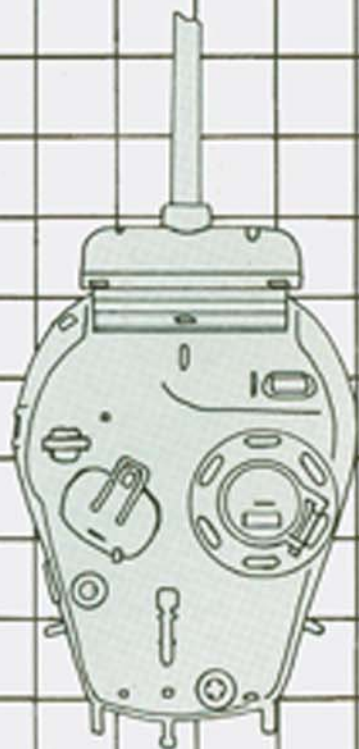
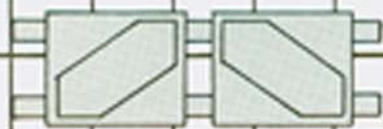
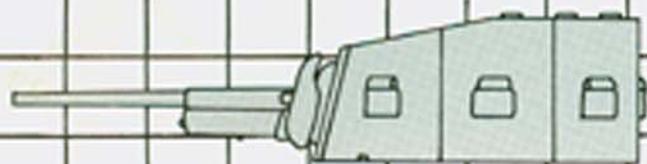


ARMOR



50th Anniversary U.S. Armored Force

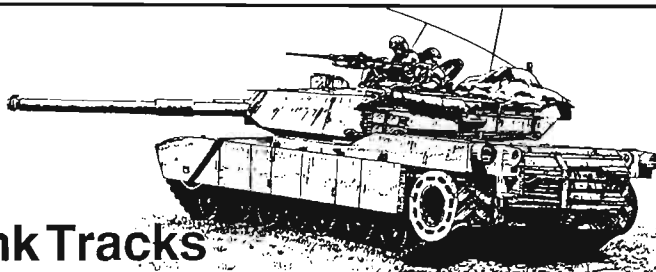


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May-June 1990

Tank Tracks



We Americans love anniversaries. The news media help by producing anniversary stories on movies, court cases, natural disasters, famous murders, battles, the start of wars, the end of wars, and commercial products, to name a few. (The only anniversaries we have trouble remembering are wedding anniversaries, which can cost dearly.)

We have already marked a few milestones in the last five years, of which you are likely unaware. In 1985, the United States Armor Association marked its 100th year, and **ARMOR** hit the centennial mark in 1988. This year's Armor Conference (May 8-10) will include the 100th meeting of the U.S. Armor Association. We observed these points in time with little fanfare. We made mention, we produced a little artwork, and wrote an article.

But July hosts two significant anniversary dates for our branch. The War Department formed the Armored Force on July 10, 1940; and the Defense Reorganization Act of 1950 formally organized Armor Branch as a continuation of Cavalry on July 20, 1950.

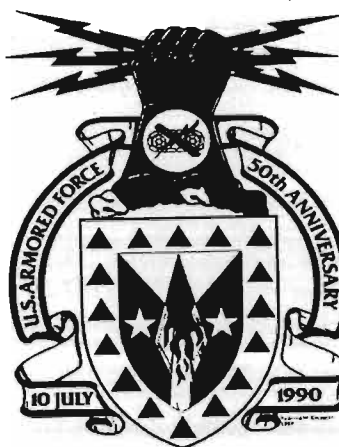
Thus begins a celebration that will last through 1993, when the 16th Armored Division, the last to be activated during World War II, marks its 50th.

The Fort Knox observance will kick off with the unveiling of the monument to the first three Chiefs of the Armored Force during the Armor Conference on 8 May. This monument to

Chaffee (Cavalry), Devers (Artillery), and Gillem (Infantry) highlights the combined arms roots of Armor.

The gala celebration falls on July 10 with a day-long revue that includes parades, displays, and demonstrations of historic and modern vehicles and equipment; firepower demonstration; band concert; tours of Fort Knox; and the dedication of Memorial Park adjacent to the Patton Museum. This will be quite a day, one we are not likely to see again. So, plan to come, and bring your camera.

