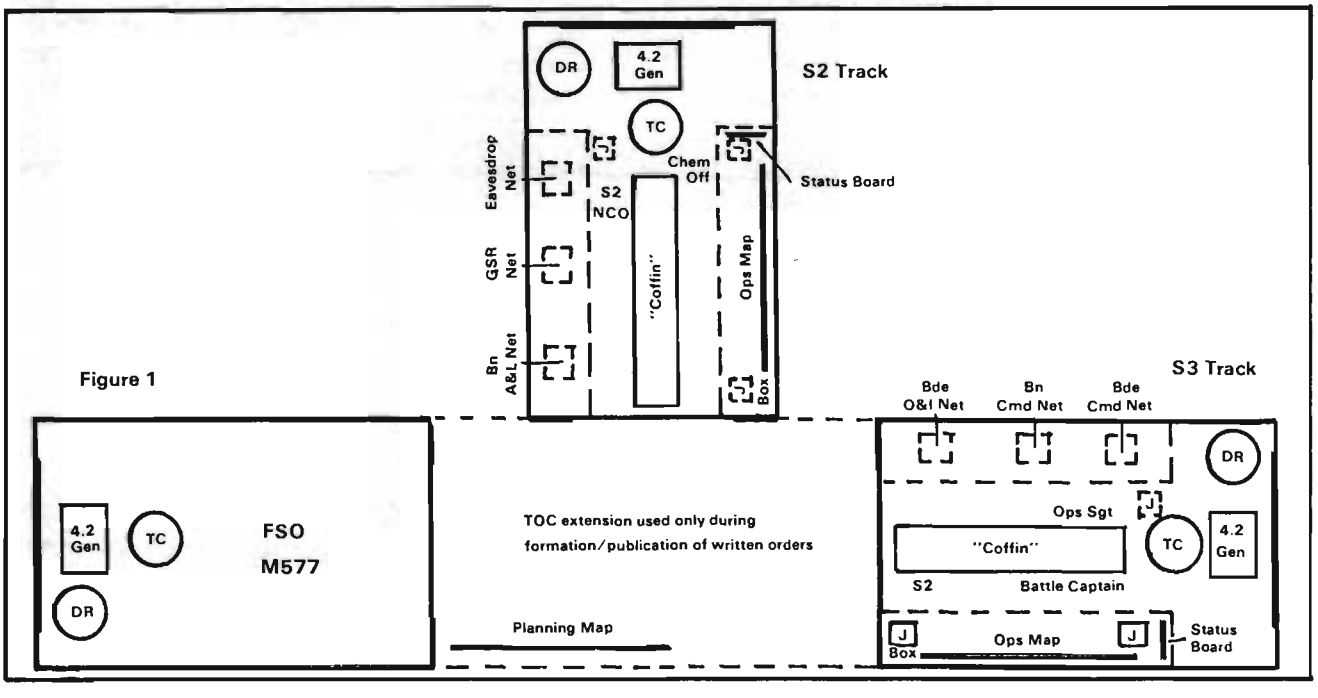


Figure 1

Photo 4. An M577 is configured as a tactical operation center where the battle captain and S2 share the same map. Photo shows right side of the vehicle's interior.

tion is orchestrated by the battalion battle captain. He provides supervision for the staff and combat support elements: he ensures there is coordination between all the key staff officers and combat support representatives; he advises the commander of the situation as he sees it; he informs the brigade of the battalion situation and continually makes the battalion case for additional combat power, if needed, and he ensures that all reports required by brigade are provided accurately and on time.

The 1-13 Armor has elected to leave the FSO and FAC at the TOC for many reasons. The most important of which is better communications. The FSO's tactical fire direction system (TACFIRE) requires excellent FM communications, which is dependent upon proper selection of TOC sites. Communications is the key not only to TACFIRE but also to the overall effectiveness of combat operations. Therefore, command post locations are selected after ensuring the site profiles with the brigade TAC/TOC and supporting artillery TACFIRE sites. The battalion commander influences the artillery support by calling the TOC and directing the battle captain to fire missions, shift priority, etc. The FAC stays with the TOC to ensure there is Air Force/artillery coordination and planning. When battalion-support air missions are inbound, the FAC will move forward in his *M113* to link up with the command group, or company, to direct the air strikes.

The internal organization of the TOC is configured as shown in figure 1 and in photo #4. Three people sit in the operations track at one time. They sit on a padded "coffin" that contains the safe and storage (acetate, overlays, etc.). The operations sergeant sits behind the battle captain and monitors the brigade command net. The battle captain monitors the battalion command net and has the ability to switch to the brigade command net. When he does this, the operations NCO switches over to the battalion command net. The S2 and battle captain work together off a common operations and intelligence map posted with the current enemy and friendly situation. This is done with semi-transparent, stick-on military symbols. The common OPS/INTEL map is important as it ensures that the battle captain and S2 talk about the tactical situation. Separate map boards, even when placed side by side, tend to be kept isolated. Next to the situation map is the "mind-jogger" chart printed on a 5x8 card, covered with acetate and held up with magnets (figure 2). This chart keeps the up-to-date status of TAC, mortars, artillery, air defense, engineer and pending warning orders. This chart is kept next to combat power/task organization markers anchored by magnets to a steel plate. Each company has a marker with current status of tanks, *TOWs* and *Dragons*. A blank marker is kept for each company in the brigade, in case additional companies are attached to the battalion. The battalion battle captain also keeps a 5x8 card on company personnel status (figure 3), and fuel/ammo status, and maintenance status (figure 4).

The other track, which is identically configured, is manned by the S2 NCO senior intel analyst and the S3 Air/chemical officer. The chemical officer prepares downwind data and plans chemical targets/effects. In addition, the chemical officer/S3 air monitor the battalion administration/logistics (A/L) net and keep the battle captain logistically informed. The S2 NCO monitors the ground surveillance radar (GSR) net and takes their reports. The third radio is used to eavesdrop on the scout platoon or company FM nets, whichever is in contact. It is critical that the two operations/intelligence *M577s* be identical; should one fail, or be destroyed, the other provides backup.

A spiral note pad is maintained at each shift member's station. This pad is used to copy down messages and reports. By keeping all messages and reports in a spiral note pad, the shift member can easily refer to an earlier meesage. Important messages such as FRAGOs and Warning Orders (WO) are copied from the pad onto a standard message form and placed in the TOC journal. The journal is nothing more than a manila folder with the DA Form 1594 Daily Staff Journal attached to one inner side of the folder and a standard message form with transmitted or received messages attached to the other side. The journal contains the radio traffic for one day from 0001 to 2400. At 2400, the battle captain or S3 Air, who is on duty, reviews the days's activities and prepares a daily summary to be posted as the last journal entry of the day.

The 1-13 Armor liaison officer (LNO) has an important role in TOC operations. The LNO is normally at the Brigade TOC. He brings to the Battalion TOC any orders or messages from brigade. If possible, he places himself inside the brigade TOC to get a flavor of the division/brigade and flank unit situation. Every 6 hours the LNO travels to the battalion TOC to pick up a written battalion commander's situation report that is prepared by the battle captain. Every 12 hours he stops by the combat

PERSONNEL STATUS DTG

UNIT	AUTH	O/H	%	PRI OF FILL	REMARKS
A					
B					
C					
D					
HHC					
ARTY					
ADA					
FAC					
GSR					
ENGR					

MAINTENANCE STATUS DTG

UNIT	TANKS	TOW	DRAGON	GOER-C	GOER-F	5 TON	2½ TON
A							
B							
C							
D							
SCTS							
MTRS							
HHC							
ARTY							
ADA							
ENGR							
GSR							

Figure 2, above, and 3 are samples of ready-reference "mind-jogger" cards — acetate-covered 5- by 8-inch file cards used to keep track of personnel and maintenance status. These are posted next to the situation map in the TOC 577. A twin 577, used as an intelligence center, is capable of being switched to a TOC, providing backup.

trains to pick up the personnel and logistics reports for the battle captain's review before taking them to brigade.

A key player in the TOC is the operations sergeant. He is responsible for the proper configuration of all the vehicles in the TOC. He is signed for all the equipment. The S3 and S2 separately tried to construct identical *M557s*. This was not successful. The successful solution was to make the operations sergeant responsible for all vehicles. He is also solely responsible for the movement and erection of the TOC. Rapid, accurate TOC movement requires one boss, and in this battalion, that is the operations sergeant.

The S2 and S3 *M577* are powered by one 4.2 KW generator. Generators are not dismounted. One track's generator will power itself and through a long slave cable, the other track. When that generator runs out of gas, the other generator is started and the system reversed. This reduces the noise level and allows maintenance on the non-operating generator. One generator can easily pull the power load of the two tracks. One track driver is on duty at all times to service the generators.

The two identically configured TOC *M577s* not only provide expanded command and control capabilities and redundancy, but also allow the TOC to move by echelon.

A very precise system to move the TOC has been developed. The system is designed to allow recon/quartering, continuous operations and rapid accurate moves. The system has four phases:

Phase 1. The battle captain determines the requirement to move. Planning guidance in this battalion is to move every 6-8 hours. The battle captain does a map recon and points out potential sites to the operations sergeant. (During periods of high activity, the off-duty operations sergeant is also briefed). The operations sergeant then takes the battalion XO's jeep and moves to recon the site. Upon his return to the TOC, he and the S2 *M577* driver take the track to the new site. At the new site, the operations sergeant makes communications checks with the companies on the battalion command net, and brigade on both the command and the operations intelligence net. The operations sergeant then informs the battle captain that he is "set."

Phase 2. The battle captain posts an acetate drop of the current enemy and friendly situation from the situation map and packs up any reference material (OPORDS, etc.) that he may need. He then has the on-duty S2 officer mount his jeep while the off-duty S-2 officer takes his place in the TOC track. The battle captain then moves to the new site followed by the on-duty FSO and FAC in their jeeps. The XO's driver knows the way, as he drove the operations sergeant on the recon. The on-duty S3 officer is in charge of the TOC operation until the battle captain is ready to operate at the new site.

Phase 3. The battle captain arrives at the new site; posts the enemy and friendly situation; and gets an update from the TOC. When this is completed, the battle captain announces that he has the battle, and the old TOC prepares to move. The XO's driver is then sent back to the old TOC site.

Phase 4. The XO's driver arrives at the old TOC site and guides the rest of the TOC to the new location.

These phases may seem redundant and time consuming, but experience has shown that "Murphy" can and will kill you on TOC jumps. This system ensures that no one gets lost (if the XO's driver is

sharp), someone is in control at all times, and communications are checked. Using this system, this battalion's TOC displaced nine times during a 3-½ day exercise without losing control. Most of the jumps were not more than 2 to 3 kilometers. The longest jump was 7 kilometers. This movement allows the TOC to stay where it is needed during mobile operations and provides a measure of security, but movement requires a "no frill" operations. *M577* ramps are kept up. The tracks are wired together with a hot loop for internal communications. One extension is deployed only if the battalion is required to publish an order.

If the battalion receives a written order, the 1/3rd rule is immediately applied. If the staff can assemble, do an estimate and publish the order in 1/3rd of available time before execution of the order, it will be prepared and published at the TOC. If not, the companies will receive a FRAGO. If sufficient planning time is received, the following steps are taken:

- Upon receipt of the brigade OPORD, the battle captain immediately issues a warning order; the commander, S3/XO and battalion staff assemble at the TOC.
- At the TOC, the commander reads the brigade order, restates the mission, gives guidance and the staff prepares an estimate.
- Within 15 minutes, the staff is usually ready to brief the commander on courses of action. The commander chooses or modifies a course of action and the staff prepares the order.
- The order is handwritten; each staff officer is responsible for his portion. The order is written on spirit alcohol reproduction paper and published on a hand-cranked spirit alcohol duplicating machine. The battalion commander feels that a good order now is better than a great one later, so our orders are simple and direct, giving mission-type orders to the company commanders.
- Overlays may also be reproduced on the reproduction paper if the operation covers no more than about 20 kilometers (the length of a long sheet of paper). If not, the operations sergeants and the drivers engage in an overlay making drill. The operations sergeant makes one copy of the S3's overlay on clear acetate and hands the copy to his assistant operations sergeant. They both then make a copy and hand one copy to the two drivers. Then all four each make two copies. This system gives you 11 copies in a very short time.
- The orders process usually takes no more than 90 minutes from the time the commander gives the staff his planning guidance.
- The company commanders and the mortar and scout platoon leaders arrive and are given their copies of the order. They read it, ask questions, and then are sent back to their units. Formal orders briefings are not given, as they are too time consuming. The company commanders and platoon leaders must be given time to prepare their orders.

During the orders process, the XO ensures there is staff coordination. If the XO is the battle captain, however, he may be tied up running the current operation; thus allowing the commander to focus on the future planning. In this case, the S3 is the staff coordinator.

One of the biggest challenges in the TOC is to ensure that TOC personnel receive adequate rest. This challenge is made more difficult if the TOC moves a great deal. We feel we have met this challenge by taking the following measures:

Photo 5. A 2½-ton truck, configured as a sleeping van, can accommodate six men off-duty. The truck eliminates need to set up tents and can redeploy fast.

- "No frills" — one extension is erected only if a written order is to be published — a relatively rare occurrence. No duck boards, exotic charts, or barbed wire are put up. No barbed wire? The common one roll of barbed wire seen around a TOC is ridiculous. It would take a minimum of three staked rolls placed 50 meters all the way around the TOC to provide the minimum amount of security. TOE TOCs don't have the manpower, haul capability or time to erect such an obstacle. Security must depend upon site selection, good intelligence and most importantly, movement.
- Use camouflage nets only when absolutely necessary. Pick sites with overhead cover whenever possible. Try to find sites with thermal cover as well. Setting up in a village or town is ideal. Setting up and taking down camouflage takes too much time.
- Construct the S3 2-½ ton truck into a sleeper. This gives TOC personnel a dry, warm place to sleep without setting up tents, stoves, etc. Our S3 truck can sleep 6 people at a time, plus store our equipment and give the operations sergeant a place to make overlays and run off orders.

During lulls in the battle, the battle captain sleeps and the S3 Air or chemical officer assumes the role of battle captain.

The TOC and command group are supplied with Class I and III by the battalion communications officer, who is normally located in the combat trains. When the HHC first sergeant brings Class I to the combat trains, the signal officer takes the TOC/command group's portion along with any required Class III vehicles to the TOC first and then to the command group. This reduces the burden on the HHC first sergeant and establishes a periodic visit to the TOC/command group by the communications officer to fix/evacuate radios, update CEOIs and encryption devices.

The TOC and command group radio configuration described thus far is not in accordance with the MTOE. The radios to make this system work come from the ¼ ton trucks. Extra radio mounts, cables, matching units and antennas were purchased thru the Class IX supply system and mounted in the command tanks. The extra radio in each command tank comes from the battalion commander's and battalion XO's jeeps. The S2 track is authorized the required three VRC 46s. The S3 is authorized six VRC 46s. Three radios are installed in the S3 *M577*, one radio in the FAC track and one radio in the S1/S4 track. The last radio is installed in the S3's wheeled vehicle, if authorized. Our current MTOE does not give the S3 a light tactical wheeled vehicle and thus the extra radio is used as a *float*.

Effective and efficient TOC operations are a result of training. The system described thus far took 60 days to implement due to construction requirements. During those 60 days, and an additional 30 days thereafter, training in TOC operations was conducted by the battalion battle captain. This training consisted of weekly 5-hour periods. During these periods, orders were developed and published, TOC movement was practiced, both day and night, and communications nets were exercised. In addition, the battalion participated in 2 CPXs that were instrumental in eliminating unnecessary equipment and polishing procedures.

TOC operations can be reduced to a series of drills. Movement, orders publication, communications, and coordination drills must be developed and practiced. Initiating a TOC operations system is not as hard as sustaining a system. Units tend to peak before an exercise or evaluation and then go on to other seemingly more important tasks. 1-13 Armor sustains its system by conducting one 5-hour training period per month. During this training period the TOC will do a staff estimate, publish an order and make a jump.

1-13 Armor deploys echeloned trains, a combat and field trains, both of which have a unique yet supporting logistics functions. The battalion combat trains has an operations role in 1-13 Armor equally as important as the TOC and command group. It is responsible for the battalion's logistical operations and, as such, must organize and train in a manner similar to the battalion TOC.

The combat trains are located 4 to 10 kilometers behind the companies. The combat trains use the following criteria (in priority) to pick a trains site.

- Communications — as the battalion A/L net control, the combat trains must be sited to insure FM communications with companies and battalion field trains, which is located in the vicinity of the brigade field trains.
- Cover and concealment — Built up areas are used whenever possible.
- Near the battalion main supply route (MSR).

The combat trains is controlled by the S4 assisted by the S1. They operate out of the radio-teletypewriter (RATT) *M577*. As stated earlier, the TOE S1/S4 *M577* is used by the command group. The RATT track, with modification, functions well as the combat trains command post. A great deal of the battalion's administration and logistics communications with brigade is passed on the long range AM RATT. Colocation of the RATT and CP helps eliminate the "tyranny of the message center." The authorized RT 524 in the RATT has been exchanged with the pushbutton RT 246 from the HQs 65 tank. The auxiliary receivers from the two headquarters tanks, with secures, have also been installed in the RATT *M577*. The S1/S4 are unable to operate inside the *M577* due to space limitations and the RATT noise, so they operate in the extension. A long cable running from the *M577's* 1780 to a jack box mounted on a plywood board is used. A speaker and a microphone is attached to the jack box. In addition, a long cable is run from the face of the pushbutton RT 246 to a remote switch. This is also mounted on the plywood board. Speakers from the 2 auxiliary receivers are mounted on the back of the track. This allows the S1/S4 to keep the receiver/transmitter on the battalion A/L net and monitor the brigade A/L and battalion command nets. The remote switch enables the logistics operators to switch to the brigade A/L net when necessary without disrupting the teletype operators.

The battalion standard *M577* Velcroed map board hangs in the extension. The map board uses the same modular map system used at the command group and TOC. The S1/S4 keep abreast of the tactical situation by monitoring the battalion command net. They are required to post the friendly and enemy situation and could, if necessary, function as the battalion tactical command post should both the command group and the TOC be destroyed.

The combat trains is made up of the RATT track, the two medic *M577s*, the S1 2-½ ton truck, two *M88* recovery vehicles, two prescribed load list (PLL) trucks with tool trailer (one PLL truck carries the NBC decon equipment), 2x5-ton cargo trucks loaded with tank ammunition, 2x5-ton tank and pump trucks loaded with diesel fuel, each pulling a trailer mounted pod filled with MOGAS. The combat trains also has the S4, chaplain, retrans, signal officers, and battalion physician's jeeps and the maintenance warrant's *M880*.

The combat trains is manned by the S1 and S4 (one of whom is awake and in charge at all times), the battalion chaplain, physician, physician's assistant, medical platoon headquarters, maintenance warrant, battalion motor sergeant or maintenance service section sergeant, PLL clerks, PAC clerks and vehicle drivers.

During offensive operations, the combat trains must move often to maintain responsive support. Prior to movement, the maintenance warrant discusses proposed new combat train's locations with the S1/S4

and then conducts a reconnaissance. Upon his return, he leads the quartering party to the new site. When the quartering party is ready, the S1/S4 lead the combat trains to the new location assisted by a guide who went on the reconnaissance with the maintenance warrant. During a recent ARTEP, the combat trains displaced four times while maintaining support.

The company first sergeants control their medic and maintenance *M113, M88* recovery vehicle and a fuel and ammunition GOER. Normally, the first sergeants keep the maintenance contact team and medics forward in a company trains and leave the fuel and ammunition GOERS with the combat trains. He will then bring fuel and ammunition forward when needed, usually at night.

The combat trains CP is the line company's single point of contact for A/L support. Empty fuel and ammo GOERS are taken there by the first sergeant and S4 ensures they are dispatched to the field trains for refill. The combat trains can also serve as a relay between the first sergeant in the company trains and his supply sergeant in the battalion field trains. The first sergeant uses the supply sergeant to interface with the company mess teams and to bring rations, mail replacements and supplies forward. The first sergeant designates the time and location the supply sergeant is to meet him. Usually it is at the combat trains.

The field trains is the coordination point for logistical support from the forward support battalion. It is located near the brigade field trains and uses a site selection criteria similar to the combat trains.

The field trains is controlled by the HHC commander. He and his command group (XO and 1SG) are responsible for site selection, quartering, movement, security and operational control. The HHC first sergeant is additionally responsible for the Class I, III, V support of the scouts, mortars and combat trains.

The battalion motor officer, motor sergeant and the remaining PLL trucks are in the field trains. They ensure that required repair parts and major assemblies are received from the FSB and pushed forward to the combat trains. Maintenance operations are characterized by the following doctrinal statements:

- Fix as far forward as possible.
- Keep recovery assets forward.

If the company contact team cannot fix the vehicle because of a lack of a required part in the combat trains or time (2-3 hours) to receive and replace the part, they drag the vehicle to the battalion MSR and drop it off. Recovery vehicles from the combat trains will pick up the vehicle and drop it off at the organization maintenance collection point (OMCP) established near the combat trains. Vehicles that cannot be repaired within approximately six hours are recovered directly to the battalion field trains. It has not been determined what recovery assets will accomplish this. The battalion does not have the assets to move broken vehicles the 20-30 kilometers to the field trains and return; and the FSB currently does not have the recovery assets.

The support platoon leader and platoon sergeant are located in the field trains and are responsible for the following:

- Coordination, pick up and delivery of all classes of supply except Class IX.
- Supervision of the mess operation.
- Supervision of the company supply sergeants.

The support platoon leader builds logistics packages based on company requests and dispatches these packages to the company first sergeants under the supervision of the company supply sergeant.

The S1 operates a replacement receiving point (RRP) in the field trains. The RRP is manned by two PAC clerks in the field trains CP.

The field trains CP is manned by the HHC commander/XO/PAC clerk and is located in a 1-½ ton trailer belonging to the communications platoon. The HHC commander's jeep radio is remoted into the trailer and maintained on the battalion A/L net. Wire communications are established from the CP to the battalion maintenance officer (BMO), support platoon, mess teams and to the brigade field trains CP.

The combat trains is responsible for keeping the field trains abreast of the tactical situation.

With the XO in either the TOC or command group, the role of logistics troubleshooter falls on the battalion command sergeant major (CSM). The battalion's senior noncommissioned officer has the experience and, more importantly, the clout to do this well. Many battalions feel the battalion XO is the only person capable of energizing the logistical system. We have found that the CSM has equal if not greater motivational power than the XO.

In summation, this is how we operate in the 1-13 Armor. The operations and logistics system described in this article is based on doctrine, evolved through trial and error, practiced by training and executed successfully on an externally evaluated ARTEP. This system is as simple as it can be made but is still complex. Executing this system requires construction and training. Sustaining proficiency in the system requires periodic training. We feel we can sustain proficiency thru 5-hour practical training exercises for the entire operations and logistics system conducted at least once a month.

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Employing Tank Mine Rollers and Ploughs

by Major F. R. Thomas, 8th Canadian Hussars

NATO forces can initially expect to conduct defensive operations against large numbers of Warsaw Pact (WP) MBTs. As the only kinetic energy tank-killing system presently available, tanks have a key tactical function in the crucial antiarmor battle.

Tanks will be employed in two main roles: First, they will provide the kinetic energy (KE) antitank fire of the positional antiarmor framework required to blunt enemy attacks and hold ground. Secondly, tanks will form the basis of the mobile antiarmor element held in depth to block or counterattack. Both of these tasks will require great mobility on the part of NATO's greatly outnumbered tank force.

The Soviets, on the other hand, intend to deny our tanks this needed mobility through, among other tactics, massive offensive mining operations. Hasty minefields will be used to stop or slow NATO tanks positioning for defense or attack. Mobile obstacle detachments (POZ) are found at both divisional and regimental levels (see Figure 1). The main tasks of these detachments are to defeat counterattacks, seal off flanks of moving opposing formations, and to assist in the defense of objectives already taken. Since disruption is the main purpose, only small minefields — up to 150 mines — are laid. Each engineer vehicle of the POZ carries at least 20 to 30 mines, regardless of task. The tracked minelayers of the division POZ carry 208 mines and can lay them in about 20 minutes.

The Soviets also have the technology to deliver scatterable mines, although the WP is thought to prefer to do this by aircraft, helicopters, or rockets (MRLS) rather than artillery. It is obvious that the Soviets have the means to delay or stop NATO tanks through the use of either hasty or scatterable minefields.

To ensure the mobility of MBTs, Canada and the U.S. have equipped tanks with mine-rollers such as that shown in Figure 3. Canada has also adopted use of the mine ploughs to be used in conjunction with mine-rollers. The intended scale for Canadian units is two mine-rollers per tank squadron (company) and one plough per tank troop (platoon).

Normally, only individual tanks will *wear* this mine-clearing apparatus unless a particular tank is embedded in the positional antitank framework. Mine-rollers are heavy[1] and MBTs are probably the only currently available vehicle that can carry a set and still maintain cross-country mobility. Moreover, attempts to marry up mine-rollers held separately from the tanks at times when these breaching devices are urgently needed will invariably be subject to all the factors that cause *foul-ups* on the battlefield. Tank commanders can't afford to wait for the arrival of whatever vehicle is carrying the rollers or whatever unloads the nine tons or so! Some tanks in any armoured force expecting to encounter mines, that is, at least once a day, must wear mine-rollers perma nently. The question is then, which tank will carry the extra ten tons in a squadron (company) sub-unit?

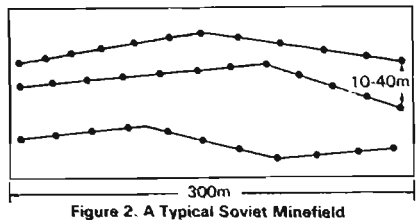

Figure 2. A Typical Soviet Minefield

A compromise solution has been adopted in Canada which puts one mine-roller on a tank in squadron headquarters (SHQ) and one mine-roller on a tank in a troop (platoon). While I agree that all tanks of the squadron can carry the mine-rollers, I think that for command reasons the squadron commander (OC) must have this vital equipment under his direct control. Moreover, the mine-roller can restrict use of the main armament. If the firepower of any element is to be restricted, it should be the tanks of squadron headquarters. Troop firepower units should not be reduced to three tanks from four through technical limitations on the use of their main armament or because of employment. Therefore, I consider the two mine-rollers in each squadron to be additional MBTs added to squadron headquarters to carry these rollers. Mine ploughs do not affect the use of the tank weapon system, so they can be distributed to each troop for assignment by the troop leader to a tank in his troop.

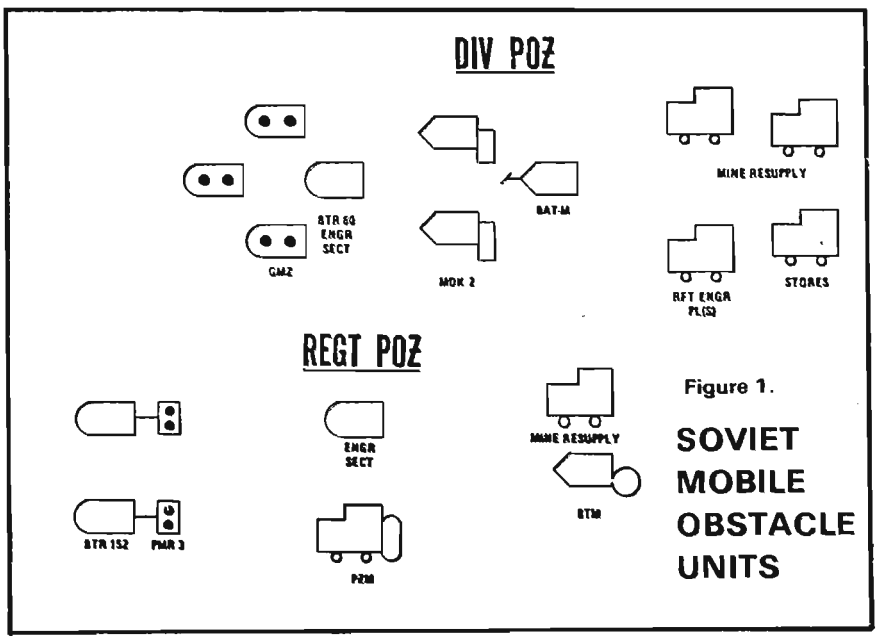

Figure 1.

SOVIET MOBILE OBSTACLE UNITS

Figure 3. A Canadian tank-mounted mine roller.

Although the equipment is now being issued, it still remains to answer Captain Tesdahl's question of "How-to-Breach" raised in an *ARMOR* magazine of eight years ago.[2]

The first step is to discover the mines. Although progress must still be made in the development of means for detecting mines from fast moving AFVs, alert commanders can anticipate likely locations. Moreover counterattack routes are recce'd in advance. Likely spots for mines are defiles near enemy positions or weapons, at road blocks, in old ruts, at crossroads, on the shoulder of sharp curves or narrow portions of roads, at blown culverts, and around craters. It must be remembered that the mines are deployed to delay the counterattack, protect the enemy's newly-seized defensive position, or his flanks. Soviet practice is to cover these hasty minefields with fire.

Thus, the first indication of a minefield may not be a detonation of a mine but destruction of a tank by antiarmour fire. Crew commanders in the ensuing engagement may then discover mines as they move their tanks forward. Coming under fire then may be the squadron commander's cue to move his mine-rollers forward at least in line with the leading tanks.

Crews that survive the initial contact must then take appropriate action on encountering the mines. Hasty minefields are laid in multiple strips approximately 300 meters wide. Therefore *not all tanks,* if deployed for fire and movement (at least 100 meters apart), will encounter mines.

However, to maintain momentum the squadron commander must immediately deploy a mine-roller from squadron headquarters followed by a tank with a plough from the nearest troop. The mine-roller tank must mark the lane since tracking exactly is important, particularly under conditions of poor visibility.[3] The roller/plough mix is the combination which statistically will enable the most tanks to breach undamaged.[4] However, as tanks must deploy in single file behind the mine-roller and plough, the OC must order the squadron's other mine-roller to start a second breach. The idea is to have the squadron moving through two breaches simultaneously. Obviously, friendly fire, including smoke, must be brought to bear while this is happening as the enemy will concentrate his fire on the tank with the breaching apparatus. The enemy will be hoping to destroy the momentum of the counterattack so any delay plays into his hands. If mine-rollers are rendered ineffective, the commander may have to chance casualties by continuing to cross without mine-clearing equipment, bearing in mind the limited depth of the hasty minefield.

The key is to remember that if tanks stop on encountering hasty minefields, then the enemy's use of mines has been successful.

Mine-rollers and ploughs offer tanks an opportunity to continue moving to block or counterattack with a minimum of casualties. Remotely delivered mines that are dropped on top of a tank company require different action. Mines delivered on top of tanks still require time to become armed. The best policy is to keep moving as there may not be time to form up behind the squadron's (company's) mine-rollers and ploughs.

Even if mines are encountered that at first appear not to be covered by fire, the principle of fire and movement must be maintained.

The key to employing mine-rollers is to keep them directly under the squadron commander's control in squadron headquarters. Each mine-roller must be brought into action as quickly as possible to breach any hasty minefields encountered and should be followed by a tank troop (platoon) led by its organic plough. Mobility must be maintained if the Soviet use of hasty minefields is to be defeated.

Footnotes

[1]Each roller bank in the Canadian mine-roller set weighs approximately 4.5 tons.

[2]R. Michael Tesdahl, "Probing for a Solution," *ARMOR,* May-June 1977, p. 55.

[3]Equipment for marking lanes is going into service as this is being written, for example (CLAMS).

[4]N. Gass, and P. O'Connor, *Effectiveness of Plow/Roller Combinations Against Mixed Minefields,* DREV 3621R-050 October 1983.

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Two British regiments now field the Challenger MBT.

The Armoured Regiment of the RAC

by Lieutenant Colonel Oliver E. Holder and Major Frederick G. Lee

Forty years ago, the allies brought to an end the long and difficult struggles of World War II. As we look back on the accomplishments of 1945, they should serve as a reminder that we must continue to look forward to a day when we might possibly have to fight again as part of an allied effort.

But what do we really know about our allies? What is their history, how are they now organized, what is their equipment and how do they train?

The Personal Exchange Program allows a fortunate few a 2-year tour of duty with an allied army, and an in-depth look at that army's organization and practices. Thus, in the spirit of interoperability, we would like to describe the British Army's Armoured Corps with a focus on the armoured (tank) regiment and the role it plays in the defense of Northwest Europe.

The Royal Armoured Corps (RAC) was formed in 1939 and is composed of two wings — the former cavalry regiments of the line and the Royal Tank Regiment. There are 17 regiments in the RAC and, although a separate corps, the Household Cavalry provide a further two regiments which are both tasked operationally, and equipped similarly to the RAC, in addition to providing the state ceremonial mounted regiment in London. (See Figure 1).

The history of the cavalry regiments dates back some 300 years and they still retain their titles of Dragoon Guards, Hussars and Lancers.

The name "dragoon" derives from mounted infantry of the 16th and 17th centuries, who were armed with a carbine called a dragon and who dismounted to fight. Regiments of Dragoon Guards have fought in some of the most influential battles of the last 500 years — the Battle of Sedgemoor, the Austrian and Spanish Wars of Succession, the Seven Years War, the Crimean and Boer Wars and the Battle of Waterloo (where they were personally thanked by the Duke of Wellington). The last successful cavalry charge of World War I was by a regiment of Dragoon Guards and in World War II they were on battlefields as far apart as Burma, the Western Desert and Normandy.

Like Dragoon Guards, Hussars have a long and glorious history. They were originally expert horsemen of the plains of Hungary who were raised by the Hapsburg Emperors to guard against the Turks on the Eastern front. Their British counterparts have taken part in the War of Spanish Succession, the Bat-

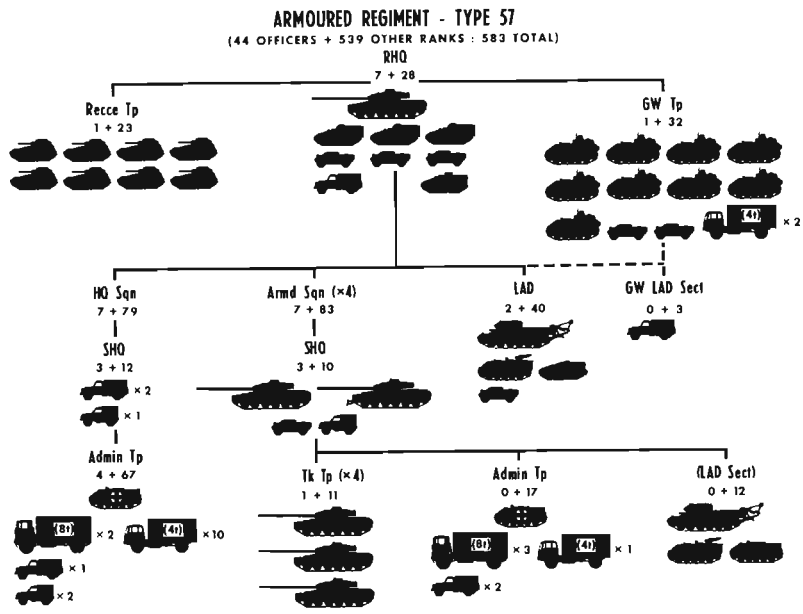
tle of Culloden, the Peninsular War, the Afghan and Sikh Wars and the Boer War. In the Crimea they took part in the Charge of the Light Brigade and were among the first troops to go into France during World War I. All the major battlefields of World War II saw Hussars in action and the exploits of the 11th (now part of the Royal Hussars) as an armoured car regiment in the Western Desert are legendary.

The lance was introduced into the British Regular Army in 1816-17. Several regiments of Light Dragoons changed their title, role and uniform to that of Lancers. British Lancers first charged with the lance at Bhurtpore in India in 1825 and then served in the First Afghan and Sikh Wars. They also took part in the Charge of the Light Brigade at Balaclava and helped to suppress the Indian Mutiny. In the late 19th Century, they fought against the Zulus, took part in the Boer War and charged the Dervishes at the Battle of Omdurman. In World War I, they served in France and Flanders and their WWII actions included covering the retreat to Dunkirk, the Battle of Alamein, and the plains of Northern Italy.

The Royal Tank Regiment is descended from those who manned the earliest tanks — a British invention of WWI. (The name "tank" was adopted for security reasons when the machines were reported as "water tanks for Russia" in 1915.) From 1917, this new arm was known as the Tank Corps, and it was instrumental in breaking the deadlock along the Western Front in 1917 and 1918. It became 'Royal' in 1923 and was very largely responsible for developments in equipment and tactics for both tanks and armoured cars between the two wars.

When the mechanization of the cavalry was nearly complete in 1939, all those manning tanks and armoured cars — cavalry and Royal Tank Corps — formed the Royal Armoured Corps. Subsequently the Royal Tank Corps changed its title to The Royal Tank Regiment (RTR).

Royal Tank Regiments fought in every British theatre of war between 1939-1945, right up to the fall of Berlin.



Purpose

Of the 19 regiments of the Household Cavalry and Royal Armoured Corps, 14 are equipped as armoured regiments and five as armoured reconnaissance regiments. At any one time 13 regiments are based in West Germany (11 armoured, two reconnaissance) (See Figure 2) and the remaining six in the United Kingdom. Regiments rotate through the two training regiment roles in the United Kingdom. The United Kingdom-based regiments have wartime and training commitments, either in West Germany or on the northern flank of the NATO forces. It is likely in the near future that one of the two training regiments will be deployed to Germany to form a twelfth armoured regiment. This will leave only one training and one armoured regiment in the United Kingdom.

The 13 regiments make up part of Britain's permanent garrison of 55,000 troops in West Germany. This force is limited in size by political and economic constraints, but would swell to approximately 130,000 in time of tension or war.

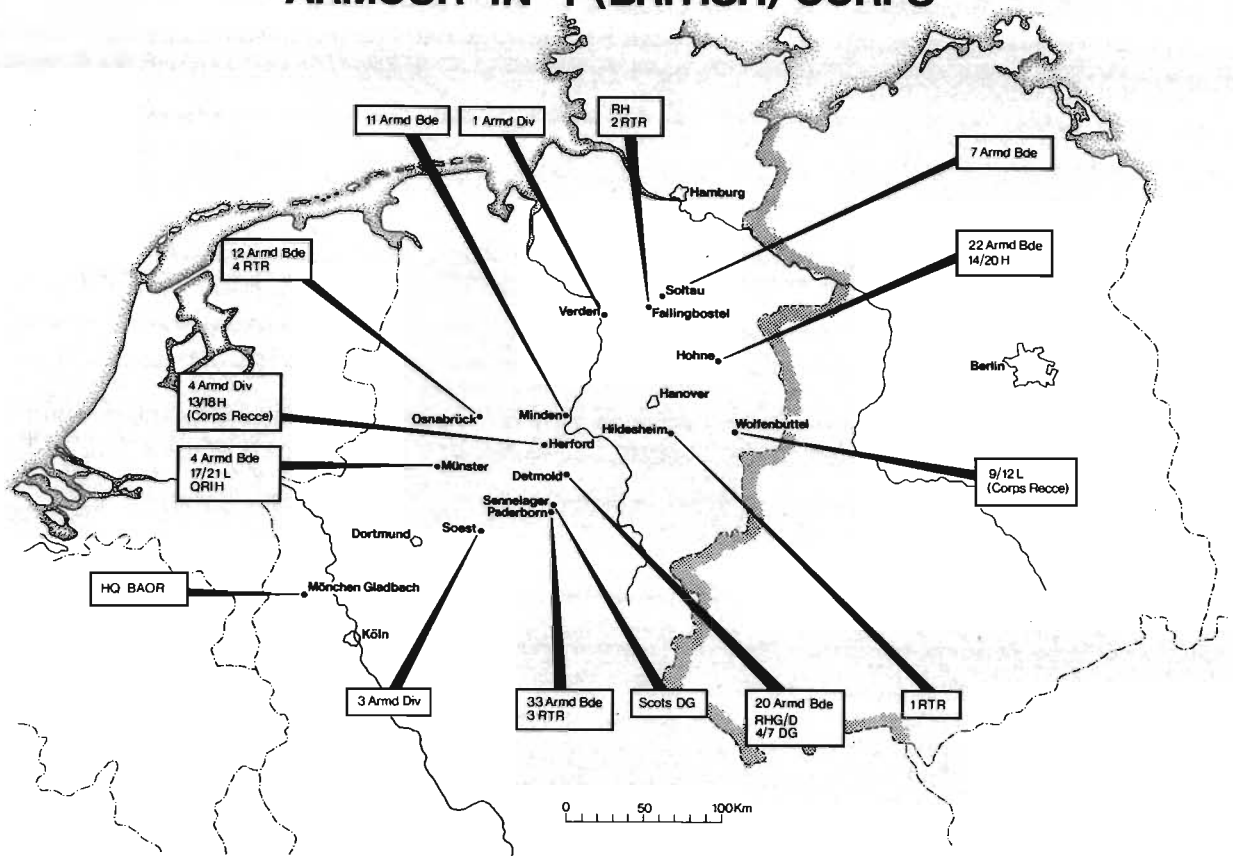
The garrison's sector lies between the 1st German Corps and the Belgian Corps and is based on the Hanoverian Plain, a likely axis for fast-moving Warsaw Pact forces intent on capturing the industry of the Ruhr or the English Channel ports. (See Figure 2). This is tank country in every sense of the word and requires a hard-hitting mobile force to react quickly to the type of forces likely to be encountered. So let us look then at the armoured regiment as it is organized in 1st British Corps today, and make some comparisons to the United States Division 86 Tank Battalion.

Organization

The British armoured regiment, like its United States counterpart, the tank battalion, has recently undergone a number of organizational changes to adapt it to current battlefield requirements. Despite the confusion in terminology — regiments, squadrons and troops versus battalions, companies and platoons — the British armoured regiment in its present form has many similarities to the U.S. tank battalion. These similarities are not only in size — 57 tanks and 583 personnel versus 58 tanks and 579 personnel — but also in organization, type of equipment and tactics. But there are distinct differences too, which are influenced by training and fighting philosophies as well as cultural differences and economic pressures.

Shown at Figure 3 is the Type 57 Armoured Regiment which was adopted in 1984. It is composed of a regimental headquarters made up of command and control elements, a close reconnaissance troop and

ARMOUR IN 1 (BRITISH) CORPS



an antitank guided weapon (ATGW) troop; four armoured squadrons with four tank troops in each; a headquarters squadron for providing logistic and administrative support; and a Light Aid Detachment for regimental maintenance and recovery support. This organization is descended from the Type 62 Armoured Regiment, which began to change in 1980. That regiment, with 62 tanks, provided an additional tank in the regimental headquarters for the second-in-command and a third tank in each squadron headquarters for a "battle-captain" who helped the squadron leader with control and provided a back-up rear communications link. In its evolution to the Type 57, the Type 62 gave up five tanks but regained the close reconnaissance and ATGW troops, which for some years had been attached, when required, from other units. Being considered for the future is a further reduction in the number of tanks in some regiments, perhaps as few as 43, which would allow for an extra armoured regiment in West Germany while remaining within the manpower ceiling of 55,000 troops.

Chieftain is the standard main battle tank, and, although fielded in 1967, has been modernized and will remain in the fleet for some years. The new main battle tank, *Challenger,* has been introduced to two regiments and it is planned for issue to five more by 1986. (See "British Army Introduces the *Challenger*" by R. M. Ogorkiewicz in the March-April 1982 *ARMOR*).

The regimental and squadron Commanders train to fight from tanks, as do the squadron seconds-in-command.