The nearly decade-long effort to erect a memorial to the Armored Forces in Washington will culminate on 11 November with the dedication of that memorial on the approach to Arlington Cemetery.



While we work to shape, organize, and equip the Armor Force of the future, it is important and valuable to look to the past, to study, reflect, and say thanks to those who cranked 'em and rolled 'em before us. That is what anniversaries are for.

This is one anniversary none of us should allow to pass with a whimper. Don't just observe, join in, go to the reunions, sing along, and celebrate!

To all the WWII divisions, separate tank battalions, tank destroyer battalions, amphibious tractor battalions, and Armor as a whole — Happy 50th Birthday! — PJC

By Order of the Secretary of the Army:
CARL E. VUONO
General, United States Army
Chief of Staff

Official:
WILLIAM J. MEEHAN II
Brigadier General, United States Army
The Adjutant General

ARMOR

The Professional Development Bulletin of the Armor Branch PB-17-90-3

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LETTERS

Deactivate the 1st Cav Div.: Keep the 2d AD

Dear Sir:

It's time to give the 1st Cavalry Division back to the Infantry.

The recent changes in East-West relations, coupled with the federal budget deficit, make reductions in Active Duty strength inevitable. Equally inevitable is that heavy forces will bear much of the burden of this reduction. The Army recently announced that the 2nd Armored Division, currently stationed at Fort Hood

with one brigade in Germany, will be inactivated when the 1st Armored Division departs Germany for CONUS. If the Army's four armored divisions must be reduced to three, I believe the unit that should be eliminated is the 1st Cavalry Division.

At the outset, let me state that I have no personal axe to grind in this matter. I have never served with either division, and I have no doubt that both formations are highly capable units. As an amateur armor historian, however, I feel that retaining the 1st Cavalry Division in lieu of the 2nd Armored Division would ignore the critical role the 2nd Armored has played

in the history of the Mounted Combat Arm of Decision.

The 1st Cavalry Division has little historical connection to the Armor Branch. While the 1st Cavalry served as horse cavalry from its organization in 1921 until 1943, this division was converted to an infantry unit prior to its deployment to the Pacific Theater in World War II. The 1st Cav served as an Infantry Branch unit from 1943 until 1971 when it returned from Vietnam. During this 28-year-period, it fought in three wars: World War II, Korea, and Vietnam. The division was organized as an experimental "TriCap" division when it returned from Vietnam. Finally, in 1975, it

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converted to a conventional armored division. The salient truth concerning the 1st Cavalry Division's history is that its greatest contribution to the defense of our nation was made during its service as an infantry unit in three wars. Its connection to armor is weak at best.

The 2nd Armored Division, on the other hand, is one of our most illustrious armored units. The Armored Force was created on July 10, 1940, in response to Germany's highly successful blitzkrieg, and the 2nd was one of two armored divisions that were created on July 15. The "Hell on Wheels" Division was the only armored division that was ever commanded by General George S. Patton, America's premier armor general. The 2nd was the first armored division to see combat in World War II, when elements of the division took part in Operation Torch, the Allied landings in North Africa in November 1942. The division went on to serve as the only American armored division to fight in the Sicilian campaign, then moved to England to prepare for the invasion of Normandy. The 2nd was the first American armored division to land in France, and fought through all five campaigns in northwest Europe.

In recognition of its outstanding wartime record, the 2nd Armored was the first American division to enter Berlin. The 2nd Armored Division continued its tradition of stalwart service to the nation throughout the Cold War, alternating between Fort Hood and Germany. This summer, the 2nd Armored will achieve the distinction of being the only American armored division that has been continuously active for 50 years.

I do not wish to belittle the 1st Cavalry Division's history or accomplishments. It has served our nation well, and probably deserves to remain on the active rolls of the Army. It simply does not deserve to displace the 2nd Armored Division.

The solution is to turn the 1st Cavalry Division over to the infantry. The 1st Cav could replace one of the light infantry divisions currently active, or even the 101st Airborne Division (Air Assault) in light of the 1st Cavalry's service in that role.