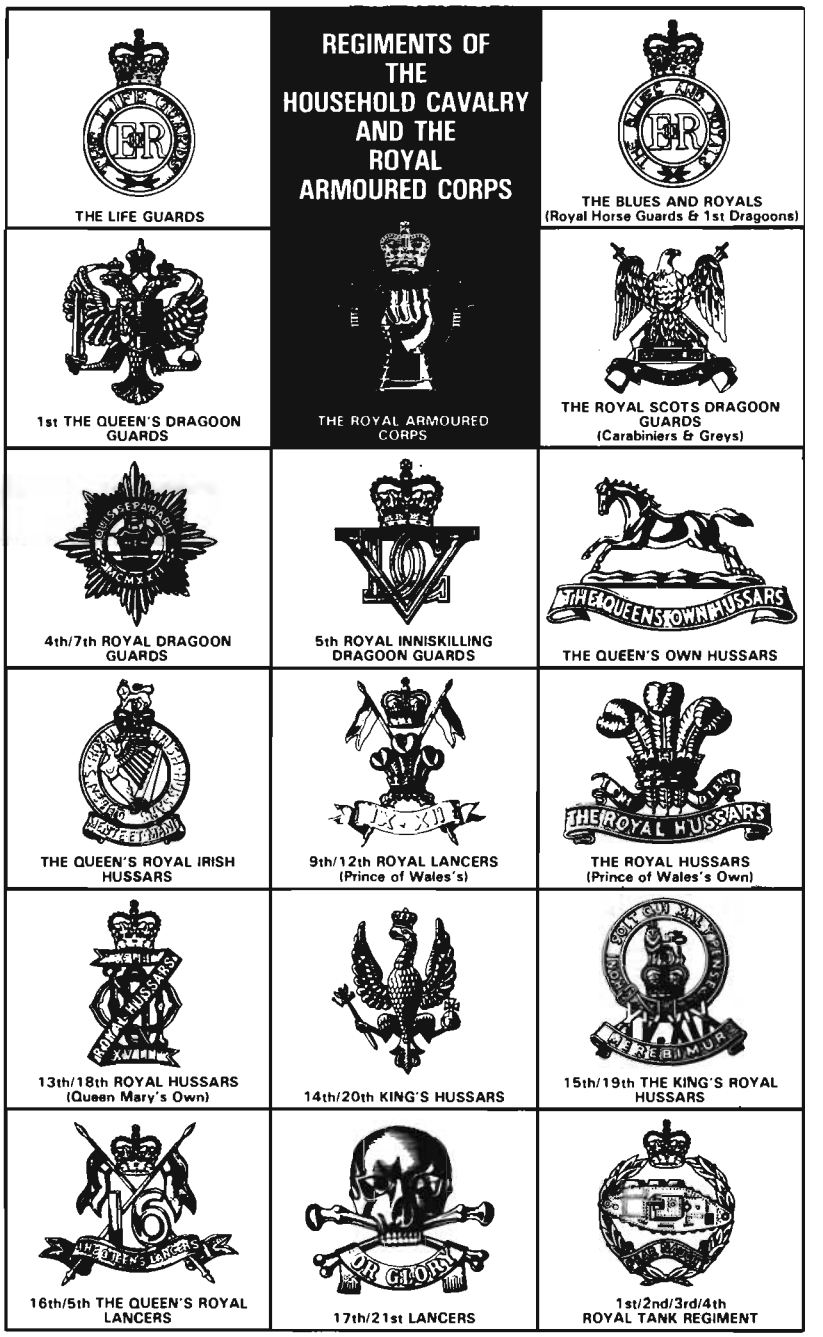
Within the squadrons, there are two chief differences from the United States tank company; the first is that the commander is a major, not a captain. This, of course, delays the command opportunity but does provide an officer who is more established in his career, more mature and who has spent considerable time at regimental duty. The other difference is the organization of the squadron into four troops of three tanks instead of three and four. The merits of this approach could be endlessly debated. Its disadvantages are recognized, but in wartime it reduces the leader-to-led ratio and in peacetime it does provide more troop command and small-unit training opportunities for officers *and* NCOs. (Two troop leader positions per regiment are designated for NCOs).

The close reconnaissance troops of eight *Scorpions* came back into the regiment's organization in 1984. Prior to that, close reconnaissance was provided by a troop that would be attached to the armoured regiment from an armoured reconnaissance regiment. It was realized that this system was unwieldy and that the armoured regiment commander needed his "eyes and ears" to be a permanent part of this "head". This troop performs the traditional close reconnaissance troop tasks to include route, area and zone reconnaissance, mounted and dismounted observations posts, obstacle, nuclear and chemical reconnaissance, and traffic control and rear area security. With its eight *Scorpions,* the troop can operate either as a whole, in half-

troops of four vehicles each, or in sections of two vehicles. With its relatively small size, excellent mobility, but limited firepower, the *Scorpion* troop normally operates on the principle of reconnaissance by stealth, but may fight for information. With eight of these vehicles, the regimental commander has enough to commit to several tasks simultaneously but the three-man crew is a limitation for 24-hours-a-day operation.

The ATGW troop, equipped with nine FV 438 *Swingfire* vehicles, has also recently returned to the armoured regiment organization. Prior to 1984, it was part of a battery in the brigade and was provided by the Royal Artillery. This was changed in recognition of the need for the armoured regiment to have its own long range antitank fire to complement the tank guns. The *Swingfire* system, with its 4,000-meter range (day and night), can provide flank protection, overwatch in the advance, long-range fire in the defense, or can be held as a regimental asset or detached to individual squadrons. In practice, the brigade commander may still keep a string on them for concentration of long-range fire at critical moments in the battle.

You will have noted that both the British armoured regiment and the United States tank battalion have about the same number of tanks; both have a reconnaissance unit and both have long-range ATGW systems (with the U.S. ATGW systems on the scout platoon's *Bradleys*). But what about mortars? The armoured regiment has none and has no plans to acquire them. Indirect fire support will come from the direct support artillery and, if operating as a battlegroup (task force), from the attached infantry's mortars. It is believed that the armoured regiment on its own does not require the high explosive fire effects of mortars (HE and smoke rounds are a part of the tank's basic load). Of course smoke grenade dischargers are mounted on both *Chieftain* and *Challenger* to provide a quick vehicle smoke screen.



Logistics

Without going into logistics in detail, it is of interest to note that armour commanders consider integral ammunition and POL "lift" inadequate. This problem is exacerbated in *Challenger* regiments, which use double the amount of POL. Battle replenishment is "on call", rather than on the usual once-daily basis, and squadron echelons are held well forward.

Fighting

The traditional roles of British armour continue to be:

- Aggressive mobile action to destroy enemy armour.
- Close combat in conjunction with infantry, artillery and engineers.
- Shock action.

The nature of the open terrain within the 1st British Corps area dictates mobile and flexible tactics. The introduction of the *Challenger* main battle tank to five armoured regiments (with a possible three more) provides increased mobility and flexibility and allows commanders to concentrate armored forces to provide the necessary

shock action at critical points during the battle.

In almost all situations the armoured regiment will not fight as a pure regiment but will form the nucleus of a combined arms battle group (BG). Such a group will be commanded by the regimental HQ and will normally include:

- Some or all of the regiment's armoured squadrons. (In some cases, one or more squadrons will be detached to provide armour for another BG formed on a mechanized infantry battalion).
- The close reconnaissance troop.
- All or part of the ATGW (Swingfire) troop.
- Artillery in support.
- One or more mechanized infantry companies.
- One or more detachments of *Blowpipe,* the shoulder-fired low-altitude air-defense missile.
- Other support appropriate to the operation, such as helicopters (although available on a very limited basis by U.S. standards) and engineers.

When engaging in operations at squadron level which require armour and infantry forces, a "squadron/company group" may be formed. This grouping of two company-sized units under one squadron commander means that there is more infantry combat power and that the company is operating intact. The same grouping could occur in an infantry BG for an armoured squadron and for the same reasons. This avoids penny-packeting forces below the squadron or company level which should mean that they would fight more effectively. It may seem this would lead to some interesting command and control problem, but in the British Army the system has been tried and tested and is found to work well.

To make maximum use of armour's mobility, it must be given room to maneuver, and it should be given tasks which take advantage of its freedom of action while limiting its exposure to its chief vulnerabilities, such as air attack and antitank weapons.

In the defense, there are several tasks which take advantage of mobility and firepower. Counterattacks and counter-penetration operations can be mounted by armoured battle groups or larger units and will be used when the enemy is caught off balance, when key positions must be retaken, or to halt the forward movement of the enemy force.

Counterstroke is another key task and is receiving much attention today. It is one which a brigade-sized formation — made up of two or more armoured regiments supported by air and artillery — will execute against large enemy formations that have achieved a rapid penetration of the forward defense. The purpose of the counterstroke will be to destroy the enemy force (or vital parts of it) while it is on the move by attacking the more vulnerable flanks. The taking of ground will occur only as an indirect consequence. It is an operation which cannot be preplanned in detail, and which will require flexibility, initiative, the ability to concentrate rapidly, and violent execution. Armoured regiments train to fight this battle.

There will be times, of course, when the armoured regiment may have to compromise on the principle of mobility to take up a secondary role as antitank forces in support of infantry in main defensive positions. These tasks may include the occupation of villages forward of main defensive positions, covering obstacles as part of a strong point and the occupation of defenses in depth as part of a counter-penetration plan. In these cases other arms will provide local protection and mutual support.

The traditional roles for tanks have not changed, but there is an increased awareness that they are a premium asset. When supported appropriately and applied at the critical moment, they can have a decisive impact on the outcome of the battle. The greatly increased capabilities of *Challenger* give a new meaning to mobility and flexibility for the armoured regiment.

RAC equipment includes the much-modernized Chieftain MBT, at left, the Swingfire ATGM system, at right, and the Scorpion reconnaissance vehicle, lower right. The Sultan, bottom of page, is a C&C vehicle equivalent to the U.S. M577.

Training

The British, because of the regi mental system and subsequent com parative lack of turbulence, have an advantage in crew and higher collective training. Field training, other than the annual FTX over the German countryside, is limited to the one training area at Soltau (between Hannover and Hamburg). This area (SLTA) is heavily used by all arms and is occupied virtually year-round. Armoured regiments usually manage 5-6 weeks each year on SLTA, divided into two or three periods. Training each year progresses from troop level through squadron to BG level. Standards of training are tested by the next higher commanders, frequently culminating in a brigade exercise with two battlegroups opposing one another with the brigade commander acting as chief umpire and controller. There is no formal ARTEP, but standards of training are monitored throughout the year and all skills, including physical fitness, NBC, and first aid, are tested at least twice.

The British are fortunate to have the NATO (Bergen/Hohne) tank ranges fairly close at hand. Each regiment undergoes a closely monitored annual firing camp lasting two weeks. Although this is not a "test" for the commanding officer, the reputation of the efficiency and readiness of a regiment is judged during the gunnery camp. With the introduction of modern technology into gunnery training simulators, a high standard of gunnery is much easier to retain than in years past but, as with any training simulator, however realistic, it does not replace the real thing.

We are familiar with the elements of "in-barracks" training and the skills that should be practiced. With the automotive improvements to *Chieftain* and the intro-

duction of *Challenger*, less time needs to be spent in the tank park (motor pool) on maintenance tasks. Training programs reflect this and there is more time available for combat skills, fitness training and sport. Troop leaders and sergeants are responsible for running their squadron leader's "in-barracks" training program. It is of interest to note that NBC training is taking a much higher priority than in the past. Collective (crew) protection is being improved and more time is spent on individual NBC skills.

The most valuable training that British armoured regiments have is at the British Army Training Unit Suffield (BATUS) in Alberta, Canada. Both armoured and infantry BGs from BAOR train at BATUS. This means that, as there are seven BG training periods each year; a squadron should go once every two years. The training at BATUS is the most realistic that can be devised within safety regulations. BGs go to BATUS for 5-½ weeks, during which time they complete a series of all-arms, live-firing exercises encompassing all the phases of war. For armour, gunnery is the most important aspect within the framework of a tactical scenario. Included in the training are the tactics and combined weapons effects of all arms, NBC drills, map reading, survival (when the climate is extreme) and, very importantly, the planning and execution of all aspects of logistical operations. The training is arduous but rewarding. It is closely monitored by the resident training team which provides the exercise scenarios, acts as higher control, and gives advice and help. The cost of maintaining the establishment and transporting BGs to and from BAOR is fully justified and contributes greatly to readiness for war.

The Regimental System

Earlier, a brief mention was made of the "regimental system" and how this benefits training by minimizing turbulence. There are many arguments in favor of this system.

When a person joins a regiment in the RAC, either as an enlisted man on a 3-, 6-, 9- or 22-year engagement, or as an officer on either a Short Service (3 years) or Regular Commission, he remains a member of that regiment and wears its uniform throughout his career. He will return to his regiment for duty up to the rank of regimental or squadron sergeant major or lieutenant colonel (if he is to be the commanding officer) after either temporary or longer duties elsewhere.

Each regiment is recruited from specific areas in the United Kingdom, which gives each regiment its own character.

All of this has the distinct advantage that everybody gets to know everybody else, their strengths and weaknesses, and provides a sound basis for mutual understanding and trust, as in any family, large or small. Sons and brothers join the same regiment as their older relations, and close contact is maintained by regiments with their recruiting areas.

The members of each regiment, past and present, believe that their own is the best.

It should be pointed out that there is one disadvantage of being an armoured soldier; for reasons already discussed, the majority of British armoured regiments are based in West Germany, and for financial and combat purposes, they spend eight or more years there. (The formation of a twelfth armoured regiment in BAOR will ultimately increase this period to up to 11 years). Being stationed in the same garrison for such a period can affect the morale of some, for obvious reasons. At the same time, the long tours in Germany do mean that the officers and soldiers know their ground extremely well, are acclimated to the environment and would be that much more effective if they were to fight there.

There is a unique "esprit" with the Royal Armoured Corps. This has been developed from the regimental histories and traditions, the family atmosphere fostered by the regimental system, and by the quality of the soldiers who desire to be better than those in other corps or arms.

This character, confidence and cohesion, combined with modern equipment and training, give the armoured regiments the capability to carry out their battlefield missions as part of any allied effort in Northwest Europe.

LIEUTENANT COLONEL OLIVER E. HOLDER, educated at Harrow and Mons Officer Cadet School, was commissioned in the 10th Royal Hussars in 1961. He has served with his regiment in England, Germany, and the Middle East, and was second in command when the unit was the first to be issued the Challenger MBT. He has also served as a divisional staff officer and on the training staffs, including the Tactical School at the RAC Centre. As an exchange officer, he served at Fort Hood with the 1st Cavalry Division as assistant G3 for training management and as S3 of the 1/7 Cav.

MAJOR FREDERICK G. LEE attended the Marion Military Institute and was commissioned in Armor from the University of Alabama in 1970. He has served with armor and cavalry units in CONUS, Korea, and Europe and is a graduate of the Infantry Officers' Advanced Course and the Command and General Staff College. He is presently the U.S. Army exchange officer at the Tactical School, RAC Centre, and has most recently been assigned to the 2d Battalion, 64th Armor, 3d Infantry Division.

An AVLB was used to cross the Union Pacific tracks on 130-mile road march.

Photos by Robert Rogge

The Hot Ones

by Robert E. Rogge
ARMOR Assistant Editor

A tactical road march of some 130 miles through mountains and desert takes a lot of advance planning. Especially if the unit is manned by National Guardsmen who meet only one weekend a month and then for two weeks of annual training. And if the unit is equipped with *M48A5s,* certainly not the newest tanks in the inventory, the importance of planning becomes even more crucial.

But a unit that wins the Draper Trophy (a top award for effective leadership in all phases of armor/cavalry) has what it takes, and the 1st Battalion, 221st Armor, of the Nevada Army National Guard showed they had it last June. They did it in style, too, with their own portable shower unit, an inimitable maintenance chief warrant officer, and a level of unit morale that had to be seen to be believed.

The 1/221st cross-countried from Henderson, Nevada, to Fort Irwin, California, over some of the same bleak desert terrain that tested the spirit of some of their fathers 45 years ago. They covered more than 130 miles up and down mountains — including one pass about wide enough for a single *M48* — navigating across an interstate right-of-way, bridging a railroad line, through desolate country as far as the eye could see — when the dust clouds settled long enough for the eye to see at all.

"They are a great bunch of troops, and I'm proud of them," said Lieutenant Colonel Jerry Bussell, 41-year-old 1st Battalion commander. "The battalion has been talking about doing this for the past year or so," he said, during a scheduled maintenance stop in the middle of a dry lake bed. "We finally got it all together; we rounded up all the permissions we needed from just about everybody you can imagine and now we're doing it."

The dust-covered commander made it sound simple. It wasn't.

When the 1/221 rolled into the National Training Center at Fort Irwin, CA, after their two-day march, they faced two weeks of platoon, company and battalion training exercises with their own A Company acting as the OPFOR. Then they would road march back to Henderson, their start point. After their busy 2-week stay, there was also the annual PT test to be passed, a wingding party to be faced up to and, best of all — payday!

One of the prime purposes of the unprecedented road march was to test realistically the state of the unit's vehicle maintenance. The march, the training exercises, and the return march would surely tell whether they could take the 180 tracked and wheeled vehicles on a rugged, cross-country march, fight them, and get home again.

When it was all over, the numbers pointed to success. "We made it back with 95 percent of our equipment up and ready for a fight," said the unit maintenance chief, CWO James Smith. "Each tank had over 500 miles on it and we never had two tanks down at the same time. This was very good..."

...And perhaps the understatement of the year.

"This is a first for any Army Guard unit," said Lieutenant Colonel Bussell. "The only time previous to this that an armored unit has taken on a trip of this caliber —along with field exercises — was more than 45 years ago when General Patton trained Regular Army armored units in the desert out here. What we have," he said, "is Patton Tanks following in the tracks of their namesake."

The unit cranked up at 0530 on Friday, 14 June, and by 0730 the last vehicle was moving out. Seventy-one tracked and 109 wheeled vehicles made up the convoy. At the end of the first day's march — covering 94 miles — one *M48A5* was down with a blown engine and one *M561 Gama Goat* broke down. The *M48's* power pack was replaced at Fort Irwin and the tank was in

The Guardsmen's relatively trouble-free road march hinged on aggressive preventive maintenance. Here, road wheel bearings get a shot of grease during scheduled halt.

action at the end of the two-day road march. The so-called "Weekend Warriors" drove, fixed, fueled, cussed at and sweated every vehicle through the mountains and desert with the minimum of delays. There were 43 *M48A5s*, six *M577A1* command post carriers, eight *M113A2* personnel carriers, four *M106A1* mortar carriers, two *M578* recovery vehicles, six *M88A1* recovery vehicles and two *M60* AVLB bridge-laying vehicles in the tracked inventory.

A total of 109 wheeled vehicles completed the convoy: Twenty-one *M35A2* 2½-ton trucks, nineteen *M813* 5-ton trucks, seven *M561 Gama Goats,* one *M816* wrecker, three *M911* heavy transporters, forty-seven *M151A1* utility trucks (jeeps), two vans, one *CJ5,* one carryall, four Blazers, one 2½-ton stake truck and two sedans. The convoy stretched from 15 to 25 miles along the torturous route.

Routine mechanical problems were cured during the march by drivers and crewmen, or by the maintenance platoon that ate dust all the way as it tailed the convoy.

Maintenance was the key to the move, said the commander. "Our maintenance practices were not exactly viewed with complete pleasure at higher echelons," he said, "but this move proves that we were right. And the credit goes to CWO3 Smith... He knows his stuff. He's been at this work for years, and he gets the work done properly and on time," Lieutenant Colonel Bussell added.

CWO3 Smith is typical of the long-service chief warrant officer (he plans to retire sometime this year). He tends to become a bit irritated at times with foolishness and forgetfulness, but his men really work for him. They know that he knows what it's all about. Smith's vehicle maintenance program carried out with a full-time crew of only 11 technicians and 25 of an authorized 100 part-time Guardsmen, saw to it that the 1/221's vehicles were ready for the long desert trek and the training maneuvers that followed. Their track record for the out march proved Smith's maintenance capabilities.

"He gets pretty wild at times," grinned the colonel, "but he gets things done. We couldn't have made this trip without him."

The 1/221 won the highly prized Draper Trophy in 1983 for its overall excellence, and vehicle maintenance played a big part.

Three maintenance halts were planned along the route for routine work on the vehicles. The sight of crews hammering at track connector links, heaving on track adjusting wrenches and really sweating over steaming hot engines was something to see. Every man worked hard at keeping the vehicles running despite heat that made the colonel lay down the order: "Every track crewman will drink one quart of water every hour when on the road." Track drivers were changed frequently as temperatures inside the hulls topped the 150°F mark.

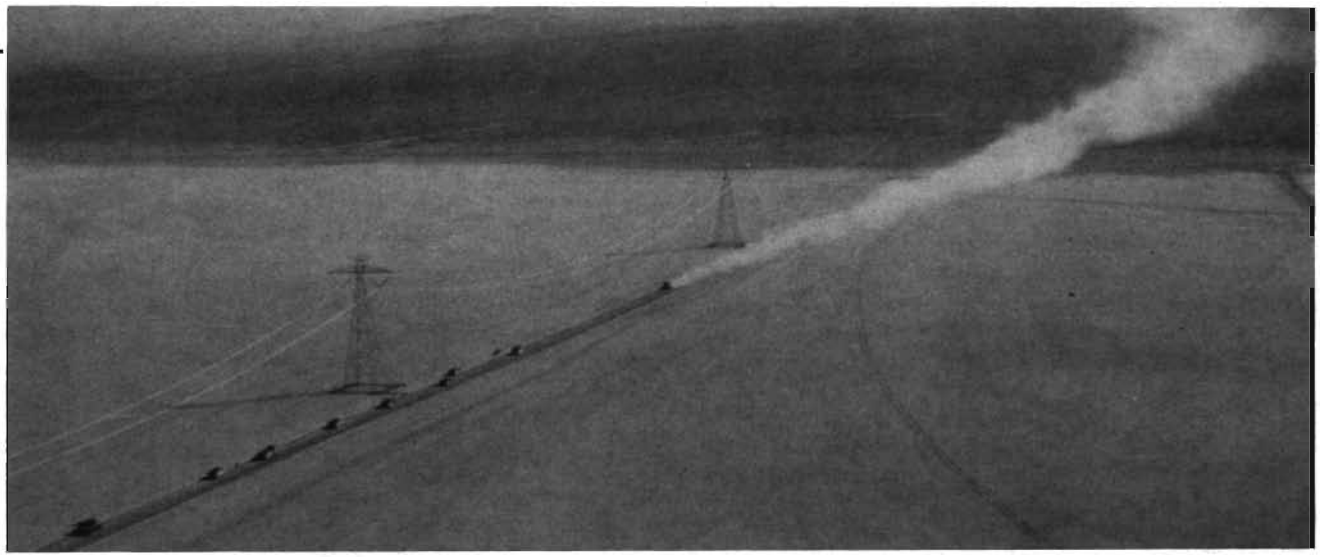
The overnight stop at Silver Lake, CA, brought welcome relief to the dust-caked and weary troopers — and the unit's own mobile shower rig ran its 1,200-gallon tank dry in short order. Smith's maintenance shop worked up a simple, six-shower-head unit that pumped warm but welcome water on to the skinny dippers. After their showers, the crewmen lined up for evening chow that was ready and waiting for them.

During the seemingly interminable road march, the battalion motor officer, Captain Robert Brewer, kept control of all 180 vehicles with radio jeeps stationed at intervals along the route and a "get-there-quick" repair truck equipped to handle all but major problems.

"We're training to one set of standards — excellence."

This was not an all-male tactical movement. Three women drove the *M911* heavy transporters, hanging in there as they literally man-handled the immense vehicles right along with the brawniest of tank crewmen. Female MPs from the 72d MP Company, NARNG, worked traffic control at the Nevada-California border where the convoy crossed

Crossing I-15 at the California-Nevada border, an M48A5 is lined up perpendicular to the roadway before crossing so as not to chew up the pavement with locked tracks.



The unit throws up columns of dust emerging from McCullough Pass and entering a dry lake bed.

I-15. These young women kept their cool in the heat — and in the face of irate 18-wheeler drivers and their blasting air horns as road traffic was halted to allow the convoy's crossing. That crossover was the only patch of paved road the convoy traversed during its record-making march.

A tactical crossing of a railroad was made during the first day's march. One of the 1/221st's *M60* AVLBs bridged the Union Pacific Railroad tracks — between trains — for the passage of all vehicles.

Air support was provided by two *UH-1H* medevac choppers, one *CH-54 Sky Crane* chopper to airlift pre-assembled power packs, etc., and one *OH-58* command and control chopper. At the completion of the cross-country to Fort Irwin, only one man had to be air evacuated for heat problems.

Advance planning for the road march was detailed and time consuming. Coordination had to be accomplished with the Nevada and California departments of transportation, many county and local governments, the federal Bureau of Land Management and several electric power companies before one wheel or track turned. Guard units from Winnemucca, Yerington and Hawthorne, in northern Nevada, and from Henderson, Boulder City, North Las Vegas and Las Vegas convoyed to Henderson to join up for the march. "It's still a paper war," Colonel Bussell grinned.

The move also pointed out how much a modern Guard unit depends on fuel. CWO3 Smith figured out that the 1/221st burned nearly 10,000 gallons of mogas and diesel fuel on its road march from Henderson to Fort Irwin.

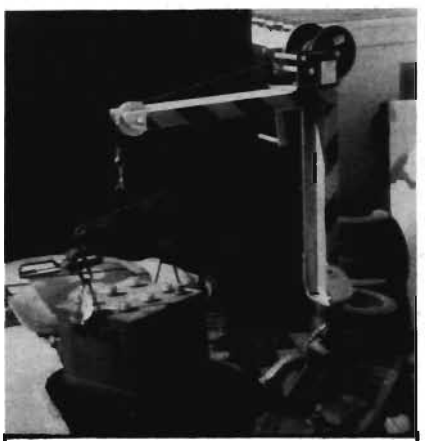
And then there was the heat. Outside thermometers hit the 120-degree mark and those inside the tracks topped the 150-degree line. The commander's order to drink lots of water was obeyed with gusto in the moving steel ovens. A specially insulated and refrigerated truck kept a constant supply of crushed ice at the designated maintenance halts and at the overnight stop. It was to see full-time service during the two-week training period and on the road back. It would be a safe bet (even for Las Vegas!) to say that as much water was consumed as vehicle fuel on that road march.

But not a drop of alcohol. "Alcohol will kill you in this desert," said Lieutenant Colonel Bussell. "It dehydrates you, and that's the last thing you need in the desert. You sweat gallons as it is, and you don't need anything to help the drying-out process. A dried-out crewman will pass out, and if he's not attended to right away, he's gone."

Major General Thomas Cole, deputy commander, 6 Army, said while lined up for chow, "We're training to one set of standards — excellence. This unit has an advantage over the Regular Army units because of its stability and relative lack of troop turbulence. This march is providing very good training for the troops. It is, I'm sure, instilling them with a large measure of confidence in themselves and their fighting equipment."

The 1/221st did things the right way. On their arrival at the NTC, quartering did not meet the commander's standard — so the unit back-tracked 25 miles into the desert and made another run in. And this time they got it right. "There's another fifty gray hairs for me," said CWO3 Smith, when he heard about the extra mileage.

The 1st Battalion, 221st Armor, is justly proud of its long road march and extends the challenge to all other Army National Guard units: "Here it is. Beat it, if you can."



Pulling Batteries With No Sweat

How many times have two or more men bashed knuckles, murdered the English language and generally worked themselves into a sweat pulling tank batteries? The 1st Battalion, 221st Armor, Nevada Army National Guard had the same problem with the batteries in their M48A5 tanks — so they did something about it. Rather, their maintenance chief, CWO3 Smith, did something about it.

Smith and his crew of expert mechanics made a battery puller that works. Fabricated from locally available supplies, and some scrounging, the hand-operated winch fits into the machinegun pintle on the turret and withdraws the heavy wet cells with the minimum of effort, sweat and tough language. It's a simple gadget, but simple gadgets often work where sophistication fails.

The Battle of the Cold

by Colonel William W. Crouch and Major Thomas E. Taylor

During the winter of 1985, the Second Armored Cavalry Regiment, headquartered in Nuernberg, Federal Republic of Germany, had many opportunities to experience Europe's coldest temperatures in recent history. Such opportunities included REFORGER 1985 in northern Germany, cavalry platoon maneuvers in southern Bavaria, tank gunnery and scout training at Grafenwoehr Training Area, and continuous border surveillance of East Germany and Czechoslovakia. The leaders of the regiment believe the lessons learned during this cold weather are too valuable not to be shared with other units who plan to train in cold weather conditions. Concentrating on leadership techniques, this article discusses cold weather lessons learned or reconfirmed.

The impact of cold weather can be categorized into adverse effects on personnel, equipment, and tactics.

Leadership Factors

Regarding leadership and the welfare of personnel, the following observations were made. When in great discomfort, people quickly focus upon themselves rather than those for whom they are responsible. If leaders allow themselves to feel sorry for either themselves or their subordinates because of the environment, they will fail to care for soldiers and equipment properly.

"...The individual will disregard his own safety in favor of warmth and sleep..."

It is critical that the leaders set a good example by wearing the proper equipment and by not trying to be "macho". Since the soldier looks to his sergeant, he may try to emulate the "tough guy from Montana" and wind up with frostbite.

Leaders need to pay particular attention to less motivated soldiers since they may neglect themselves earlier than a motivated soldier. The individual will disregard his own safety in favor of warmth and sleep. Last winter, for example, one man was found asleep in a snowdrift, in a sleeping bag, in the path of a track.

Leaders must take time to check themselves in addition to their subordinates. Training in the cold requires extraordinary attention to leadership fundamentals and draconian adherence to absolutes.

Cold Weather Clothing

All soldiers should be properly fitted with clothing which is not too tight. This means that the central issue facility must properly fit the soldier and that the leader must check the fit. Tight clothing is not conducive to cold weather survival because it inhibits the insulating advantage of layered clothing. Everyone should have the same type of cold weather gear available but should not be made to stay in the same uniform. Flexibility must be provided, based on local conditions and the type of work being done.

Uniform choice should not be left up to the soldier. Leaders must designate — according to temperature and moisture — whether soldiers should wear the parka, or overshoes, or sweaters, or other combinations of clothing. Soldiers need training on how to wear their field clothes during cold weather, especially in regard to cleaniness and layering. Military clothing is adequate in cold weather, while civilian clothing is sometimes *too* warm and causes excessive sweating. Excessive clothing, too, can cause just as much of a problem as not wearing enough clothing.

Overshoes are required regardless of temperature, because the rapid temperature decrease of wet boots can cause frostbite. Soldiers should be encouraged to buy slight-

ly larger sized boots for the winter so that they can wear two pair of socks comfortably. Also, the boots should be waterproofed with special polish or a sealant. Leather vesicant dressing works very well. Boots and socks should be changed at least daily.

Wearing the wet weather and/or MOPP gear during the cold months could increase the risk of injury due to the retention of moisture. This is especially true if strenuous work is performed. When riding in a cab of a truck for an extended period, overshoes should not be worn if the heater is operational.

A good glove to wear if a person has to work on or handle metal is NSN 8415-00-227-1220 (Small), -1221 (Medium), -1222 (Large). (The reference is CTA 50-900, CL, dated 29 Aug 75). If a soldier inadvertently touches bare skin to metal, and it adheres, pour water or other liquid on the metal to thaw and save the skin.

Encourage soldiers to wear wool caps or sleeping hoods in sleeping bags to prevent heat loss because the majority of body heat exits through the hands and head. Cleanliness is very important, yet very difficult. A dirty field jacket is easily penetrated by moisture. If the activity is stove cleaning, the soldier should be clothed in wet weather gear to protect more porous uniform articles.

Gloves and overshoes are essential in cold, damp winter weather, especially when troops are exposed. The authors urge units contemplating cold-weather training to prestock adequate repair parts for stoves and heaters and to have skilled repair personnel available should the equipment break down.

Feeding in Cold Weather

Ensure that soldiers eat well because they burn more calories in the winter. This is especially difficult early in the morning since many soldiers may try to avoid eating breakfast. Leaders must be sure everyone eats breakfast. Increased food and water helps offset increased energy expenditure in producing body heat.

Fluids (water, juice, milk) must be forced on soldiers. Simply making fluids available does not meet the requirement. Avoid coffee, tea, cola, and beer, which cause dehydration.

A hot meal, preferably an A ration, becomes a necessity rather than a luxury in cold conditions. Drugs, medications, alcohol, and nicotine decrease the body's resistance to the cold because they affect body metabolism. Be aware of the soldiers using medication and prohibit alcohol use.

Cold Weather Health

Sergeants tend to think that allowing their soldiers to stay in their tents as much as possible helps to reduce cold weather injuries. The reverse is true: active work prevents cold weather injuries. Troops need to exercise in the cold. Exercise not only warms them, but prevents the degeneration of fitness which normally occurs during field exercises. The soldier should have a list of simple exercises which he can perform on duty.

Designate a Cold Injury Control NCO and a medic who will check personnel daily for hygiene, injuries, clothing, and equipment. Make sure all extremities are inspected, not just the one about which a person complains. Make spot checks of soldiers' understanding of cold weather survival.

Kitchen staffs and KPs are among the most vulnerable to injury. A person does not necessarily have to be exposed to extremely low temperatures to get hypothermia. Individuals with histories of cold weather injuries should have their temperatures monitored by a medic, situation permitting. White

Vehicle movement, fuel pumping, and engine replacement are routine tasks greatly complicated when the mercury drops, as it did last winter when a record cold wave enveloped Europe.

cloth loop marking of those most susceptible to injury is a great technique. Medics should have cold-weather, low-reading thermometers for possible hypothermia cases. These types measure down to 60 degrees Fahrenheit while some fever thermometers only go down to 96 degrees.

Guards must understand the increased importance of their duties to ensure the safety of all personnel. Also, if they realize they have a warm dry area to retire to after performance of duties, and if length of duty tours are based on existing weather conditions, soldiers more willingly perform duties in an alert manner. Rotate guards and other personnel more frequently as it gets colder. Guidelines must be clearly established and enforced.

Do not leave personnel stranded for long in disabled vehicles, especially if the heater is inoperable. The buddy system must always be used. Soldiers left alone are much more prone to cold weather injury.

Equipment Maintenance

Cold weather starting procedures, following the operator's manual for all types of vehicles, need to be drilled at home station. Leaders cannot allow shortcuts. Perhaps the most important phase of the exercise is a detailed pre-combat inspection of vehicles and people to ensure proper equipment and personal items are present prior to the exercise.

Cold weather starting and operational checks must be scheduled in mass by the commander. Equipment, particulary generators, need to be started periodically to prevent freezing. Idling at the correct RPM is all the more important in the cold. Radios need to be kept warm and be allowed proper warm-up time prior to use. All 3-kw generators should be modified with the electric starting system. Electrolyte batteries will freeze more quickly when overfilled.

Consideration in handling all equipment must be emphasized as radical changes in temperature (rapid expansion/contraction of metals and plastics) cause brittleness and breakage.

The most difficult aspect of vehicle maintenance is keeping windows and lights clean. Special supplies are required, such as ice scrapers and de-icer. Fogging and the development of condensation in optical gear can be partially prevented by avoiding movement of these devices between areas of extreme temperature differences.

Shortages of equipment needed to combat cold weather must be identified early and placed on order. Winter shortage of parts for all heaters must be anticipated. Heaters must have proper ventilation and must constantly be checked, and units must designate a heater repairman who is skilled and has the repair parts.

Stoves must be periodically cleaned and serviced by teams. Fire watch is mandatory, especially at night. Keep tents clean of snow. As heaters operate, snow melts and dampens tentage and gear inside. Tents with stoves and straw must be checked continuously to prevent fires. Store water inside heated areas.

Reconnoitering assembly areas for wheeled vehicles is more critical in winter. Slight slopes in wooded trails that normally are not noticed can prove to be disastrous in a training area as the temperature drops and snow falls. Commanders must recognize that driving conditions are different in snow and ice, and that there are differing snow and ice conditions. Commanders must constantly assess whether trails and roads are trafficable, rather than allow convoys to stumble into dangerous conditions. Be especially aware of black ice on roads.

The time it takes to execute almost any operation is increased dramatically. At least 1/3 to 1/2 more time must be allocated in preparation and execution of movements and operations. Map reading is more difficult, as many features are obscured by snow and ice.

Camouflage needs to be tempered with common sense. For example, do not clean stoves in the middle of a snow covered field. Camouflage nets still help disguise installation and assembly areas, regardless of their color. Painting vehicles with whitewash is unnecessary. After a day of rain, the whitewash is gone anyway.

Soldiers on OPs are prone to snow blindness and must be rotated more frequently. Prevent snow blindness by putting soot under the eyes, wearing sunglasses, or using cardboard with narrow slits cut out for the eyes as sunglasses.

Range perception is much more difficult when everything is covered with snow.

Summary

Fortunately, by following these common sense procedures for fighting in the cold, the regiment encountered no serious cold-weather injuries. Unfortunately, several of the key procedures, such as heater maintenance, parts stockage, and degree of personal protection, were learned through cavalry training experiences during the winter of 1985. This led to the one most important lesson learned: prepare to fight in the cold when the weather is warm.

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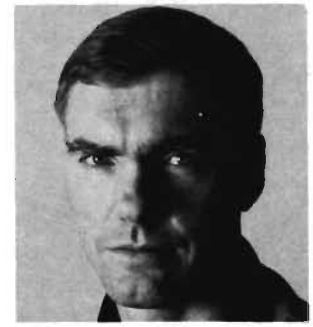


MAJOR THOMAS E. TAYLOR is regimental signal officer, 2d Armored Division in West Germany. He was commissioned into the Signal Corps from ROTC and has served as artillery communications platoon leader and signal battalion adjutant in the 25th Infantry Division. He was an instructor in the U.S. Army Signal School and served as signal company commander and battalion XO at Ft. Gordon, GA. He holds a bachelor's degree in Management from Georgia Tech and a master's degree in Education and an Education Specialist degree from Georgia Southern College.

Return to Singling

by A. Harding Ganz, PhD.

In April 1978 two American tankers, retired Colonels James Leach and Robert Cook, returned to the WW II battlefield of Singling in Lorraine, France. In December 1944, First Lieutenant Bob Cook had been a tank platoon leader, and Captain Jimmie Leach the tank company commander, of Team B, mounting a tank-infantry attack as the spearhead of the veteran 4th Armored Division, as Patton's Third Army drove to the German border. At the village of Singling they encountered elements of the German *11th Panzer Division,* and at day's end the Americans abandoned the village as not worth the cost, even as the 4th Armored's Combat Command A secured its primary objective of Bining.

The fight at Singling was the subject of a detailed study by Second Lieutenant Gordon Harrison of the War Department's Historical Department, and published in its "Small Unit Actions" series in 1946. When Leach and Cook returned to Singling some thirty years later, they were guests of Major General Paul Gorman, CG (Commanding General) of the 8th Mechanized Infantry Division stationed at Bad Kreuznach. Two *Bundeswehr* officers accompanied them. They toured the battle area, by helicopter and on the ground, to clarify details of a typical armored battle, as a division terrain walk exercise. The tankers could critically review and analyze the tactics of that fight, even as in their minds' eyes they vividly envisioned the four destroyed and blackened tanks and the ten casualties, that included the other two tank platoon leaders, on that grim December day.

Tactics and Weapons

In the breakout and pursuit campaign in the summer of 1944, the 4th Armored Division had performed brilliantly, receiving th accolade from General George Patton: "There has never been such a superb fighting organization as the Fourth Armored Division." But the situation was changed for armor in the offensive that had jumped off on 8 November. The Germans had been able to create an elastic defense-in-depth, skillfully using minefields and the muddy terrain to canalize an armored attack and block it with demolitions and antitank gun ambushes. The few *panzer* units available conducted a mobile defense, but with the threat of American air superiority, mounted only sharp, local platoon- and company-level counterattacks. There would be no large-scale tank battles as there had been in September.

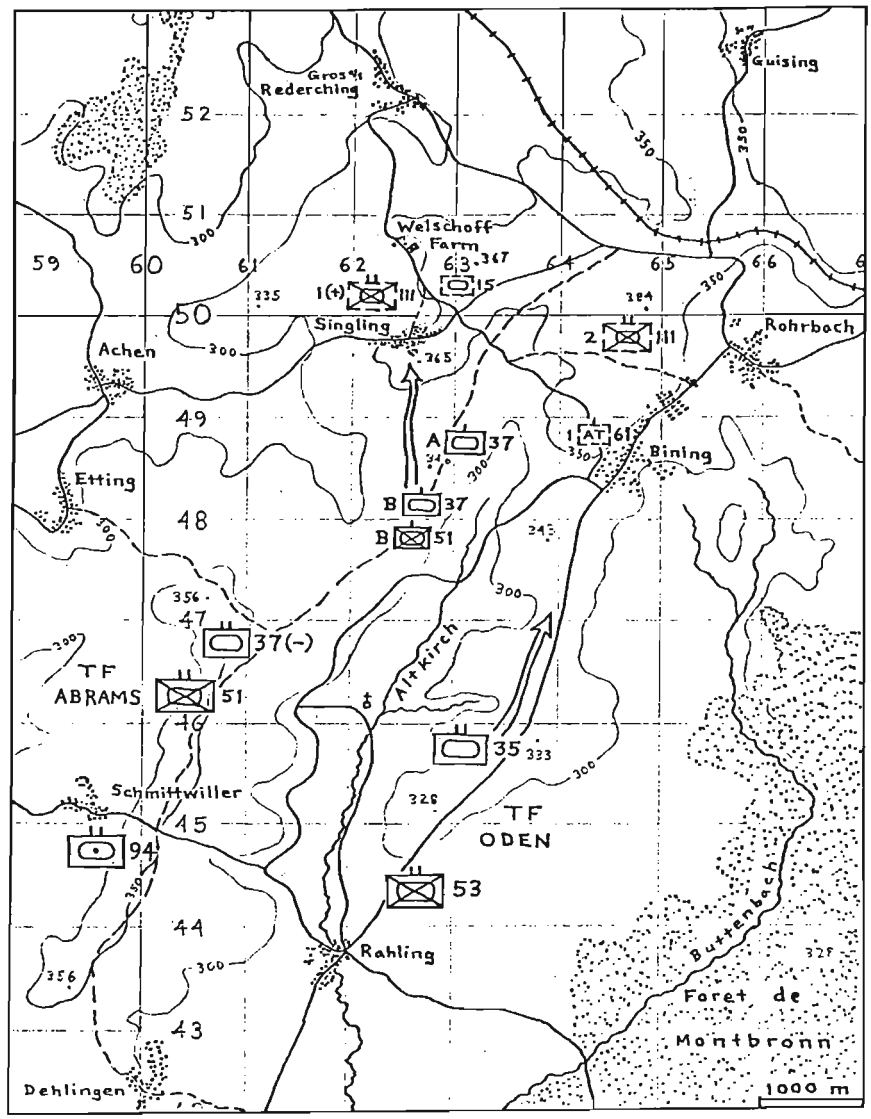
The German main battle tank *Panther,* with its 25 3/4-inch wide track, giving it a ground pressure of 12.52 pounds per square inch, had a flotation and cross-country terrain capability greater than the American *M4A3 Sherman* tank, with a 16 9/16-inch wide tread and a ground pressure of 13.7 lbs psi. Duckbill track extensions helped only somewhat. The power traverse and gun stabilization of the *M4* gave it some advantage over the *Panther's* slower manual-hydraulic system of gun-laying, but the high velocity 75-mm KwK 42 L/70 German gun could easily penetrate the *M4's* 2½-inch frontal armor at 2,000 yards. The *M4's* low velocity 75-mm could not penetrate the *Panther's* 3⅛-inch frontal armor, angled 55° from the vertical. Upgunned 76.2-mm HV *M4s* began to replace the older tanks during the autumn of 1944, but even these, with HVAP (Hypervelocity Armor-Piercing shot) ammunition, were really only effective under 300 yards. Thus German tactics were to seek positions with extended fields of fire and engage at long range. American tactics were to close the range, under cover of defilade or obscuration (smoke and artillery fire), and engage at close range or from the flank.

American tanks were further encumbered by the armored infantry, who were carried on the tanks. The *M3* halftrack with its thin ¼-inch armor and open top, was not a battle vehicle, nor could its tires and narrow treads negotiate the muddy terrain. The practice was for the armored infantry to ride their personnel carriers from the assembly area to the attack position just short of the LD (line of departure), and there "marry up" with the tanks, a rifle squad of armored doughs clambering onto each tank to maintain unit integrity, the platoon leader mounting his counterpart's tank to facilitate communication using the tank com-

pany radio frequency. The infantry dropped off in the assault or if the tanks came under fire. An artillery FO (forward observer) in his own tank was attached to a tank company, to call fire missions of WP (white phosphorous) for smoke screening, or HE (high explosive) to weaken defenses and cause casualties. The limited range of the *M7's* 105-mm howitzer, 12,000 yards, under seven miles, meant frequent displacement to cover an advance.

American tactics were improvised of necessity. American armored forces had been organized and equipped to implement the doctrine of Lieutenant General Lesley McNair's AGF (Army Ground Forces), whose concept was that the armored division was *not* to spearhead the advance — as was the mission of the *panzer* division in the German *blitzkrieg* concept — but was to exploit a breakthrough made by the infantry divisions. Hence, American tanks were not designed or gunned to fight German tanks, nor were the infantry trained to fight from their vehicles.

The American doctrine had been dramatically successful in the breakout and pursuit during the summer of 1944, but literally bogged down in the mud and German defenses of November. Patton had not achieved the decisive breakthrough for which he had hoped, and the armored divisions had had to be committed to slug the advance forward.



Map illustrates the routes taken by U.S. units enroute to Singling.

First Advance on Singling

By early December 1944 Patton's Third Army was driving to the German border and the *Westwall* Siegfried Line defenses of the Saar industrial area. On 5 December, the 4th Armored Division advanced from its Eichel River bridgeheads with its two combat commands abreast. Combat Command B's 8th Tank Battalion had captured Voellerdingen, crossed the Eichel, and now drove almost to Schmittwiller; but then was ordered to hold up until CCA cleared Domfessel. The new CG, Major General Hugh Gaffey, Patton's former Chief of Staff, committed the relatively fresh 37th Tank Battalion from Reserve Command through CCA, to drive to Bining, toward Rohrbach les-Bitche.