Alternatively, it could replace the 9th Infantry Division (Motorized) as that division is reduced to a motorized brigade. (I have never understood why an infantry division was used to perform what is so clearly a

cavalry function.) Finally, the 1st Cav could replace one of the mechanized infantry divisions in CONUS.

But in any event -- if the Army must lose an armored division, it's time to give the 1st Cavalry Division back to the infantry.

THOMAS D. DINACKUS
(Formerly CPT, Armor, 3d ACR)
Arlington, Va.

IPB Process Requires Many Inputs, Not Just the S2's

Dear Sir:

I read with interest Captain Anthony Paternostro's article in the November-December 1989 *ARMOR*, titled "Intelligence Preparation of the Battlefield Made Easy." However, I feel his article failed to communicate the degree to which the commander and staff must be involved in IPB. Specifically, his discussion of threat integration left the impression that the S2 should develop a draft decision support template, concentrate only on what he felt were the most probable enemy courses of action, and "bet his bars" by stating one enemy course of action was most likely. Unfortunately, he failed to state that the decision support template results when the commander, S3, S2, and other key staff members, wargame a friendly course of action against potential enemy courses of action. Wargaming is critical to IPB because it allows the commander and staff to analyze friendly courses of action, and the S2 and S3 to synchronize their efforts. The commander or his S3 should lead wargaming, not the S2, because wargaming deals with friendly courses of action.

Captain Paternostro also failed to warn that "betting one's bars" on the "most likely" enemy course of action calls for more than simple terrain analysis or intuition. The commander can ill afford to consider only those potential enemy courses of action that a less-experienced S2 may have considered, correctly or incorrectly, most probable. Commanders would do well to insist that any S2 offering a recommendation about the relative probability of a particular enemy course of action should be ready to provide the facts that support such a recommendation. Those facts include enemy dispositions, doctrine, force composition, or other evidence from the threat data base. In other words, the S2 needs a lot more than doctrinal templates

and a map to do a credible job of analysis. In fact, when wargaming, the commander will want to consider the range of enemy capabilities that could keep him from accomplishing his mission and not necessarily limit his thinking to a few "most probable" enemy courses of action.

IPB is a valuable staff tool when used correctly. Wargaming is critical to the threat integration step of that process. Hopefully, commanders and S3s will take their lead and insure that their IPB is relevant, timely, and focused on the mission.

DOUGLAS A. CAMPBELL
MAJ, En
IPB Author
U.S. Army Command and General
Staff College

Light Tanks Are Available Now

Dear Sir:

LTG Lindsey, Commander of Special Operations Command (SOCOM), testified before the House Armed Services Committee this past February on Operation JUST CAUSE. In answering questions from Senator Sam Nunn, he stated that, although the Sheridan tank performed adequately in Panama, there was a strong need for a new, modern light tank to support LIC operations. In fact, LTG Lindsey went on to say that the Army needed a new light tank ten years ago. I would like to echo LTG Lindsey's comments wholeheartedly.

There has always been a need for a light tank in the armored force. While the Sheridan performed well in JUST CAUSE, it remains an old vehicle and needs constant upgrades to keep it combat-effective. It will never provide the crew protection designs and fire-control systems of modern production tanks without a major depot-level overhaul.

The Army built two excellent prototype light tanks in the early 1980s: the FMC Close Combat Vehicle and the Teledyne Continental Direct Fire Support Vehicle. Also, Cadillac Gage Corporation built the STINGRAY as a private venture in anticipation of the Army's need for a light tank. All three of these offer excellent crew protection, a 105-mm main gun, superb mobility, and a modern fire-control system. Either one of these might be suitable for LIC operations. Given the time it takes to adequately test, evaluate, and produce

a new combat vehicle, we in the armor community need to work now to get a modern replacement for the aging Sheridan.

BRIAN K. CHATHAM
CPT, Armor
Asst. S3, 1st Bde, 5th ID(M)
Fort Polk, La.



M-22 LIGHT TANK

Tanks As Tractors? The U.S. Did It in 1946!