As the main highway was exposed to flank fire from the Foret de Montbronn, the 37th Tank's commander, Lieutenant Colonel Creighton Abrams, swung to the next ridge line farther to the west. It was late afternoon as the tanks advanced. The 94th Armored Field Artillery (AFA) Battalion had barely gone into firing position to support the attack, though its CO, Lieutenant Colonel Robert Parker, had planned numbered concentrations with Abrams to be fired on call. About 800 yards south of the small village of Singling, Captain Charlie Trover's C Company tanks churned over a slight rise in the line formation and five mediums were simultaneously knocked out by high velocity gun fire. Nine others were disabled by accurate artillery fire while they were mired in the mud on the naked high ground. Fourteen tanks were lost, including two FO tanks. Charlie Company was wiped out; and under the covering fire of Captain Jimmie Leach's

Sergeant inspects welded-on "duck-bills", used to widen narrow Sherman track for operation in soft terrain.

B Company tanks and the 94th AFA, Abrams withdrew his battalion for the miserably cold, wet night.

There had been no infantry to secure the village, there had not been enough artillery to effectively screen the advance over the open ground, and Lieutenant John Whitehill's A Company tanks, deployed to the left, had not been able to provide the long-range tank fire necessary to suppress the high velocity tanks or guns apparently in and around Singling. In addition, the loss of the FOs, and the dreary rain which grounded even the *L4* spotter planes, kept the ubiquitous American artillery from pin-pointing specific targets.

Second Advance on Singling

On 6 December, CCA advanced again, on two axes. Task Force Oden drove along the highway through Rahling toward Bining, while TF Abrams would come in on Bining from the West. Abrams had his own 37th Tank Battalion and Lieutenant Colonel Dan Alanis' 51st Armored Infantry Battalion (AIB), cross-reinforced. But Abrams determined to neutralize Singling, so as not to expose his flank as he swung on Bining, and so recommended to CCA.

Whitehill's Able Company tanks moved out to neutralize Singling by fire. They were supported by Batteries B and C of the 94th AFA which fired smoke concentrations of 131 rounds. But heavy direct and indirect German fire stopped A Company. Since this fire could not be suppressed, Colonel Abrams decided on his own initiative to take the town of Singling. By radio he passed the order to Captain Jimmie Leach, commanding Team B, which was moving up for the attack on Bining.

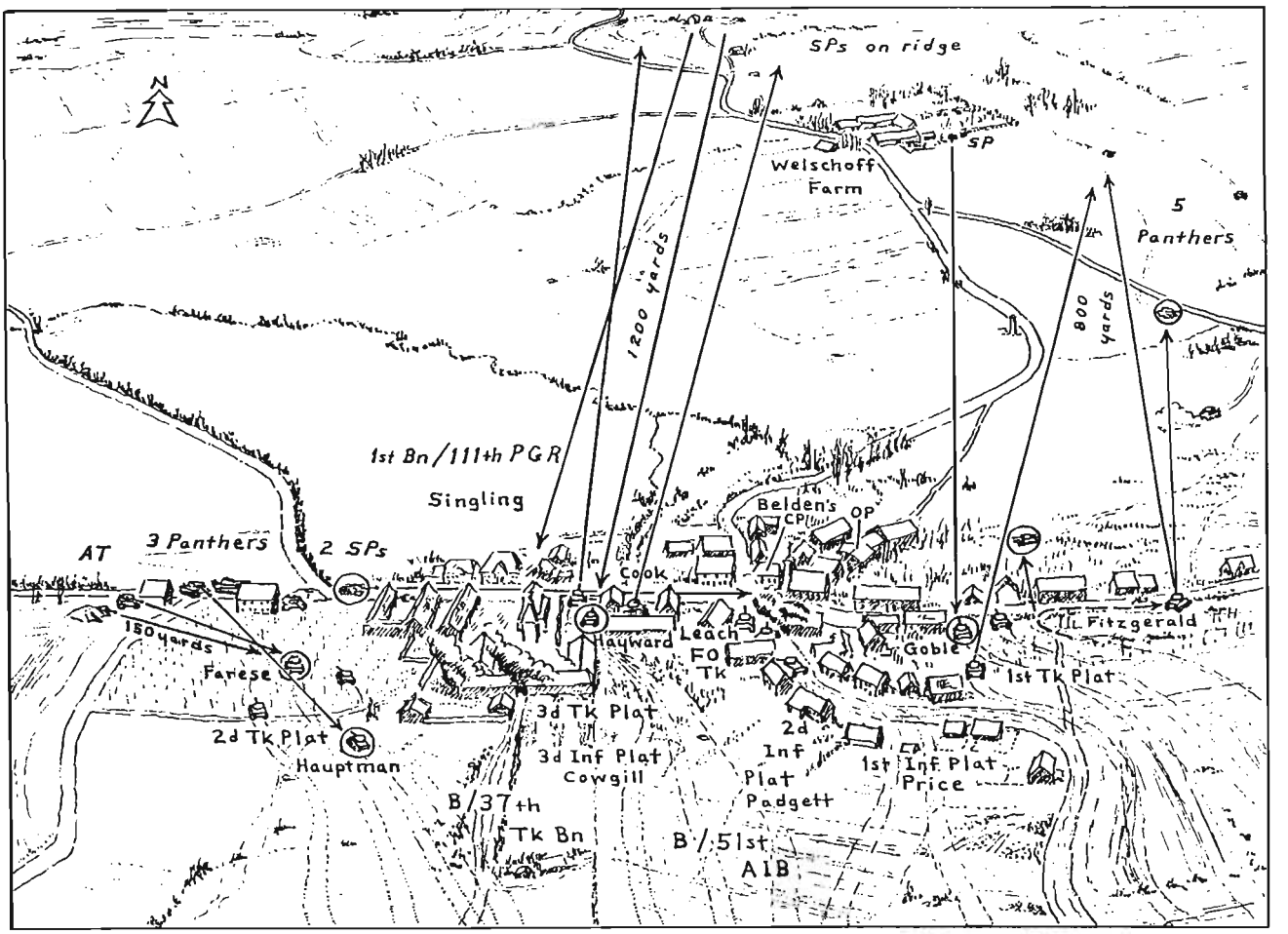
Like-lettered infantry and tank companies were often paired as teams, the tank company CO usually commanding the whole team until the infantry went into action. Familiarity and cooperation between the company commanders was essential. Captain Jimmie Leach's B Company/37 Tk was at strength, moving out with fourteen of its seventeen T/O&E tanks, five of them having the new 76-mm gun, plus First Lieutenant Don Guild's FO tank of the 94th AFA. Leach was an aggressive company commander, and his tankers were veterans of the campaigning since Normandy. But First Lieutenant Dan Belden's Baker Company of the 51st AIB was far below strength, reflecting the proportionately heavier casualties the infantry incurred, and the scarcity and inadequacy of replacements. The three rifle platoons numbered 19, 14, and 15 respectively, instead of the authorized 56 men each, there were only 6 in the company headquarters section and 7 from all the weapons squads. In addition, there had been a 100% turnover in officers during the November fighting, though Belden himself was experienced, having returned after recovering from wounds. Further, morale was not helped any by the fact that three days earlier, the division's beloved commander, Major General John "P" Wood, had clashed with the corps commander and been relieved by General Patton.

The two companies had moved out of their bivouac areas at 0700, but the halftracks soon bogged down. "The mud was so bad," related the battalion After-Action Report, "that only full-tracked vehicles could maneuver, even on trails." The armored doughs mounted the tanks in the tankers' assembly area, 3,000 yards from Singling. When Leach received Abrams' order changing his objective from Bining to Singling, he could pass it on to Belden, but with radio listening silence he was unable to inform the other platoon leaders or to make detailed plans. The commanders had to rely on their combat-wise men to adjust to the change of objective, though even that night some believed they had been fighting in Bining, not Singling.

At 1015, Team B jumped off in the attack. There was a heavy overcast, and no air support could be anticipated. A and B batteries of the 94th put 107 rounds of HE on Singling, and the 37th's assault gun and mortar platoons took up the smoke mission from 3,000 yards distance. Whitehill's A Company tanks put down covering fire on the road to Bining, and a platoon of *M18 Hellcat* tank destroyers from B/704th TD Bn, put direct fire on Singling with their high velocity 76-mm guns, though their open turrets were soon exposed to German artillery fire. A WP smoke screen, stabbed occasionally by HE explosives, drifted across the village, partially obscuring it. There were some fifty buildings strung half a mile along the road to Bining, a typical Lorraine farm village, stone stuccoed houses fronted by manure piles. But the Singling ridge was in the old Maginot Line, and the stone buildings and scattered pillboxes provided good defensive positions.

Tank Attack

Leach's tankers opened up with their cannon and machineguns, shells and tracers streaking across that sodden ground as the tanks churned forward, an impressive volume of fire to overawe the defenders. Indeed there was no return fire as the tanks advanced on the smoke-shrouded village. Sergeant Joe Hauptman's tank of the 2d Platoon developed transmission trouble and dropped behind, and Staff Sergeant Max Morphew's radio conked out, and his tank dropped out of 3d Platoon to help evacuate wounded later. In the sudden violence of tank action, radio commo was essential. In a five-tank platoon, only three or four tanks were generally available for



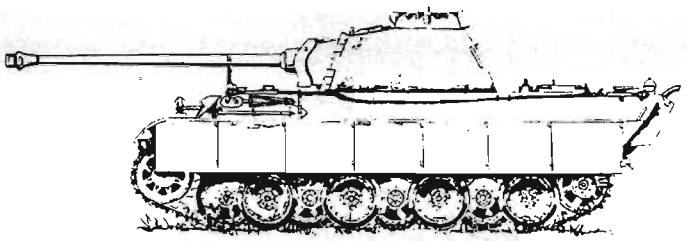
combat. But the other thirteen tanks deployed and attacked in line formation, spitting fire, on a front of 600 yards. Watching from a distance was Lieutenant General Fritz Bayerlein, whose *Panzer Lehr Division* had just been relieved by *11th Panzer*. He later recalled that it was "an outstanding tank attack, such as I have rarely seen, over ideal tank terrain." It was the compliment of the true professional.

On the left, Second Lieutenant Farese's 2d Platoon, carrying no infantry, moved up through a sparse orchard toward the west end of the village. Jim Farese's tank had just topped a slight rise — when suddenly three armor-piercing shells slammed into it. The platoon leader and his loader, PFC Bill Bradley, were killed by the steel shards that flew around the turret compartment. The gunner was wounded but managed to get out. The driver and BOG (bow gunner) scrambled out, and dodged back down the slope. The other two tanks backed into defilade, finding that even exposing their radio antennas drew instant AP fire. Farese had been knocked out, it was later determined, by a *Panther* or by a towed 75-mm AT gun emplaced by the buttress of an old French pillbox, scarcely 150 yards away.

Meanwhile, the other two tank platoons reached a hedge just south of Singling, and slowed up to let the armored infantry jump off. Lieutenant Belden met his platoon leaders as they came up, telling Second Lieutenant Bill Cowgill to take his 3d Platoon to the left side of the town, followed by First Lieutenant Norm Padgett's 2d Platoon. Second Lieutenant Ted Price's 1st Platoon was to take the right side.

Cowgill had almost reached the town square when he spotted a German SP (self-propelled) gun in the smoke of a burning building, and shouted for the tanks to hold up. Captain Leach dismounted his command tank, "Blockbuster 3d," and advanced ahead of it, to see the situation for himself. He joined Cowgill's men in spraying the SP with tommy-gun fire. The assault gun backed up, opening up with its own machinegun. Bullets ricocheted off the stone walls, and the armored doughs ducked into the buildings. The SP then drove off west down the main street, with Leach firing his grease gun at it and gesturing wildly for his gunner in "Blockbuster 3d," Corporal John Yaremchuk, to fire with the 76-mm. When he accosted Yaremchuk later he demanded, "Why didn't you open fire?" His faithful gunner replied calmly, "You were in the way, Cap'n" — for which Leach has been forever grateful.

Leach then radioed his 3d Platoon leader, First Lieutenant Bob Cook, to "get that SP." Cook's 3d Tank Platoon had come up in the center, and he now led his other three tanks past a large burning farm building. Suddenly his tank lurched at a dangerous angle upon hitting a low retaining wall invisible in the smoke, and then lumbered over a two-foot drop into a walled garden. Two other tanks followed, but then found themselves exposed to the Welschoff Farm ridge 1,200 yards to the north. They were about to cross the street, when Cowgill came up and warned Cook, "There's a Kraut tank behind the third building down to the west." That meant the street was enfiladed, and Cook ra-



U.S. armor at Singling encountered the formidable German Panther, known as much for its frontal armor as its powerful, long 75-mm high-velocity gun.

dioed Captain Leach to see if 2d Platoon tanks couldn't maneuver around to the southwest. His own tanks registered on the ridge to the north should more *panzers* appear, but he was beginning to feel a little boxed in and vulnerable. By now Farese's death had also been reported over the company frequency, and Leach realized that he had a real fight on his hands.

The American tank and infantry company team was, in fact, engaged with an entire *Panzer Grenadier* battalion, reinforced — the three rifle companies and the heavy weapons company of the *1st Battalion/111th Panzer Grenadier Regiment* of the *11th Panzer Division*. Though itself understrength, the battalion still counted 150-200 troops in Singling, supported by an AT gun and three 20-mm flak guns, and a two-barrelled rocket launcher and five 81-mm mortars, to the north. Division and corps artillery were on call. Armor in the village included two SPs (probably mounting the 75-mm L/48 on a *Panzer IV* chassis) from the heavy weapons company, and three *Panther* tanks from the *15th Panzer Regiment*.

The American fire during the assault had suppressed defensive fires, however, and enabled Team B to close on their objective. When Cook's tanks fired across the valley to register on the Welschoff Farm ridge, the concussion from the screaming shells demoralized some Germans who had crowded into a small pillbox, and who now waved white rags to surrender. Lieutenant Ted Price had them come out and sent the eleven to the rear as PWs. His own 1st Platoon was to have gone to the right, but they had stopped to round up eleven other Germans in two small pillboxes. Thus Norm Padgett's 2d Platoon ended up deploying to the right, and began clearing the houses to the east.

Padgett's 2d Squad had already rounded up 28 German soldiers and two officers, hiding in a cellar. The GIs had asked a French villager if there were Germans inside, and he had shaken his head; but a radio antenna sticking out of a cellar window had given the Germans away. The incident did typify two things: that the eastern Lorrainers, many of whom stayed in their villages and sought shelter from the shelling, were pro-German; and that the *panzer grenadiers* at Singling, as battle-weary as their American foes were cowed by the violence of the American fire and tank at tack. The growling tanks clanking and churning around the village, and armored doughs coming in with them, were enough to break the defenders' will to resist.

The *panzers* in the west end of the village were another matter, however, and Bob Cook went to find First Lieutenant Don Guild, the Arty FO, to put fire on them. Guild was with Leach and Belden at a house north of the square, where the infantry CO had set up his CP (command post). The consensus was that the *panzers* were too close to the American GIs to bring in artillery fire, so Leach sent word to have Cowgill go after them with the two bazookas in the infantry company. One was a headquarters bazooka, the other was carried by three mortarmen attached to 3d Platoon. (The company was down to one mortar squad, and they had left the 60-mm mortar behind when they mounted the tanks, taking a bazooka instead.)

Counterattack

Suddenly a white signal flare shot up just west of town, the signal for a German counterattack. Artillery shells came crashing in as the GIs ducked for cover, and some were wounded. Sergeant Joe Hauptman's tank in the orchard had rejoined 2d Platoon, but an AP shell ricocheted off the ground and into the turret, killing his loader, PFC Bill McVicker, though the rest were able to bail out. In the garden with 3d Tank Platoon was Sergeant Bob "Pappy" Grimm (at 42, the oldest man in Baker Company). Grimm looked through his field glasses toward the distant ridge just in time to see a long-barrelled *Panther* fire directly at his tank. He shouted at his driver, Tech 4 Chuck Bienick, to reverse "Backbreaker" out of the garden. But five more AP rounds streaked in and hit Sergeant Giles Hayward's tank, and Gunner Ginoli and BOG Furlow died as it flamed up. Grimm's tank successfully backed out between the buildings, only to bog down in the mud; and Cook's tank was left trapped in an adjacent courtyard.

Cowgill's 3d Platoon doughs had meanwhile taken the two bazookas up to the attic of a house to fire down at the German assault gun on the road. One bazooka misfired, and the other only hit after four tries, though the SP was scarcely 100 yards away. The SP was hardly damaged, but the crew bailed out and two were gunned down by GIs in the basement. Then a *Panther* came up, elevated its gun, and sent a round crashing through the house, just as another round from the north smashed into the foundation, showering the men inside with plaster. Cowgill and his men scrambled back to a different building, as another artillery concentration pounded the village.

Unable to raise Lieutenant Bill Goble by radio, his 1st Tank Platoon on the east end of town, Leach ran over personally to warn him about the approaching German tanks. Goble in turn had Sergeant Bob Fitzgerald on the right move his tank to better cover the primary armor approach, down the Bining road. Fitzgerald had his gun sights

The improved Sherman, with wider tracks and a longer, more powerful cannon, helped somewhat to neutralize the Germans' armor advantage, but was still vulnerable to the panzers firing from standoff ranges.

set at 1,400 yards, the range to the northern ridge, when suddenly he saw a *Panther* coming down the slope only 150 yards away. "Gunner! Kraut tank! Shot! Traverse Left!" Simultaneously the *Panther* halted and also began to traverse, but Gunner Private Chuck Fibranz was faster, "Steady...On! One-fifty! Fire!" Fibranz tromped his foot on the firing pedal and the 76-mm bucked and flamed. That fired the *Panther*, but Fibranz slammed two more rounds into it anyway.

"More Kraut tanks!" yelled the doughs. Fitzgerald crunched though the hedge and along the road to get a clear view to the northeast. There he saw another *Panther*, but it fired its turret-mounted smoke mortars and reversed behind its self-made smoke screen. Fitzgerald also reversed, back behind the hedge for concealment, then dismounted to join Goble in Padgett's CP. From the house they saw a third *Panther* in the valley, and both raced back to their tanks. Fibranz fired at the *Panther* — short! Adjusted to Burst On Target, and got two hits that fired it up. Fitzgerald and Sergeant Emil Del Vecchio then engaged a fourth *Panther*, but it was 800 yards away, and even 76-mm shells bounced off the angled frontal armor.

The 1st Platoon was engaging some five *Panthers*, and there were also a couple of *Panzerjager IV* SPs with 75-mm L/48 high velocity guns among the buildings of Welschoff Farm. Lieutenant Goble had scarcely regained his tank when "Bottle Baby" was hit by an AP round that wounded the platoon leader and his gunner and fired the tank. "I had the motor off so we could hear the Kraut shells come in," said driver Tech 5 John "Swede" Nelsen. "I had just finished cleaning my periscope and had stuck it back in place when — wham! It sounded and felt like our own gun firing, but it wasn't. A shell had hit our turret. I looked back and saw smoke behind me. I was thinking of getting out when — blam — again. And I'll be damned if I didn't have a German armor-piercing shell in my lap." The hot slug scorched his olive drab gloves, but Nelsen and the rest of the crew scrambled out to safety.

Platoon Sergeant John Fitzpatrick then assumed command and ordered the platoon to back over the hill into hull defilade, keeping the frontal armor toward the enemy. The German counterattack had failed and B Team still held most of the village, but the enemy dominated the position by fire.

Relief in Place

It was shortly past noon when Colonel Abrams was ordered to turn over Singling to Combat Command B, and move on to his own objective, Bining. Major Albin Irzyk, CO of the 8th Tank Battalion, drove up in his tank to meet with Major Alanis of the 51st AIB. He was new to the command, but a veteran tanker. Irzyk clambered atop Colonel Abrams' tank "Thunderbolt VI". Abe was impatient to move on, and said he was "ready to turn over to them their objective — and without a fight." A misconception had arisen that would lead to casualties and acrimony, and exemplifies the confusion of battle command, for the relieving units assumed the town was clear. Leach recalls relaying to Abrams that the center and right of Singling was clear, but not the left, "which is still under hostile antitank fire." The import of this radioed message was unfortunately lost.

Major Irzyk ordered First Lieutenant Bill Marshall's C Company/8th Tank, carrying First Lieutenant Bob Lange's B/10th armored doughs, to enter the town "as the other unit had done." But as Second Lieutenant George Gray's 1st Tank Platoon followed Farese's tracks left into the orchard, his tank was struck by two AP rounds, ripping off his hand, and killing Gunner Aro. Marshall then radioed Staff Sergeant Ed De Rosia to circle around east with his 2d Platoon tanks, but German fire discouraged that move. A shaken Marshall then ordered all tanks, still carrying the infantry, to back to the reverse slope south of town. He then drove back in his tank to find out from Major Irzyk what the hell the story was.

Lieutenant Lange went on into town and met with Leach and Belden, and arranged for his company (down to about 40 men total), to relieve B/51 in Singling. Colonel Abrams meanwhile wanted to pull out of Singling and get on with the attack on Bining. He radioed Captain Leach, but Leach had gone to find Lieutenant Marshall of the 8th. As acting CO, Lieutenant Cook reported on the situation, and Abe told him to pick up the infantry and move out immediately.

Captain Leach had gone on foot to the C/8 tanks. Finding Lieutenant Marshall gone, he called Marshall on Sergeant De Rosia's tank radio, outlining the situation, and insisting on knowing when his tanks would be relieved. Marshall, who had just been ordered by Major Irzyk to stay put, responded that he would not come into town "until my orders are changed" — and he never did.

It was dusk as Cook, rejoined by Captain Leach, pulled his tanks and infantry back about 400 yards south, to where Marshall's tanks were in defilade. The badly wounded Lieutenant Gray came out on the turret floor of Leach's tank. AP tracers streaked through Singling and across the valley, and German mortar and artillery concentrations periodically crumped into the village, where Lieutenant Lange's B/10 infantry were hunkered down, alone and with no tank support. When tank engines were heard in the orchard, Second Lieutenant Bob Victor went to investigate — but it was Germans who had crept down, trying to start the engines of the two knocked-out tanks from Farese's platoon. They were chased off, but returned during the night and set them on fire.

Task Force Abrams had now been reoriented, and converged on Bining with TF Oden, to take the primary CCA objective. Major Irzyk could see no point in holding Singling, zeroed in as it was from the high ground. When Lange reported that a German mess truck, with hot soup for at least a company, had been shot up and captured when it drove into the town square, Irzyk ordered B/10 AIB to pull out. They made it back with five casualties, to Marshall's C/8 tanks, and outposted them for the night. They did not attack again the next day, as elements of the new 12th Armored Division were to relieve the 4th Armored units during the night. Singling had cost the 4th Armored 23 men. All six killed, and six of the wounded, were tankers, for Singling had been a tanker's battle. Five medium tanks had also been lost, and could not be recovered. Known enemy losses were two *Panthers* and 56 prisoners.

In 1978, Colonel Jimmie Leach returned to the spot where his Sherman, "Blockbuster 3", was sited in Singling action.

Critique of Operations

The village of Singling was of little tactical value in its own right. It was captured by the 12th Armored a few days later, as the Germans fell back to defend Rohrbach. Nonetheless, because of the extensive combat interviews and the detailed study made of the fight at the time, and its subsequent analysis by two of the participants, it is instructive as a 1944 small unit armored battle.

Could the German armored forces to the north have been suppressed?

The Welschoff Farm ridge dominated the village area tactically. It was 1,200 yards distant, beyond the effective range of American tank gunnery, but ideal for the high velocity German guns. Nor could the ridge have been effectively screened, for artillery would have had to fire continuously all day. The ridge might have been attacked and captured, but there was a similar ridge farther north, and the axis of advance was not in that direction.

Could the Germans in the village have been defeated?

The German *panzer grenadiers* were demoralized by the violent armored assault and offered little resistance. The *panzers,* however, were manned by determined crews. They were well-sited to fight the American tankers, who in any case soon had to contend with a counterattack. But tanks alone in built-up areas are vulnerable, and if the American armored infantry had had more antitank weapons than two bazookas, they might have been destroyed.

Were American supporting fires effective?

American direct-fire tank guns were limited in range, and the tank destroyers, while mounting an excellent 76-mm gun, were exposed and vulnerable to enemy artillery fire. Indirect fire weapons — mortars and artillery — effectively put down smoke and HE that screened the attack, and demoralized the defending infantry. Had adequate artillery fire also been called down on the German counterattack, the *Panthers* would have been forced to button up, with loss of visibility, and churning around in the open, would have been sitting ducks for the American tanks. (Colonel Abrams had, in fact, wanted more artillery support.)

Was communication adequate?

The tank radios were effective, and used as the team's primary

"...The Germans finally prevailed because they had the advantage of terrain..."

method of communication. The infantry radios (walkie-talkies) were less effective, because of building obstruction. Runners were sent, but the enlisted men seldom had an overview of the unit situation; they had difficulty locating the indicated command post, and their information was quickly overtaken by events. In any case, it is better for commanders to confer personally and make decisions in coordination.

Were command and control adequate?

The CP and the Arty FO were sometimes only located with difficulty. In town — fighting this was not unusual. While small unit communication was provided by word-of-mouth of necessity, some symbol or object to mark the CP would have been advantageous. Unit commanders were not always at their posts. But usually it is better for company-grade officers to see for themselves what a situation is, rather than rely on impressions from other sources. In such cases it is important that unit elements know the chain of command, and are able to refer others to acting commanders. Again, one is struck, that in crack units like the 4th Armored, leadership was up front.

Could the German battalion have better defended Singling?

That the German soldier could continue to fight effectively at this stage of the war was credit to his will and determination. Yet the *panzer grenadiers* at Singling crowded into cellars and old French pillboxes, and were taken prisoner without resistance. Even though they were exposed to the whirlwind of fire of the American armored assault, they could have better used the stone buldings for defensive protection. The German *panzers* were also not well positioned to capitalize on their long-range fire advantage. Yet the battalion had been in the town since the night of 4 December. But even in the constricted village the *panzers,* at least, held their own.

Might the German counterattack have succeeded?

The German counterattack was well coordinated. Yet the advantages of German *panzers* were their armor and long-range gunnery from over-watching defensive positions. Advancing across the open closed the range and negated these advantages, especially with their lack of gun-stabilization and slower traverse. The Germans might have done better to isolate the American force by long-range fire and counterattack at night, with *panzer grenadiers* using *Panzerfausts* (AT rockets).

Was the American mission accomplished?

"Yes," concludes Colonel Leach. "We were to neutralize Singling and take fire off the main attack —we did this quickly and easily." The village itself was of little intrinsic military value, nor was it worth additional casualties.

Conclusion

Fighting forces manifest characteristics of weaponry and capability that the astute commander uses to advantage. To this extent, the American forces were probably better handled. The Germans finally prevailed because they had the tactical advantage of terrain, and in dominating a specific area by long-range antitank fire. Team B was not itself strong enough to affect the larger battle area. Yet armored warfare demands flexibility in attitude, even to accepting losses and abandoning an untenable position, to achieve the larger objective.

Source Materials

This account of the Singling fight depends heavily on the study by Second Lieutenant Gordon Harrison in the War Department's Historical Department "Small Unit Actions" series published in 1946, though checked against the original combat interviews, and unit diaries, journals, and After Action Reports, and using Kenneth Koyen's *Beach to Bavaria* (1946). Essential, of course, was collaboration with Colonels (ret.) James H. Leach and Robert M. Cook, through correspondence, and discussions at the annual 4th Armored Division Association convention, in Columbus in 1984. In addition, Brigadier General (ret.) Albin F. Irzyk related the circumstances of the relief by the 8th Tank Battalion. German sources, including the *15th Panzer Regiment* history by G. W. Schrodek (1976), and the *11th Panzer Division* history by Oberstleutnant Donnhauser and Generalmajor Drews (1982), are unfortunately limited in detail. Research assistance was provided, in part, by a Special Research Assignment from the Ohio State University, Newark Campus.

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T-64, IT-122, and IT-130: The Soviet Advantage

By Captain James M. Warford

When a requirement for a new weapon system or combat vehicle is identified within the Soviet military, a vehicle is designed (or reverse-engineered) to satisfy that requirement. Once such a vehicle is fielded it will continue to be developed and modified over a usually long active service life. During these in-service developmental years, the Soviets gain very valuable experience and expertise concerning the vehicle's capabilities. It is this expertise that can give the Soviets an edge. When the time comes for a new vehicle to replace the fielded one, or the established vehicle is sent into combat, the practical experience the Soviets have acquired over the years may give them and their fielded vehicle a dangerous advantage. Such an advantage may prove to be the deciding factor on the battlefield.

While the number of vehicles that fit into the Soviet advantage category is fairly numerous, three vehicles stand out far and above the rest: the *T-64* battle tank and the *IT-122* and *IT-130* assault guns. Prior to the first public appearance of the *T-62* battle tank in 1965, a new Soviet tank, designated the *M1970* or *T-70,* was identified by western intelligence sources. The appearance of the *T-70,* not only confirmed that a still older vehicle known as the *T-67* was in fact an interim design "probably configured for vehicle running tests of the *T-64's* hull and the turret of the *T-62,*"[1] but, also, that the Soviets had identified the requirement for a new tank. This new tank would not be evolutionary, as was the policy of Soviet tank designers, but instead would be revolutionary. The *T-64* that was put into production in the mid-1960s appeared to be the service model of the *T-70;* a tank that, according to several sources, never went into production.

The West was suddenly faced with a new, very modern Soviet tank that had no counterpart in any other army. The *T-64* mounted the fully smoothbore 125-mm *RAPIRA3*[2] main gun, which fired a new APFSDS round at a muzzle velocity in excess of 1,600m a second.[3] This gun, while still being the largest main gun mounted on any tank in the world, was only one aspect of the *T-64's* offensive capabilities. The tank was also fitted with a fully automatic loading system, allowing the crew to be reduced to three men while still allowing a useful amount of 125-mm ammunition to be carried. Such a system is unusual on a Soviet tank, but was developed and fielded to fulfill an identified requirement. Another important aspect of the *T-64's* firepower was its fire control system, which included a coincidence rangefinder. The adoption of such a system for fitting to a tank also marked a departure in Soviet policy. "While some assault guns, like the *IT-122* and *IT-130,* had been fitted with optical rangefinders (stereoscopic or coincidence), tanks had been equipped with only sim-

Armor author Steven Zaloga composed this drawing of the Soviet IT-130, at left, by combining the chassis of the M1977 recovery vehicle, lower left, with the M-130 field gun that was adopted for the tracked vehicle. The photo at lower left clearly shows welding marks where the original gun was removed. At right, a side view of the T64A MBT.

ple stadiametric rangefinders which were not effective at long ranges."[4]

The T-64 MBT

The *T-64's* powerplant is one of the most radical aspects of the tank's design. It consists of a 750-hp diesel engine that represents a drastic change from conventional designs, "being a flat, five-cylinder design, with horizontally opposed pistons."[5] Several sources report that the engine is plagued by problems, and is constantly breaking down. The Soviets, however, seem to be happy with this innovative engine and apparently have solved the problems that confronted the British with their flat, opposed-piston engine in their early model *Chieftain* battle tanks.

Perhaps the single most discussed aspect of the *T-64's* design is its armor protection. While no conclusive unclassified information has been released concerning the type of design of armor used, the feasibility of fitting a *T-64* era tank with composite armor (that includes a cast armor turret) has been confirmed by the design and testing carried out on the American *T-95* prototype tank from 1 June 1958 to 1 August 1960. The *T-95's* fused silica (glass) composite armor, having been designed to defeat primarily HEAT rounds, would fit very well into the Soviet concern over western antitank missiles (ATGMs). Since it is known that the Soviets began work on composite steel/ceramic laminate armors as long ago as 1940,[6] it can be determined that the *T-64* is protected by at least a first generation of advanced armor. Whatever the exact composition of the armor turns out to be, one thing can be said for certain: the Soviets were faced with a requirement for a tank that was fitted with advanced armor, armor that was more survivable than earlier designs when faced with the growing numbers of ATGMs that it would encounter on the modern battlefield.

The exact role the *T-64* plays in the overall Soviet tank plan, as well as the reason the Soviets fielded a tank with the capabilities of the *T-64,* are the subject of much speculation. One theory is that the *T-64* is the modern embodiment of the Soviet heavy tank. The combination of an accurate, long range, large caliber gun (coupled to an advanced optical/coincidence rangefinder); with what probably was the most advanced and heaviest armor of its era, might allow the *T-64* to be labeled a new *heavy* tank. Another theory is that the *T-64* is a true battle tank, designed from the ground up to fight on the battlefield of the future. A third theory is that a tank like the *T-64* was demanded because of the appearance of the *M60A1* and *Chieftain* in the West. These tanks, combined with the latest technological breakthroughs, brought out the weaknesses and the drawbacks of the *T-62* very clearly. The Soviets needed a tank to deal with the threat from the West.

Whichever of these three theories (or any combination thereof) turn out to be correct, the Soviets have made one thing very clear: the time had come for a tank like the *T-64* to be fielded. The requirement was identified and using the most modern technology available, was satisfied.

Soviet TD Doctrine

In the Soviet Army, the tank destroyer (*IT-ISTREBITEL TANKOV*)[7] is seen as a vehicle designed from the ground up to be particularly well suited for destroying tanks. They are vehicles that combine a large caliber main gun (larger than the main gun of the tanks with which they are employed), heavier armor than what is possible to fit to turreted tanks, and a much larger ammunition-carrying capacity than a conventional tank. All of the above characteristics are then mated to the hull and suspension system of whatever current battle tank the Soviet Army made available. This meant that the tank destroyer could use the same hull and suspension of the tanks that were deployed with each unit they supported. According to Viktor Suvorov (the author of the book *Inside the Soviet Army*), "Every motor-rifle regiment (inside the USSR, but not abroad) has one battery of heavy assault guns,"[8] (tank destroyers).

The *IT-122,* which first appeared in the Soviet Army in the 1950s, replaced the *SU-100M.* This earlier vehicle gave the Soviet tank and mechanized units the ability to defeat the German *Panther, Tiger I,* and *Tiger II* tanks of WW II. The *IT-122* apparently was first seen in photographs taken of the DNIEPR exercises in 1967. They were also employed during the Soviet invasion of Czechoslovakia. Again, according to Viktor Suvorov, they are employed "at times of acute tension."[9] Once the situation in Czechoslovakia had been quieted, the *IT-122s* were returned to the Soviet Union.

The *IT-122* itself is based on the *T-54/T-55* hull and suspension with the turret removed, and replaced by a heavily armored superstructure. The main gun is the *D-74* 122-mm cannon. Perhaps the most interesting feature of the *IT-122,* while not overlooking the huge jump in main

gun caliber over the *T-54/T-55,* is the mounting of a coincidence or stereoscopic rangefinder. The device, mounted at the commander's station, "provides a very clear indication that the *IT-122* was developed primarily for long range elimination of NATO heavy tanks."[10] It was not until the appearance of the *T-64* in the mid-1960s that a Soviet tank was equipped with such a modern and accurate ranging system.

The *IT-122* was replaced in the 1960s by the *IT-130,* this time mating the *T-62* hull and suspension with the excellent *M46* 130-mm gun. According to some sources, the *IT-130* stayed in production after the deployment of the *T-64.* This was probably due to the performance of the 130-mm gun. The reason the Soviets decided to mount this field gun on a tank destroyer is two-fold. First, the gun had been available for many years, and its capabilities were very well known; second, the Soviets were faced with the requirement to defeat the new tanks fielded in the West. While the earlier *D-74* 122-mm gun was very capable, the Soviets were faced with a new problem. This started with the American *M-103* and British *Conqueror* heavy tanks and evolved into a tank with which the Soviets became very concerned, the British *Chieftain.* The answer to this problem was simple: develop a heavy tank to shoot it out with these new Western tanks, or update the tank destroyer fleet by choosing a newer base vehicle and re-fielding the 130-mm gun. There is some speculation that the Soviets decided to do both; however, it is known for sure that the *IT-130* was fielded. In the same way that the *SU-100* supplemented the *IT-34/85,* the *IT-130* was able to provide "the high accuracy and hard punch to supplement the scores of medium smoothbore-armed tanks firing at close range on the move."[11] In addition to the capabilities already mentioned, two more must be discussed. First, the 130-mm gun gives the *IT-130* the additional ability to provide very long range and accurate indirect fire support to suppress Western defensive/ATGM positions. Second, the extreme size of the gun not only offers the possibility of 130-mm APFSDS ammunition, but also the possibility of a heavy metal "aluminum-based heat round, where overkill is such an important factor in armor penetration."[12] It can easily be seen that the Soviet decision to field the *IT-130* with the 130-mm gun may have been one of the smartest moves the Soviet military has ever made. The *M-46* 130-mm field gun that was first shown to the public in May 1954, allowed the Soviets to field a tank destroyer that was "certainly capable of defeating any NATO tank of its day."[13]

Exactly how successful the *IT-122* and *IT-130* were (are) is hard to determine. The reason for this is that these two vehicles have been surrounded by an extremely high level of secrecy. The explanation for this secrecy is not known, although the Soviets have historically been very protective of their antitank weapons. The only antitank weapons that are displayed and well known in the West are the ones that the Soviets are willing to export. "The systems which may not be exported are never demonstrated but remain unknown from their birth, throughout their secret life and often, even after their death."[14] The Soviet ability to keep the existence of major weapon systems a secret has been demonstrated more than once in the past. Perhaps the best example of this was the total surprise the Germans experienced when suddenly faced by the *T-34* in WW II. The Germans were not only not aware that the *T-34* was in mass production; they were unaware that it existed. Any final assessment of the *IT-122* and *IT-130* cannot be made without the explanation of two additional points.

IT-122

The *IT-122* was not suddenly developed to solve a new problem that Soviets observed. It was fielded as the latest answer to a continual problem that was becoming more important as new vehicles were developed in the West. The *IT-122* had at least two predecessors and, as mentioned above, was replaced by the *IT-130.* The question now is, "Where will the Soviets go from here?" It is highly unlikely that the Soviets will stop with the *IT-130.* The adoption of the *T-64* or *T-72* as a base vehicle mated to the new long barreled 152-mm field gun of the *2S5* self-propelled gun (which has been fielded since 1981) would

At left, a bogged-down IT-122, showing top-mounted 14.5-mm antiaircraft machinegun. The chassis is derived from the T-54/55. At right, one window of the coincidence rangefinder on the T-64A can be seen immediately to the left and below the TC's station.

create a tank destroyer that would be able to not only deal with the new special armored tanks from the West, but also give the needed long range fire support to the aging 125-mm main gun of the newer Soviet medium tanks. The lack of detailed information, clear photographs, and white parade paint must not be allowed to show these Soviet tank destroyers as anything less than the real threat they are.

It's very clear from the above discussion that the Soviets were faced with requirements for new vehicles, and that these requirements were satisfied. The *T-64* was needed in the mid-1960s; and once it was fielded it caused a reaction that is still influencing tank design 18 to 20 years later. The *IT-122* and *IT-130* were not new concepts in the Soviet Army. They were, instead, modern solutions to a requirement that made itself clear during WW II. Perhaps the most interesting aspect of all three Soviet vehicles (and any new vehicles that may have been developed from them) is that they have no Western equivalents. While the Western armies are equipped with modern battle tanks with many similarities to the *T-64,* they were fielded several years later. A comparison between them and the *T-64,* therefore, would be one of apples and oranges. Any of the fielded Western tanks of the *T-64* era were outclassed from the very beginning. The *IT-122* and *IT-130,* on the other hand, were truly unique vehicles. There is simply no Western equivalent for these very capable tank destroyers.

When the Soviets fielded these three vehicles, they suddenly gained an advantage over the West. This advantage was first realized when the Soviets were able to identify the requirements for a new or updated vehicle and then satisfy these requirements by fielding the proper tank or tank destroyer. The Soviets have been able to use this advantage and develop it into something even more important: expertise. This expertise — 18 to 20 years old with the *T-64* and its technologies and even older with the *IT-122* and *IT-130* — could be a deciding factor on the battlefield. The Western countries, led by the U.S., missed their opportunity for the same ex pertise. The various armored vehicle development policies in the West must be changed to allow a new vehicle to be fielded when it is required. Fielding armored vehicles to satisfy specific requirements as they are identified will not only allow the Western armies to maintain the pace of modern armored vehicle development, but would also provide the practical experience and expertise that will be needed to put steel on the Soviet advantage.

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Footnotes

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[5]Warford, Captain James M., "The T-95: A Gamble in High Risk Technology," *Armor,* September-October 1983, p. 41.

[6]Zaloga, Steven J., "Soviet T-72 Tank," *Jane's Defense Review,* May 1983, p. 425.

[7]Zaloga, Steven J., "Soviet Assault Guns," *Jane's Defense Review,* April 1983, p. 850.

[8]Suvorov, Viktor, *Inside the Soviet Army,* (New York: Macmillan Publishing Co., Inc. 1982) p. 207.

[9]Suvorov, Viktor, "Inside the Soviet Army, Suvorov Replies," *International Defense Review,* June 1983, p. 762.

[10]Zaloga, Steven J., "Soviet Assault Guns," *Jane's Defense Review,* April 1983, p. 851.

[11]Burniece, Joseph R., and Hoven, Paul A., "Soviet Heavy Tanks," *Armor,* March-April 1983, p. 24.

[12]Ibid.

[13]Zaloga, Steven J., "Soviet Assault Guns," *Jane's Defense Review,* April 1983, p. 852.

[14]Suvorov, Viktor, *Inside the Soviet Army,* (New York: Macmillan Publishing Co., Inc. 1982) p. 194.

The Division 86 Cavalry Squadron

"...Obviously, the Division 86 squadron, with fewer men and no tanks, is a greatly reduced fighting force..."

by Major Peter S. Kindsvatter

Since its inception in 1940 as the reconnaissance battalion of the armored division, the divisional cavalry squadron has gradually evolved into a powerful organization well suited for economy-of-force operations. Division 86 will largely eliminate this economy-of-force capability and restrict the squadron to primarily reconnaissance and security missions. Commanders and staffs need to be aware of the significant changes in mission and organization for the Division 86 squadron and of the squadron's limited ability to perform its primary mission of reconnaissance and security without augmentation, particularly by main battle tanks.

Prior to WW II, the divisional reconnaissance battalions emphasized "sneak and peek" reconnaissance. Fort Knox training circulars as late as 1944 stressed the desire for avoiding a fight:

> Mechanized cavalry units are organized, equipped, and trained to perform reconnaissance missions employing infiltration tactics, fire, and maneuver. They engage in combat only to the extent necessary to accomplish the assigned mission.[1]

Following WW II, however, many armor leaders argued that, based on wartime experiences, the reconnaissance battalion must be, first of all, a fighting force if it is to succeed. Major General R. W. Grow, wartime commander of the 6th Armored Division, said in a postwar study of the reconnaissance battalion:

> Too often our pre-WW II training directives emphasized the "sneak and peek" method of reconnaissance. Fortunately, far-sighted cavalry officers who believed that "the mission of the cavalry is to fight," and that worthwhile information can be gained only by fighting, influenced the development of reconnaissance squadrons, both in armored divisions and in separate groups, which were equipped and trained to carry out every type of combat mission.[2]

Although organization and equipment have changed since Grow's day, this basic concept of cavalry as a fighting force powerful enough to develop the situation has remained. As recently as 1977, FM 17-95, *Cavalry,* reflected this concept:

> In order to see the battlefield and the enemy, cavalry must move continually and rapidly. Cavalry *moves to see and moves to fight.* When fighting outnumbered, it is necessary for any force of combined arms to move to mass sufficient force to accomplish its mission. This is more so with cavalry than with other forces, since *one of cavalry's prime tasks is to find the enemy and fight him.*[3]

In August 1980, however, this "fighting cav" concept was radically changed, at least for the divisional cavalry, by the Army Chief of Staff's Division 86 operational and organization (O&O) concept. This O&O deleted economy-of-force missions for the divisional cavalry squadron (but not for the regimental cavalry) and put the emphasis on reconnaissance, not fighting:

> This O&O concept deletes the missions of guard and cover from the repertoire of the Division 86 cavalry squadron.... Of all missions and tasks, its primary function is detailed ground and air reconnaissance *within* and to the front, flanks, and rear of the division.[4]

This change in concept, a big step backward for proponents of "fighting cavalry," was coupled, as one might expect, with a sharp reduction in the squadron's combat strength compared to the current H-series TO&E:[5]

Obviously, the Division 86 squadron, with fewer men and no tanks, is a greatly reduced fighting force. The squadron is organized as follows:

	H Series	Div 86
Total Strength	902	630
Tanks	36	-
Scout Vehicles*	45	36
Scout Helos	10	12
Attack Helos	9	8
Mortars	9	6

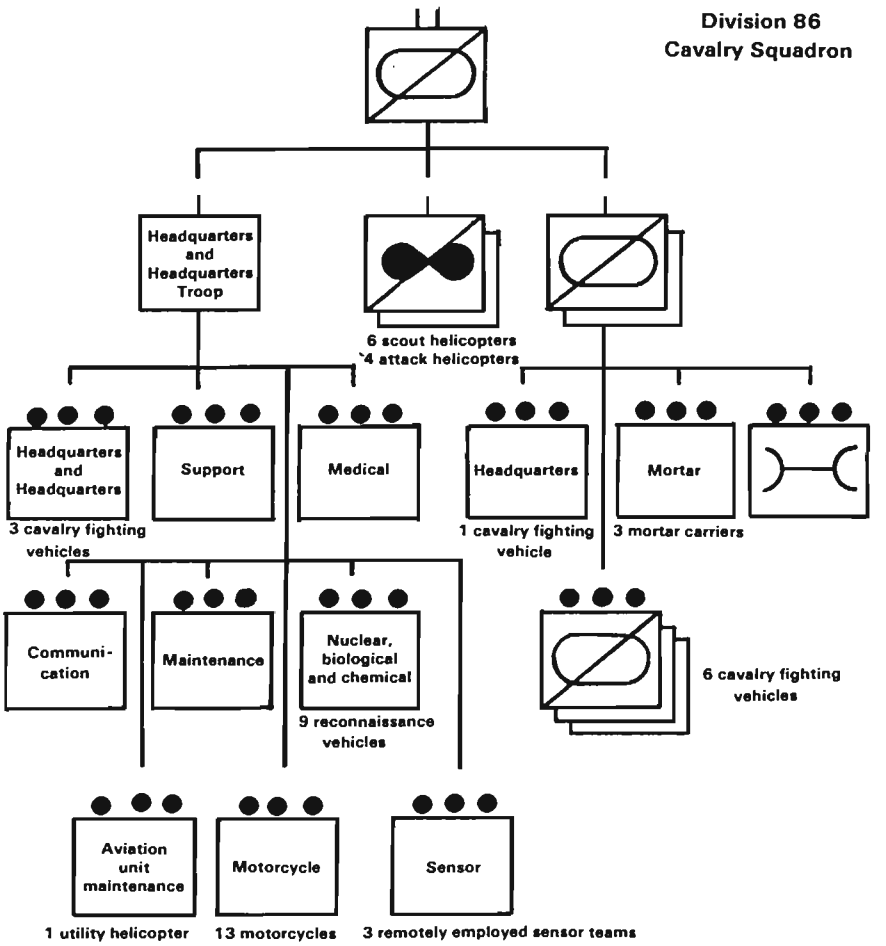
*This includes only those vehicles (*M113s/M3s*) in the cavalry/scout platoons, and, consequently, the ones that do the ground scouting.