Dear Sir:

In the January-February issue, you mentioned in "Tank Tracks" the possibility of tanks for use as farm tractors. This is not new, as you can see from the enclosed clipping from the Rock Island, Ill. ARGUS of 8 July 1946. Forty-one M-22 light tanks were sold for \$100 each at Rock Island Arsenal as farm tractors.

DANIEL T. WHITEMAN
Director, Rock Island Arsenal Museum
Rock Island, Ill.

Editor's Note:

The clipping Mr. Whiteman enclosed noted that successful bidders had to remove all armor, or arrange to have this done, before taking delivery. Original cost of these tanks was \$22,000 each!

French Vehicle Misidentified

The French Army liaison officer at Fort Knox, and numerous alert scouts in the readership, caught our mistake in the January-February Armored Vehicle Recognition Quiz. We pictured the AMX 10RC 6-wheel armored car instead of the AMX 10P personnel carrier described in the Quiz Answers. Captain Ed Bohne, Mr. Ben Hendrix, and CPL Jesse Thompson responded with letters, and many others phoned in queries.

Encyclopedia Calls for Articles

Dear Sir:

I have recently begun work on an encyclopedia on the First World War. Articles on the development and use of armor during the war will be an important part of the book. Would it be possible for me to place an announcement of this project, and a call for contributors, in ARMOR?

ANNE CIPRIANO VENZON, Ph. D.
14509 Triple Crown Place
Darnestown, Md. 20875

Brevity Counts in Op Orders

Dear Sir:

A word of praise for Captain Buckheit for his piece, "Effective Op Orders," in the January-February ARMOR. His message needs to be heard and taken to heart in many of our units. With a little practice, we can learn to do shorter, more effective orders.

A few years ago, I had the good fortune to work for an S3 who believed that it was possible to direct the battalion using three tools: a radio, a map, and a roll of tracing paper. During that period, I believe we met the challenge that Captain Buckheit has given us.

BRUCE D. REID
SGM, VTARNG
Opns. Sgt., 2-172 Armor
Rochester, Vt.

For Stealth and Small Size Two-Wheelers Have an Edge

Dear Sir:

Among several thoughtful observations in his letter in the January-February issue, CPT Douglas Morrison informs us that an "OPFOR used...motorcycles...until safety considerations (arose)." That is the wrong reason to abandon the cycles. Better training on varied terrain will reduce the motorcycle accident rate. Knee and elbow pads must be worn and helmets securely fastened. Military motorcycle accidents are most often due to a "headspace problem" between the ears of the operator.

There is much rhetoric about how we must train better and fight better in urban areas. Motorcycles — and even bicycles (knobby-tired, sturdy, rough-terrain bikes) have little constituency among vendors or in the procurement bureaucracies, but they can be very useful to soldiers able to think and take the initiative. There are thousands of covered and concealed cracks in terrain where no CUCV or HMMWV will ever fit, but where a two-wheeler can navigate and be hidden. They don't guzzle fuel like some of the behemoths in the combined arms team. If we are serious about contingency ops in the Third World, light forces, stealth, and MOUT, two-wheeled vehicles should gather an enthusiastic following.

ROBERT FAIRCHILD
LTC, Armor, ARNG
Washington, D.C.

Grate Advance in Spaced Armor?



Major Roy Thomas of the 8th Canadian Hussars (Princess Louise's) sent in this interesting approach to defeating infantry antitank weapons, seen on a T-62 just outside Kabul, Afghanistan. Salvaged grates are tied in place around crew compartment.

Reforging the Thunderbolt

What about the future? That's an important question being asked by many.

I happen to believe the future of the Army and of Armor is bright and exciting. Yes, there are unknowns as we transition to a smaller force. And yes, there are questions concerning how much and how fast. Some of the answers are beyond our control, for they depend on Congress, or on the outcome of negotiations in Europe. But now is not the time for gloom and doom. To be lethal, our Army must be modern, manned with quality soldiers, trained to execute our doctrine, led by superb leaders, and properly balanced. That means armor forces, tank and cavalry units. This is an obligation the United States has, as a superpower, in order to protect our global interests. Our leaders understand that. They know full well that the Army exists to be ready to fight when necessary, and that there are only two branches with the mission of closing with and destroying the enemy. Both are important. One does so on foot, and the other, ours, fights mounted. Together, when combined with the other arms and services, we are an unbeatable combination. But there are challenges.