This organization reflects the increased emphasis on reconnaissance by the inclusion of a motorcycle platoon, an NBC reconnaissance platoon, and a sensor platoon, none of which are in the current H-series squadron. The squadron is attached to the divisional combat aviation brigade, primarily for aircraft supportability, but it will normally be employed under division control.[6]

What missions is the Division 86 squadron expected to perform? As was noted, the emphasis is now on reconnaissance, but other missions, to include some new ones, are also feasible. Unofficial draft FM 17-100, *Divisional Cavalry Squadron,* lists the following missions:

- Conduct reconnaissance within and to the front, flanks, and rear of the division (zone, route, or area reconnaissance).
- Enhance division command and control by providing a positive command link between the division commander and subordinate elements ("C² enhancement").
- Conduct screening operations (front, flank, or rear).
- Conduct line of communications surveillance. Assist and control movement of maneuver units and CS and CSS elements within and through the division area.
- Conduct internal surveillance to facilitate rear area protection operations.
- Conduct NBC reconnaissance.
- Inherent in the tactical performance of these operations is the requirement to delay and conduct hasty attacks *within the unit's capability.*[7]

Most of these missions(area/route/zone reconnaissance, screening, rear area security, and NBC reconnaissance are not new, and a brief study of FM 17-100 indicates that procedures for executing these missions have not radically changed



from those outlined in the current FM 17-95, *Cavalry.* (For example, control measures, command-and-control arrangements, and helicopter-ground force cooperation measures are basically unchanged.) One significant change, however, is the emphasis on reconnaissance *within* the division area — no long-range, semi-independent operations are envisioned — the squadron simply does not have the combat, CS, or CSS assets for independent action.

Several traditional cavalry economy-of-force missions are conspicuous by their absence from the above list: Guard, covering force, and the deliberate defense. FM 71-100 addresses these missions, but makes it very clear that the Division 86 squadron, unlike its H-series predecessor, may need significant augmentation to accomplish them. The squadron has no organic armor, infantry, ADA, engineers, bridging, EW or artillery, and its CSS assets are limited — in short, it is a reconnaissance force of limited fighting capability designed "to find the enemy for the division commander and use its firepower to develop the situation while avoiding decisive engagement."[8] Guard, cover, and deliberate defense all involve decisive engagement; hence, they are stricken from the list of missions to be accomplished using only organic assets.

Two new missions appear in the above list and are worth a closer look: LOC surveillance/movement control and C² enhancement.

LOC surveillance entails the positioning of scouts along critical routes to provide security and surveillance, augmented as necessary by sensors, NBC reconnaissance squads, motorcycles, and aeroscouts. In addition to monitoring the routes, the scouts could assist in the movement of maneuver, CS or CSS elements along these LOCs.

The second new mission, C² enhancement, may be critical in what one author foresees will be the "strangled communications environment" of the AirLand Battlefield.[9] When the division commander loses communications with an element, and is unsure of the situation, he can dispatch air or ground

"...Can the Division 86 squadron perform its primary mission — reconnaissance — without tanks?"

scouts to find out what is going on. On the nuclear battlefield, this could entail using a cavalry troop or platoon to fight its way through with orders or information.

Be they new or old missions, how well can the Division 86 squadron accomplish them? As already noted, the classic economy of force missions of guard, cover, and deliberate defense have been dropped from the mission list (unless the squadron is reinforced), and the squadron will, instead, orient on reconnaissance. Some believe this is a step in the right direction:

> Squadrons have, in recent history, been primarily used as division minicovering forces and to add significant localized combat power once a major decisive battle is joined.... On the "nonlinear" battlefield, division commanders will use their cavalry squadron to find enemy flanks and rear support areas. While this is not a *new* mission, within the context of Division 86, it has very high priority.... This capability requires light, mobile, reconnaissance-oriented forces that will make every effort to avoid decisive engagement.[10]

Advocates of the old "fighting cav" concept, however, claim that reconnaissance operations on the modern battlefield often require such decisive engagements to gain the needed information:

> Cavalry platoons (H-series) are organized to fight for intelligence. The fight for intelligence is violent, offensive in nature, and highly fluid. It requires high tactical mobility, aggressive maneuver, and sustained, all-weather combat power. Only one weapons system so dominates the battlefield as to provide the edge needed to win the intelligence fight: the main battle tank.[11]

And this brings us to the crux of the matter: Can the Division 86 squadron perform its primary mission — reconnaissance — without tanks? Given that guard, cover, and deliberate defense are deleted as standard missions (be that wise or unwise), and given that C^2 enhancement, LOC surveillance, NBC recon, and rear area protection can be adequately accomplished without tanks (a fair assessment, I think), then the controversy boils down to the reconnaissance question.

Some feel the cavalry fighting vehicle (CFV), with its *TOW* and 25-mm main gun, is powerful enough to succeed in the reconnaissance mission.[12] I disagree. The lack of tanks will seriously hamper accomplishment of the reconnaissance mission. The CFV's 25-mm cannot defeat Soviet *MBTs*, and while the *TOW* can, it is a weapon best employed defensively at long range. Those who have conducted ground reconnaissance know that, depending on terrain and weather, contact often occurs at short range between opposing reconnaissance forces, and a quick-firing, tank-defeating system immediately becomes an item in demand. The *TOW* does not fit that bill, it will force scouts, after making contact with enemy tanks, to back off quickly and take take up defensive firing positions suitable for *TOWs*. Backup air troop support will be valuable at this point, but with only eight *Cobras* and possible weather difficulties, this may not be forthcoming. Consequently, contact with even a few enemy tanks will quickly change an "aggressive recon" into a "hasty defense" — so much for "development of the situation."

And Division 86 cavalry *will* run into tanks, for just as we are weakening our divisional reconnaissance element, the Soviets are beefing theirs up, replacing antiquated *PT-76s* with *BMP-1s* and *T-64/72s*. The divisional reconnaissance battalion of the Soviet motorized rifle division now contains six *T-64/72s*, 15 *BMPs* and 12 *BRDMs*.[13] Further aggravating the problem is the Soviet regular use of reconnaissance detachments and combat reconnaissance patrols formed from regular motorized rifle and tank elements and reinforced with engin-

eers, ADA, and artillery.[14] In a meeting engagement of reconnaissance forces, our divisional cavalry will be hard pressed to defend itself, let alone develop the situation sufficiently to provide the division commander the information he needs.

In conclusion, arguments for or against tanks, for or against the need for decisive engagement, and for or against the elimination of economy-of-force missions are not easily resolved. What is evident, however, is that the Division 86 squadron will be a greatly reduced fighting force compared to its H-series predecessor, and divisional commanders must be aware of the change in emphasis in the squadron's mission away from economy of force and toward reconnaissance and security *within* the division area.

Finally, in any reconnaissance operation in which contact with significant enemy forces is likely, the division commander is well advised to reinforce his cavalry squadron with some tanks if he does not want his reconnaissance effort to degenerate rather quickly into a hasty defense.

Footnotes

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[5]Data on H-series TO&E is from FC 101-1, *Organizational and Tactical Reference Data for the Army in the Field,* June 1984, p. 8-47. Data on Division 86 TO&E is from ST 17-1-1, *Armor School Reference Data, Volume III, Division 86 Organizations,* Fort Knox, 1981, p. 493.

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[9]R. G. Rosenberg and M. S. Lancaster, "Command and Control for the Division 86 Squadron," *Military Review,* Volume LXI, No. 11, November 1981, pp. 52-53.

[10]Bush, p. 16.

[11]Thomas A. Deals, "Economy of Force — The Cavalry connection," *Armor,* Volume XCII, No. 4, July-August 1983, p. 45.

[12]See Bush, p. 16, for his discussion of this point.

[13]FM 100-2-1, *The Soviet Army — Operations and Tactics,* 16 July 1984, p. 4-95.

[14]See FM 100-2-3 (Coordinating Draft), *Soviet Army Troops — Organization and Equipment,* August 1982, pp. 7-2 and 7-3, for a description of these reconnaissance formations.

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Terrain Visualization by Strip Map

The Russians treat the map as a classified document. Only the officers are privy to it. In the U.S. Army we are all an army of map-readers. But are we good map readers? Is there anyone reading this article that has never been lost while map-reading? With the increasing speed of our combat vehicles, unless we have new ways of map reading, instances of "getting misoriented" will only increase. At the height of battle under intense pressure, the ingredients for disaster are present. I would like to present a means of augmenting our map-reading expertise, a sort of expanded strip-map technique, as a method of visualizing terrain.

The strip map referred to is not the usual strip map you imagine while on convoy. It is rather the strip-map maker's shorthand view of the territory through which he'll be operating. It should, if time allows, be a habitual technique. The expanded strip map, like a convoy strip map, should include a SP (start point), CPs (critical points), and an RP (release point). A word on the CPs, however, is vital. Normally a CP is considered to mean a check point, but not here. It is indeed a "critical point," simply defined as any decision point on the ground where you can get *lost!* Hence the map reader will likely choose as many of these as he feels prudent to ensure he doesn't get lost.

The idea behind the expanded strip map technique is to get the map reader ready to focus on the details of the terrain — to get a "feel" for it, to visualize it. The more he practices the technique, the better he'll become at it and the less likely he'll be surprised by the panorama in front of him as he crests the next hilltop or be pressured into a wrong terrain decision at a critical time. The technique requires the map-reader to *write down* what the CPs look like in order to engage his senses fully.

Let's go through the strip-map process with our platoon leader as he prepares to move his unit from its present location to a new blocking position. The platoon leader selects his route, making use of cover and concealment. Strictly from a map reconnaissance (he'll augment this later with a ground recon, both day and night, if he has time) he selects his SP, three CPs (where he thinks he might get lost!), and his RP. He uses all the resources available to him, to include a compass and his vehicle odometer (he gets the distance off the map and converts to tenths of miles). He then writes down his notes on his strip map in something like the following format:

CP	Odometer Reading	Description
SP	X (Whatever his vehicle odometer reads)	4-way intersection; 270 degrees left; woods on left; slopes downhill to the right.
CP 1	X + 0.3 mile	Crest of hill; stream 200 m on left; small town right front 500 m; go half left (210 degrees).
CP 2	X + 1.0 mile	Fork in road, take right, 45 degrees along ridge line into woods.
CP 3	X + 1.7 mile	Woods end .2 back, house on left, downhill right into ravine with small group of trees on right.
RP	X + 2.1 mile	Small bridge just before RP.

Note that the description of the CPs can and probably should include confirmatory information that you are headed in the right direction. In other words, once you pass the CP, describe the terrain that confirms you made the correct decision, e.g., "small hut with trail beside it 100 meters after CP."

The platoon leader also has drawn his own map depicting the above beside his notes and has ensured that the members of his platoon copy it. On board his tank, the driver notes the expected odometer readings for CPs and RP and the loader studies the platoon leader's notes so he can prompt him on the move. Over the tank's intercom, were you to listen in, you would hear the driver say, "Coming up on (odometer reading)." The loader would then read the description of the CP and the platoon leader would confirm it, allowing him the opportunity to focus on control of his platoon and the enemy situation. Depending on the deployment of the platoon, the other platoon tanks are doing the exact same thing.

This technique, used for any movement, focuses attention on the map and its details. The platoon visualizes the terrain before it gets to the decision points, much like an Alpine ski racer runs the course in his mind before he actually skis it. By writing down the notes and drawing the map, the leaders are not surprised by the terrain and pressured into making hasty decisions. Especially at night and with the arrival of cross country speed in vehicles like the *M-1* and *Bradley,* that cushion could prove a decisive difference.

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CTT: The Way It Should Be

All too often, administering the Common Task Test (CTT) is done out of necessity and is considered by many soldiers as boring and less than challenging. This year, Headquarters Company, 2d Battalion, 124th Infantry, contrived to make it more challenging.

The planning started with last year's CTT, which was conducted in the company area in round-robin fashion. Lines were long and soldiers selected as evaluators were not prepared for what they had to do. Soldiers found the CTT leaving much to be desired. It was decided then that the 1985 CTT would be conducted the way it should be, in the field, under a tactical situation — and be challenging.

What Type of Course

Unit NCOs were asked to suggest ways to improve the CTT (i.e. make it more interesting to the soldier). We decided a two-mile course through the forest along an unimproved road or trail would be best, with test stations placed at various locations along the trail. Soldiers would start the course in two-man teams at ten-minute intervals. The length of the course, two miles, would make waiting minimal.

Evaluators were encouraged to be innovative. Unit NCOs selected to be evaluators were notified well in advance and encouraged to become experts on tasks assigned them. Their response was overwhelming. They demonstrated not only creative ability but a good deal of resourcefulness as well. Each evaluator was given two tasks, which reduced the number of evaluators needed to conduct the test.

Soldiers were instructed to camouflage prior to starting the course. This put them into a tactical frame of mind and reduced the amount of time needed at Station One: Camouflage Yourself and Your Equipment. Soldiers were required to remain camouflaged throughout the course. At a following station, soldiers were to collect and report information using the SALUTE format. The station was located on a small hilltop overlooking another station where other soldier's were performing operators maintenance on their weapons. Using binoculars, soldiers gathered intelligence for their SALUTE report. At the challenge and password station, soldiers entered friendly lines after negotiating a barbed wire and concertina obstacle. At each station, soldiers were read tactical scenarios prior to receiving the task, condition, and training standard of the task tested.

Additional tasks were added, making the test more adventuresome. Headquarters troops seldom have the opportunity to see or use weapons and equipment used by infantry units, so stations were provided that made it possible for them to be exposed to some weapons. An *M47 Dragon LET* was set up and soldiers engaged stationary targets. At another station, a fire and maneuver course was set up, using blank ammunition and practice hand grenades, and the troops engaged simulated enemy positions and silhouettes.

Training Realism and Safety

Evaluators were told from the start that in planning their stations they would be limited only by their imaginations, and to make the stations as realistic as humanly possible. Safety was a priority from the start and was considered throughout all training. Caution statements were issued when necessary and ear plugs were provided to be used when firing weapons. Hot weather was a factor, so water points were placed throughout the course.

Because the unit NCOs were made a part of the planning process, and given a free hand in preparing the stations, it was proved once again that American NCOs are capable of unlimited initiative in planning and executing tasks assigned them. Headquarters company accomplished its mission of conducting the Common Task Test and the commander now has an understanding of where we stand on common tasks. But what was more important is that our NCOs now appreciate the value of planning ahead. Our soldiers were motivated to train hard and excelled in the tasks assigned them. As one Specialist Fourth Class summed it up, "Sergeant, I can't wait until next year."

My response: "Yeah, just wait until next year."

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Orlando, FL

Recognition Quiz Answers

1. **MINIMAN (Sweden).** Light antiarmor weapon; one-man crew; loaded weight, 2.9 kg; caliber, 74-mm; length 900 mm; muzzle velocity, 160 meters per second; armor penetration with HEAT round, 340-mm; range (moving target), 150 meters; (stationary target) 250 meters; time of flight to 150 meters, 1.2 seconds; one-shot, throwaway type.

2. **VIPER Mine-Clearing System with Combat Engineer Tractor (U.K).** 229 meter hose filled with plastic explosive in towed trailer. Fired by eight rocket motors, tail with three chutes to straighten hose and detonate after landing. Opens passage 182 meters long and 7.28 meters wide with 90 percent antitank mine removal.

3. **AMX VCI (FR.).** Crew 3, plus 10 infantry; weight, 15,000 kg, maximum road speed (gas) 60km/h, (diesel) 64 km/h; maximum road range (gas) 350 km, (diesel) 400-440 km; fording, 1 meter; armament, 1 x 20-mm cannon or 1 x 12.7-mm machinegun or 1 x 7.62-mm machinegun, 10 firing ports, rear exit.

4. **SPAHPANZER LUCHS (FRG).** Crew, 4; weight, 19,500 kg; maximum road speed (forward and reverse) 90 km/h; (water), 9 km/h; maximum road range, 800 km; 10-cylinder, multi-fuel, turbo-charged 390 hp engine; armament, Oerlikon 35-mm GDD-BOE (shown); two-man turret, or Oerlikon KDE 35-mm cannon, 1 x 7.62-mm coaxial machinegun, searchlight.

5. **BM-21 MRL (USSR).** Crew, 6; weight, 11,500 kg; 6x6 wheel drive; maximum road speed, 75 km/h; maximum road range, 405 km; fording, 1 meter; V8 gasoline 180 hp engine; armament, 40 rockets 122-mm caliber, long and short models with ranges (long) 20,380 meters and short, 11,000 meters; rockets can be HE, smoke or chemical; 40 additional rockets; reload time, 10 minutes.

6. **M47 DRAGON (U.S.).** One-man, TOW-type antiarmor missile; weight, 13.8 kg; infra-red tracking system; missile wire-guided by firer; thermal image night sight available; shaped-charge warhead; disposble launcher tube.

REGIMENTAL REVIEW

Shown above a Marine Corps H-53E helicopter prepares to land a 12-ton LAV 25 armored fighting vehicle during a tactical exercise that tested the new concept of two-point sling loading and the feasibility of the new airmobility tactic.

Marine LAVs Airlifted to Tactical Sites

The U.S. Marine Corps had been successfully experimenting with the airlift of their new *LAV25s* by *H-53E* helicopters in tactical operations.

Recently, nearly fifty of the *LAV25s* were airlifted by eight *H-53E* Corps helicopters using a new two-point system of external loading. The exercise was both a test of the tactics and of the new loading system and provided training for the *H-53E* crews and the *LAV* crews who rode in the choppers to the landing site.

The two-point loading system increased the helicopter's airspeeds from about 60 knots to up to 150 knots without the previously experienced swaying and twisting of the suspended loads using the single point system. *LAV* crews can hook up their vehicle to the helicopter in about 10 seconds.

Fully loaded, the *LAV25* weighs less than 12 tons and equips the 2d LAV Battalion, based at Camp Lejeune, NC. The *LAV* is an eight-wheeled, amphibious, highly mobile vehicle armed with the *M242 Bushmaster* 25-mm gun, grenade launchers and a 7.62-mm coaxial machinegun. The Corps intends to purchase more than 700 of the vehicles.

According to Marine Corps officers, this type of mobility gives the Corps task force commander an opportunity to acquire airmobile armor of a type that is not normally available to potential enemy forces. The capability to move the *LAV25* long distances by helicopter and emplace it behind enemy lines is not available outside the Corps, a spokesman said.

New Smoke Grenade Defeats Infrared Sensors

The *M-76* smoke grenade, developed by the Project Manager's Office for Smoke/Obscurants at Aberdeen Proving Ground, MD, is designed to defeat weapon sensors that operate in the visual through far-infrared regions, according to Army reports. The current *L-8* red phosphorous smoke grenade is effective across the visual and near-infrared spectrum.

The *M-76* smoke grenade can be fired from the *M-239, M-243, M-250, M-257* and *M-259* launchers mounted on most Army and Marine Corps heavy armored vehicles including the *M1* and *M60* tanks and the *M2/3 Bradleys*. It has a persistence time of about 45 seconds and the Army plans to distribute the new grenade by next spring.

M1 Fire Control, Gun Systems Improved

A pair of U.S. Army Armament, Munitions and Chemical Command engineers at the Rock Island, IL. facility have proposed a new environmental stress screening process for the electronic parts used in the *M1's* fire control and gun systems be improved. The screening process puts electronic parts through a series of hot and cold cycles and shakes them at different rates in a vibration test.

Marv Huizinga and Kent Schmitz noted a tremendous amount of failures on the tank's thermal imaging system and the laser range finder. They attributed the failures to flaws in the electronic components and proposed the improved stress screening process that will detect 95 percent of the faulty parts before they are incorporated into the completed systems. Currently, electronic components of the two systems have shown a reliability rate of about 64 percent. Early detection of faulty components and their replacement during assembly will result in a three-year savings of $23 million on a reduction in repair costs and a reduction in the number of spare parts required to maintain the systems.

Further applications of the improved environmental stress system on the fire control systems of the *Bradley* Infantry Fighting Vehicle and the spare parts on the *M60* tank are envisioned.

USAREUR Steps Up Modernization

More than 1,700 *M1* tanks, 800 *M2/3 Bradley* Fighting vehicles, 3,000 *Stingers*, the Multiple Launch Rocket System (MLRS) and the *Patriot* air defense missile have been distributed to USAREUR units since early 1982, said Lt. Col. John J. Przbylski with the Directorate of Force Management, USAREUR. He said the modernization effort now under way "is so massive that it will involve every unit in USAREUR by the time it is finished in the 1990s."

The major restructuring of units proceeding with the issue of new equipment and the four combat divisions in USAREUR will have a lot more firepower with fewer people.

A major feature of the new Army of Excellence organization will be the establishment of a combat aviation brigade and a MLRS battery in each division, said P. zbylski. He said there would be more than 90 MLRS launchers in Europe by the end of 1987. He also noted that USAREUR expected to have more *M1s* than *M60A3s* by late this year.

Training Space Squeeze Increases in Germany

The Army's massive modernization program in Europe has resulted in an even tighter squeeze for training space, said Major Robert M. Butt, Jr., chief of training management for 7th Army Training Command at Grafenwoehr, Germany.

The *M1* tanks, the *M2/3 Bradley* Fighting Vehicles, and new artillery have given USAREUR more firepower than it has ever had before, but "our big dilemma," Major Butt said, "is how to train units with all this new firepower in the limited training space that we have in Germany and keep local German communities happy."

The major training area at Grafenwoehr has been upgraded with new electronic ranges and targets at a cost of more than $120 million. Grafenwoehr has 60,000 acres and is the largest live-fire training area in USAREUR. Hohenfels has 40,000 acres, and Wildflecken has 18,000 acres. German army training centers at Bergen and Baumholder are available to USAREUR units on a time/space available basis, Butt noted.

Efforts by some German groups to curb weekend and night training at Grafenwoehr may also tighten schedules.

M1s Tail Leopard IIs in Biennial CAT Shoot-Out

Firing the *M1 Abrams* MBT in the biennial Canadian Army Trophy (CAT) tank gunnery competition, the 1st Platoon, A Company, 3d Battalion, 64th Armor Regiment, 3d Infantry Division (Mechanized) took second place to a platoon from West Germany's 244th Panzer Battalion. The Germans, firing the *Leopard II* MBT, won the trophy when they scored just 103 points more than the American team.

It was a first-time performance in the prestigious tank gunnery event for the *M1* and the *Leopard II*.

The competition, now in its 22d year, pits teams from Allied Forces Central Europe's two army groups against one another. Units from the NATO nations of Canada, Belgium, Federal Republic of Germany, the Netherlands, the United Kingdom and the U.S. took part in this year's shoot-out.

The 1983 CAT Trophy was won by 2-66 Armor Battalion, firing *M60A1s*.

Night Vision Device Under Development

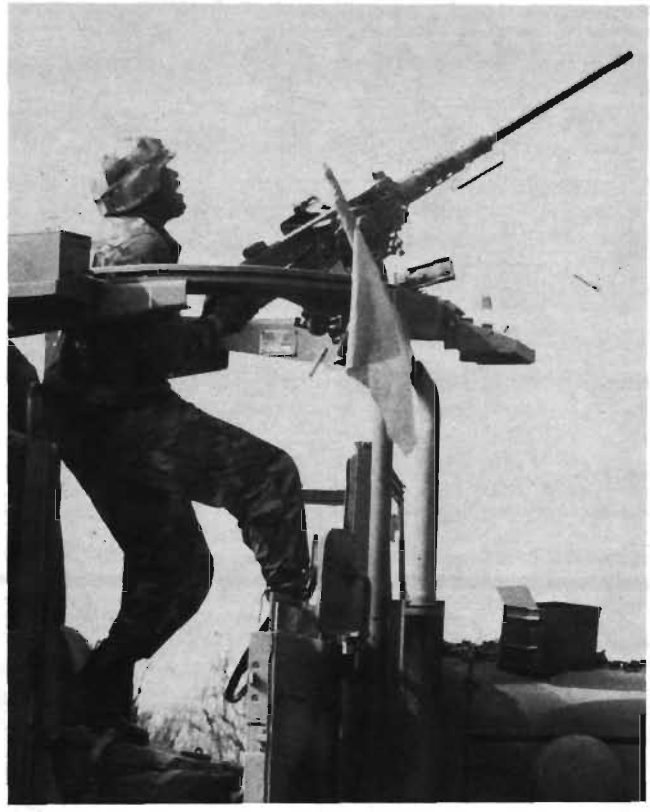
A new night vision device to be fitted to the *M1 Abrams* main battle tank, the *M2/M3 Bradley* fighting vehicles and the *M60A3* tank will enable drivers to see and maneuver through smoke, darkness and haze.

The Driver's Thermal Viewer (DTV) now under development at the Army's Night Vision and Electro-Optical Laboratory at Fort Belvoir, VA, and the Hughes Aircraft Company of El Segundo, CA, operates like the forward looking infrared (FLIR) sight in the *Abrams'* fire control system and will give driver's a television-like view. The system would be used as a navigation aid and as a supplement to the target acquisition equipment of gunners and vehicle commanders.

The Marine Corps has expressed interest in the new night vision device for its *M60* tanks and light armored vehicles.

The new viewer, designated AN/VAS-3 by the Army, produces an image by sensing the heat differences of viewed objects. After detecting the heat energy of an object and its background, the thermal system converts the energy to electrical signals which are displayed on a cathode ray tube much like a TV picture. The system is not dependent upon visible light for viewing.

Prototype deliveries are scheduled for early 1986.



Sergeant Arvis Craddieth, M2 Bradley gunner, B Company, 1st Battalion, 4th Infantry, practices with a .50-caliber machinegun before shooting from his Bradley at Todendorf, FRG. Such firing is unaimed — you take a lead and hold it and if you're lucky you see your tracers go near the target.

Bradley Gunners Go For the Planes

Third Infantry Division *Bradley* crewmen turned their machineguns and cannon skyward during recent live-fire training exercises at Todendorf, FRG. It was the first time that *Bradley* crews had the chance to fire against sleave, or towed banner, targets.

"We now know that the *Bradley* can fight instead of run if it's attacked by air," said Staff Sergeant James S. Umbarger, commander's gunner, B Company, 1st Battalion, 15th Infantry. "Although the *Bradley* wasn't specifically designed for aerial gunnery, it can knock down planes if it has to," he said.

The infantrymen accompanied the 3d Battalion, 67th Air Defense Artillery on their Vulcan spring gunnery training exercise. The *Bradleys* aren't equipped with radar tracking gear as is the Vulcan AA equipment, and *Bradley* gunners had to depend on eyesight and learning the proper lead techniques.

Shooting wasn't the only thing the gunners learned. They picked up on their aircraft identification, air defense artillery procedures, and small arms air defense. "Eventually...the *Bradley* crews...did quite well," said Captain Richard W. Sellner, Todendorf project officer for the 3-67 ADA.

An OB-10 plane towed the target sleave at the end of a two kilometer cable as the Vulcans spit out 30-round bursts and the *Bradley* crews fired machineguns and 25-mm cannon.

Several *Bradley* master gunners and crewmen compiled data on the firing to be forwarded to DA to be used in *Bradley* aerial training improvements.

BOOKS

FOR THE COMMON DEFENSE: A MILITARY HISTORY OF THE UNITED STATES OF AMERICA,

by Allan R. Millett and Peter Maslowski. The Free Press, New York, 1984. 621 pages. $24.95.

American military history has come a long way from the "drum and trumpet" days of the late 19th and early 20th centuries. The "old history," for lack of a better term, concerned itself almost exclusively with campaigns, battles, tactics, and leadership in war. The so-called "new history," which came into its own during the 1960s, took a much broader view of the nation's military past. Armed with some of the tools of the social and behavioral sciences, the practitioners of the "new history" reexamined the armed forces as institutions operating within American society. By taking this wider perspective, recent works in military history have contributed greatly to our knowledge of both past wars and present national security dilemmas.

This new book is one of the best examples of the "new history" at work. The authors, Allan R. Millett and Peter Maslowski, are both experienced historians of American military affairs. Their book attempts to survey the role of the armed forces in the life of the nation from the founding of the first English colonies to the present. That this work succeeds in fulfilling its stated purposes is due to superb editing, the clear, concise prose of the authors, and a framework which serves to focus the survey's analysis along several very manageable lines of thought.

The authors identify six major themes which relate United States military history to the development of the country. The first issue deals with the perennial problem of matching limited military means to appropriate political ends. This matter is not easily resolved, for the final determinants of a military policy have rarely, if ever, been strictly the military considerations. Rather, military policy results from a confluence of military, political, economic, and social factors, each of which serves to constrain or stimulate military policy. For example, the political and social attitudes resulting from the Vietnam War appreciably limited the foreign and military policies of the United States during the 1970s. On the other hand, late 19th Century developments in military technology, prevailing social attitudes, and the economic imperatives of the times set the United States on the path toward empire. American military policy reflected these trends in the drive to build "a navy second to none," a goal that was finally achieved during WW II.

The institutions resulting from American military policies have been as diverse as the elements which shaped them. In the early history of the nation, militia and volunteer forces assumed prominent positions within the heirarchy of military forces, largely because citizens serving as soldiers were considered the best guarantors of their own liberties. Regular forces, on the other hand, were an anathema to the values of the young American Republic, in spite of their generally better battlefield performance. A standing army was grudgingly accepted, however, to provide for defense along the western frontier. The navy, it should be noted, did not have the same stigma attached to it as did a standing army since no country had ever been oppressed by naval forces alone. The origins of these institutions, their growth, contributions to the defense of the nation, and the changing relationship between regular and volunteer (now National Guard) forces forms a second important theme of the book.

Unpreparedness for war is a recurring problem for the United States. Prior to the 1950s, the country maintained a small military establishment in peacetime, which would be rapidly expanded as America's industrial might was mobilized to equip armies and navies of ever-increasing size. While this policy was successful in meeting past needs, it was not implemented without difficulties. The authors note that "mobilizing simultaneously with a war's outbreak has extracted high costs in terms of speed and ease with each new mobilization." The advent of nuclear weapons complicated matters by eliminating the advantage of America's insularity, thus placing greater emphasis on the forces-in-being. By examining military preparedness in its historical context, the authors shed much light on how past policy makers have tailored the standing forces to meet various contingencies. Millett and Maslowski demonstrate that, in spite of being unprepared for war, American policy makers have nonetheless managed to meet national security goals.

Civilian control of the military has been an underlying principle of our national existence since the 18th Century. This idea was seriously threatened only once, during the "Newburgh Conspiracy" of 1782-83. Since that time, the question of controlling the armed forces has centered on which of two branches of the government, the executive or legislative, would exert the greater influence on military policy. The ascendancy of the executive branch began in earnest when President James K. Polk centralized the operations of the armed forces during the Mexican-American War. Polk's precedents for strong executive leadership were controversial, but not nearly as contentious as President Lincoln's extension of those powers during the Civil War. Many people believed that his squelching of certain civil liberties was unconstitutional. Nonetheless, civil liberties were subsumed to the more immediate cause of winning the war, only to be restored once the conflict ended. Presidential aegis in military affairs remained a well-established principle until, in the aftermath of the Vietnam War, Congress attempted to reassert itself by passing the War Powers Act of 1973. American military ventures since the passage of this legislation have, thus far, been limited affairs. This leaves unanswered the question of what impact the War Powers Act will have on the President's role as commander-in-chief of the armed forces.

The last two unifying themes of *For the Common Defense* address the effects of modern warfare on the development of America's armed forces. Since the late 19th Century, the military establishment has become more professionalized and nationalized. This trend was concurrent with the manner in which the industrialization revolution changed the way the United States prepared for and fought its wars. The nationalization of the National Guard was set in motion by the need to reduce state power over the country's large manpower reserves and to standardize arms and training. This reform was fortuitously implemented on the eve of WW I.

Industrialization and the attendant advances in technology reinforced the trend toward professionalization in the armed forces by making war more complex and, therefore, more difficult for the non-professional to master. The mass production of ever more lethal weapons also influenced the way American forces fought on the battlefield and at sea. The authors argue, "In particular, the United States has used increasingly sophisticated technology to overcome logistical limitations (primarily in transportation) and to match enemy numbers with firepower." The development of the American Navy's global reach in the Pacific Ocean during WW II and today's Rapid Deployment Force bear testimony to the use of technology to reduce logistical difficulties. The development of a firepower-heavy doctrine has its origins in the American Civil War, when the resources of both North and South were fully mobilized to fight a modern war. Since then, the armed forces have been organized and trained to expend steel, not lives, to achieve wartime objectives. The conduct of the wars in Korea and Vietnam demonstrated that overwhelming firepower had become an intrinsic part of America's military doctrine.

This new book is well-supplied with maps and charts to support the text. Each chapter concludes with an extensive bibliography of the most important books and articles on the period in question. Further titles in the areas of general military history, service, and campaign histories are provided at the end of the book.

This is an extremely valuable work, not

only because of the authors' fine synthesis and analysis of past events, but also for its relevancy to contemporary military affairs. It is not for the battle aficionado, however, since campaigns and battles remain ancillary to the primary purposes stated in the introduction. Rather, this work provides an excellent overview of the historical development of America's armed forces, and the relationship of military history to "the rest" of American history. Its relevance lies in the illumination of the choices faced by past policy makers in forging a military establishment capable of securing the nation's interests. For these reasons, "For the Common Defense" will become a standard work in the field of military history. It is an excellent book and is highly recommended reading for the military professional.

ROBERT E. KELLS, JR.
Captain, MI
Fort Huachuca, AZ

EAGLE AGAINST THE SUN — THE AMERICAN WAR WITH JAPAN, by Ronald H. Spector. The Free Press, Macmillan, Inc., New York. 552 pages. $24.95.

In no other work describing the Second World War in the Pacific has the contemporary underlying character of the American people come through with such clarity as in Ronald Spector's *Eagle Against the Sun*.

Spector, in one volume, captures the depth of America's perception of Asia and the world from the late 1930's through the war years. His work capably traces the ongoing change in American attitudes from the extremes of Isolationism through World leadership, and does so with close attention to the facts as they really were.

The important topics investigated in *Eagle Against the Sun* include the Japanese perception of the United States; the growth of American war weariness; the morality question vis-a-vis unrestricted submarine warfare and the conventional and atomic bombing of "civilian" targets in the Japanese home islands; and America's misunderstanding of its role as a world leader both before and during the conflict.

The discussion, for example, of war weariness, especially after the fierce, costly, Marine operations to capture Iwo Jima and Okinawa, is most pertinent in our post-Vietnam era. Had we but recognized our potential national unwillingness to fight protracted wars of attrition we might have saved ourselves much grief, treasure, and blood in Indochina during the 1960's and early 1970's.

Spector spares no one in his book. From Hirohito to MacArthur, each important leader's part in the conflict is examined and measured. No criticism or praise is held back. For this reason alone, the book is well worth reading.

If the work has any heroes, they are the American and Japanese "grunts" who felt the jungles and crossed the reefs in their vulnerable landing craft. Spector writes of these men, our fathers with insight, honor and with deep understanding. He tells it like it was!

ROBERT F. ARNOLDT
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TARGET TOKYO: STORY OF THE SORGE SPY RING by Gordon W. Prange with Donald M. Goldstein and Katherine V. Dillon. McGraw-Hill Book Co., New York. 595 pages. $24.95.

This is one of the more remarkable spy tales to come out of WW II. Sorge was born in 1895 near Baku in Russia, son of a German petroleum engineer and his Russian wife. He was educated in Germany, wounded at Ypres in WW I and again near Minsk and joined the Bolshevik Revolution in 1918. After three years in Shanghai being educated as a spy, Sorge as posted in 1933 to Tokyo in the guise of a German newspaper reporter.

Without one word of Japanese to his knowledge, Sorge within a few months won the confidence of the German ambassador, infiltrated the royal levels of Japanese society, recruited several Japanese to spy on their own country and set up what was to become one of the most effective spy rings of the war. It would pass crucial data to the Russians undetected for eight years.

Sorge had the uncanny ability to ingratiate himself into others' confidences. The reliance of the German attache (later ambassador) to depend upon Sorge for sensitive information, rather than on his own staff, was one measure of the man's acumen. Even so, Sorge's prime asset in his work was pure luck. He broke every rule of the intelligence business — womanized, drank to excess, carried secret material on his person, was plagued with financial troubles, and he and his crew were guilty of unbelievably slipshod handling of secret materials.

In October 1941, Sorge's luck ran out, but then only because of a fluke. This is a good yarn and great reading.

JOHN AYERS
Alexandria, VA

BREAKING WITH MOSCOW by Arkady Shevchenko. Alfred A. Knopf, Inc., New York. 378 pages. $18.95.

In 1978 Arkady Shevchenko, U.N. Under Secretary General and former advisor to Soviet Foreign Minister Andrei Gromyko, defected to the West, becoming the highest ranking Soviet official ever to do so. This is his account of life at the top of the Soviet power structure.

Neither Shevchenko's accounts of the corruption that permeates every aspect of Soviet society, nor of the degree to which the Soviet intelligence organs (the KGB and GRU) use the U.N. as a front for information gathering and espionage, are new. What makes this book unique is that it was written by a person who had achieved every success his government had to offer, and was a member of the small, privileged ruling elite. Shevchenko's work reflects his intimate knowledge of the personalities and organs by which the Soviet Union is ruled. His portraits of Soviet leadership are particularly noteworthy. No less engrossing are the character sketches of Soviet military leaders, from the late Marshal Grechko, who advocated a nuclear strike to "once and for all get rid of the Chinese threat," to Nikolai Orgarkov, whose insistence on excessive military appropriations led to his dismissal as First Deputy Defense Minister and Chief of the General Staff in September, 1984.

Breaking With Moscow is recommended for the unique insight it provides into the personalities that rule what many consider to be the greatest military superpower.

GILBERTO VILLAHERMOSA
Captain, Armor
HQ, XVIII Airborne Corps

BRITISH TANKS IN NORTH AFRICA, 1940-42; THE PzKpfw V, PANTHER; THE TIGER TANKS. by Bryan Perrett. Osprey Publishing, Ltd., 12-14 Long Acre, London WC2E9LP, England. Softbound, $3.95 each.

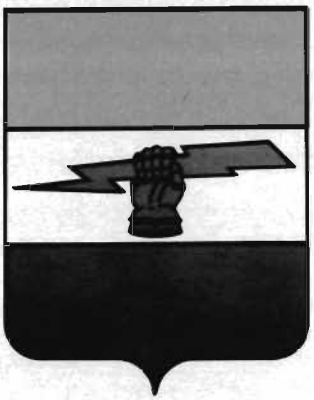
This trio offers the student of British and German WW II armor a better than normal compendium on the range of British armor in the Western Desert and on two of the most prominent German types used extensively in Russia the Western Desert and Northwest Europe.

Perrett includes a bibliography with *British Tanks in North Africa, 1940-42,* but not with the others. The *Tiger* volume includes nicely done, full-color interior drawings that will appeal to the scale modeler as well as the tanker who has wondered about such things as crew accommodations, ammo stowage, etc. in this famous tank.

The Desert War was a long, drawn-out, see-saw affair and Perrett's volume on the many types and Marks of British armor used in that campaign is meat and potatoes to the armor enthusiast. A plethora of photos and full-color artist's illustrations make each volume a need-to-have reference.

Interesting sidebar items include the fact that four *Panthers* were altered to resemble U.S. *M10* tank destroyers and used in the Battle of the Bulge. Private Francis Curry won the Medal of Honor for destroying one of them and forcing the other three crews to abandon their vehicles.
shelves of the professional as well as the knowledgeable armor buff.

ARMOR Staff



Symbolism

The shield is divided red and blue per fess, with a fess of gold thereon, the three colors of the shoulder sleeve insignia of the armored tank forces. The lightning bolt is symbolic of the striking power of the regiment.

The six tongues of the flame represent the unit's six decorations. For action during World War II, the crescent and arrowhead symbolize the Algeria-French Morocco and Southern France assaults; the colors red and green are used to represent the French Croix de Guerre awarded for the Italian campaigns; and the mace in the arms of Colmar suggested the mace head to refer to that campaign. The taeguk represents the Korean War and the three Republic of Korea Presidential Unit Citations. The mace also alludes to the striking power of armor.

Distinctive Insignia

The distinctive insignia consists of the shield and motto of the coat of arms.

73d Armor

Honor, Fidelity, Courage

Lineage and Honors

Constituted 13 January 1941 in the Regular Army as 76th Tank Battalion. Redesignated 8 May 1941 as 756th Tank Battalion. Activated 1 June 1941 at Fort Lewis, Washington. Inactivated 8 February 1946 at Camp Kilmer, New Jersey. Activated 1 August 1946 at Fort Benning, Georgia. Reorganized and redesignated 15 January 1948 as 756th Heavy Tank Battalion.

Redesignated 10 January 1949 as 73d Heavy Tank Battalion and assigned to 3d Infantry Division. Redesignated 14 July 1950 as 73d Tank Battalion and relieved from assignment to 3d Infantry Division. Assigned 10 November 1951 to 7th Infantry Division. Inactivated 1 July 1957 in Korea and relieved from assignment to 7th Infantry Division.

Redesignated 2 October 1962 as 73d Armor, a parent regiment under the Combat Arms Regimental System.

Campaign Participation Credit

World War II

Algeria-French Morocco (with arrowhead)
Naples-Foggia
Rome-Arno
Southern France (with arrowhead)
Rhineland
Ardennes-Alsace
Central Europe

Korean War

UN defensive
UN offensive
CCF intervention
First UN counteroffensive
CCF spring offensive
UN summer-fall offensive
Second Korean winter
Korea, summer-fall 1952
Third Korean winter
Korea, summer 1953

Decorations

Presidential Unit Citation (Army), Streamer embroidered COLMAR (756th Tank Battalion cited; WD GO 44, 1945)

French Croix de Guerre with Palm, World War II, Streamer embroidered CENTRAL ITALY (756th Tank Battalion cited: DA GO 43, 1950)

French Croix de Guerre with Silver-Gilt Star, World War II, Streamer embroidered ITALY (756th Tank Battalion cited; DA GO 43, 1950)

Republic of Korea Presidential Unit Citation, Streamer embroidered INCHON TO SEOUL (73d Tank Battalion cited; DA GO 75, 1954)

Republic of Korea Presidential Unit Citation, Streamer embroidered KOREA 1950-1952 (73d Tank Battalion cited; DA GO 41, 1955)

Republic of Korea Presidential Unit Citation, Streamer embroidered KOREA 1951-1953 (73d Tank Battalion cited; DA GO 22, 1956)