In many ways, we face a set of challenges that rival those 50 years ago, as the thunderbolt of combined arms was being forged. Clearly, we have to adapt to the new and very different set of circumstances which face us. This is the purpose of the white paper on armor that was distributed at this year's Armor Conference. It provides us with a vision — a plan for dealing with the chal-

lenges of the future. Some of these challenges sound a familiar ring.

Over the years, the need for armor has often been challenged. This was true following World War II, with the introduction of nuclear weaponry and also new antitank rockets. No longer a need for tanks, they said. "Besides, they're too expensive." One result was that we didn't put medium tanks in the Far East, that is, until after the Soviet-made T-34s, too powerful for our antitank weapons and light tanks, almost drove us into the ocean in 1950. And then, later in the 1960s, we didn't need armor in Vietnam, because like Korea, Vietnam wasn't "good tank country." But we relearned that lesson and belatedly remarried armor with the light infantry divisions of that era. And in the end of that tragic experience, wasn't it ironic that the North Vietnamese symbol of power was Soviet-made tanks rolling into Saigon? And then came the Yom Kippur War in 1973, and with it that familiar cry that the tank was dead, swept off the battlefield by accurate, long-range missiles. We now know how false that conclusion was, and indeed, how unrealistic a challenge it is to ask men armed only with missiles, and protected by the thickness of their uniforms, to go against the modern tank.

Another challenge is to better understand the threat - in Europe and elsewhere. While the Soviet bloc has lost much cohesion, great war-making capability remains. This, coupled with the turmoil in that part of the globe, means we must be ready to defend our interests. Moreover, little has happened throughout the rest of the world to cause us to relax our guard. In fact,

by MG Thomas C. Foley
Commanding General
U.S. Army Armor Center

the growth of sophisticated weapons, to include many tanks, in other regions of the world, increases the likelihood of war, as our white paper so clearly points out.

The requirement for balanced contingency forces, i.e., with an armor force capability, is another challenge. This was our major focus at the Armor Conference. The issue is not one of lightness. Nor is the issue any longer the relevance of armor and the main battle tank for battle success. With all of our recent focus in the Army on history, surely we understand what happens when the role of armor is demeaned and diminished. We know by now that the claims of technologists for that new, cheaper system that is just around the corner, and will let us replace the tank or scout on the ground, must be viewed with great skepticism. Our history provides ample evidence, and the examples cited above are but a few. Rather, the issue is deployability. We need heavy and light units. We must be able to deliver both, along with special operations forces at the right time and place, if we want to win fast with minimal casualties.

The fact is that light and heavy armor units provide essential ingredients for victory.

Strike Forces. Throughout our history, armor units have delivered a combination of all-weather, off-road mobility; a variety of massed firepower; protection; and shock effect to our battle captains. As a key member of the combined arms team, they have often been the major force capable of massing rapidly and striking the heart of the enemy's weakness, leading to his

sudden collapse. This is the *raison d'être* for armor, and why it is imperative for armor to be part of any contingency operation, reinforcing force, or forward-deployed force.

But armor fulfills other critical roles that must not be overlooked in the reshaping of our Army.

Reconnaissance. Armor forces enable commanders at every level to gain key information on the enemy, terrain, and obstacles. Information is collected by both stealth and fighting.

Security and counterreconnaissance. Armor forces are able to screen the main body, which could be a contingency force during its critical early buildup phase, detecting both enemy reconnaissance and reaction forces. Armor's ability to suddenly mass, strike, and quickly destroy such threats, and then to rapidly disperse to resume its all-weather screen of a wide frontage, is a unique and highly-prized capability.

Support of dismounted operations. The firepower and shock effect of armor's direct-fire heavy weapons is critical to the success of infantry in many situations. Armor's ability to overwhelm bunkers and overmatch enemy tanks, as well as other well protected targets, often is the critical element that enables our infantry to maneuver, where only it alone can close with and destroy the enemy.

A major challenge is to ensure that armor is part of any contingency force which aims for quick, decisive results with a minimum of friendly and enemy casualties. There are several dimensions to the solution of this challenge.

One part of the solution is to increase the amount of strategic lift so that we can rapidly move the armor

forces needed for victory in contingency operations. We need to speak out with one voice on this important matter until more lift is provided. This, too, is a subject of our white paper.

Another aspect of the solution is to organize and equip armor organizations that are more deployable, so that each corps stationed in CONUS has the right mix of armor forces. Our analysis reveals that much work needs to be done to achieve the proper balance. For example, only one of the CONUS corps is structured with a cavalry regiment. Why isn't there a regiment of lighter cavalry with both XVIII Airborne Corps and I Corps. AirLand Battle doctrine would appear to mandate it. Why do we have the Sheridan and its replacement, the Armored Gun System (AGS), in only one tank battalion? In World War II, we placed a medium tank battalion with each straight leg infantry division. After the war, we upped it to two. Do we need to review our current logic? Shouldn't we develop a light cavalry regiment using the AGS, and in the interim use HMMWVs and M113s? These are some of the issues our white paper addresses.

A third part of the solution is to enhance the effectiveness of every armor unit by redoubling our efforts to imbed innovative tactics, techniques, and procedures, especially for the integration of armor with contingency forces. Moreover, we must train as we say we are going to fight - heavy, light, and special operations. Should we schedule more sealift EDREs for our heavy forces that result in actual load-ups and ship-outs? We need more heavy-light and light-heavy opportunities. The NTC and JRTC are fine, but more home station opportunities are needed so we can sustain our skills year around, then deploy to the combat training center and

demonstrate our proficiency. This problem will be compounded if we are unwise in our force structure cuts and force stationing decisions.

It will also be unwise if we concentrate solely on armor's role in the contingency force. We will still have a sizable portion of our force forward-deployed, and a number of our forces have a be-prepared-to-reinforce mission. So we must continue to provide for the needs of these types of forces.

Finally, there is absolutely no doubt that the key ingredient of armor will continue to be its mounted warriors. From the first Continental dragoon to the newest scouts and tankers of today, the men of armor and cavalry have been valued most, not for their steeds or vehicles, but for their ability to cope with and even thrive on the rapidly changing situations of the mobile battlefield. That cast of mind, that special spirit and elan, that which is the essence of our branch and sets us apart, will be of even greater value in the months and years to come.

As we reforge our armor forces, we must retain all of the capabilities needed to fight and win wherever the Army is forward-deployed. At the same time, we must provide an equally lethal capability for our contingency forces. All this will require our best efforts. We recognize that armor soldiers are leaving our formations - some of their own volition, and others as directed by the Army. Whatever the reason, we thank you for your active service, we wish you well, and we seek your continued support as we meet the challenges of the future. I am optimistic about our future. I am confident of our success. It will be exciting.

Forge the Thunderbolt!

ARMOR'S SEAT

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



The Amazing Scouts

As we celebrate the 50th Anniversary of Armor, we would be remiss if we did not take a glance at the scout ("Old Bill") and track him as the Army has continued to change its force structure and doctrine.

The scout (19D) has endured many changes. He has been praised by many and damned by many. We have had him in all types of vehicles: wheel and track. We have trained him not to become decisively engaged, yet we have mounted him on vehicles with missiles and 152-mm guns. We train him on a vehicle, issue a rucksack, and require him to walk 20-25 miles in full combat gear. He jumps out of airplanes, graduates from Ranger School, and got top scores on his PT test. He has accomplished all of the above with outstanding results, and I am convinced that scouts will accomplish any mission you give them with a high degree of proficiency and professionalism. It is the same degree of proficiency and professionalism that has caused a lot of commanders to be very successful because of his knowledge and use of scouts!

However, with all the success our Army has enjoyed with scouts, there are those who want to eliminate scouts or reduce their mission. Yet,

even when missions have been changed, he is still the soldier everyone turns to when the system fails.

We now have a different scout in the light infantry battalion than the heavy battalion. Light infantry battalion scouts are 11B, heavy battalion's are 19D. Light scouts in the air cav squadron are 19D, while armor reconnaissance specialists are a breed of their own. Those who are called scouts in the infantry are also 11B. They do not specialize in reconnaissance.

Scouts have not performed well with the Bradley (too clumsy and too big) at the NTC. Recent tests indicate that with a smaller, quieter vehicle (HMMWV) the scouts in the heavy battalions have been very successful performing their mission. Their ability to go undetected around the battlefield has returned to the task force commander the added dimension that allows him to impose his will on opposing forces.

One must remember, though, regardless of how good your reconnaissance element is, if there is a confidence problem between the command group and the reconnaissance force, the best scout's performance will go unnoticed. Reaction

time on a high-tech, fast-moving battlefield gives the commander little time to react. Reported company-size organizations can be in your hip pocket in little time.

My major point is that the Army needs to readdress its focus as it streamlines the force. During the evolution of scouts — whether we called them 19Ds, 11Ds, 133s, or whatever he was before that — the scout has been very successful because he has been able to adjust to changing situations and accomplish his mission. A TRUE scout is a scout. His job requirement does not and should not be taken as a secondary mission. It has to be in his guts!

As we reduce the numbers in the force, the Army needs to re-look its reconnaissance role in its combat elements and centralize its training. Regardless of the MOS, we are all in it together — a team.

The Amazing Scout for which the Armor Force has had the responsibility for all the years, should be the only scout available to combat organizations. Combining or supplementing job specialties in peacetime might work, but when the lead starts flying, the dependency of scouts is a major contribution to the success or failure of the mission.



COMMANDO V-300 WITH 90-MM TURRET

The Light Armored Force: An Urgent Need, A Ready Solution

by Captain David L. Nobles

The military establishment of the United States realizes the need for rapidly deployable forces that can be committed to low-intensity conflicts anywhere in the world. The Rapid Deployment Force (RDF) and the Army's light infantry divisions (LIDs) are the result of this need for such forces. The Army's force planners have, however, left a very important item out of our new light forces. The Army's light forces do not have an adequate armor component.

We need a light armored cavalry regiment (LACR) and three to five light armored battalions (LABs) to provide armored support for the XVIII Airborne Corps and the Army's LIDs. We need these light armored forces now, not after years of expensive research, development,

and doctrinal formulation. Using "off-the-shelf" wheeled armored fighting vehicles (AFVs) and the doctrine we already have, we can solve this problem quickly and at low cost.

The Need: Wheels or Tracks?

We have an urgent need for light armored forces in the Army's force structure. We must quickly select and acquire the necessary weapons systems. For decades our Army has always decided in favor of tracked AFVs. Today's technology, however, provides us with wheeled AFVs that are more cost-effective than tracked AFVs of similar weight. Now we'll look at why tracked AFVs are not our only option.

Technical Comparison. The key areas of technical comparison between wheeled and tracked AFVs are mobility, vulnerability, and noise levels (both interior and exterior).

A popular misconception is that tracked vehicles have a clear advantage in cross-country mobility. Tests indicate that wheeled AFVs are just as mobile as tracked AFVs when vehicle weight is kept under 30,000 pounds for 6x6 wheeled vehicles (24,000 pounds for 4x4, and 40,000 pounds for 8x8).

These findings are based on cross-country mobility as observed over Thailand terrain during the wet season.¹ On certain soft soils and heavily-ditched terrain, tracked AFVs still maintain an advantage over wheeled AFVs. Generally, wheeled AFV mobility is excellent over a broad range of terrain (especially any dry terrain or road networks), while tracked AFVs are

Wheeled Armor in U.S. Service

more mobile over worst-case, soft-soil terrain.

Wheeled AFVs have a strategic mobility on roads that tracked AFVs cannot match. If we don't expect to operate primarily over excessively soft soil or ditched terrain, why pay, in weight and dollars, for tracked AFVs?

Vulnerability Comparisons. The second area of comparison is vulnerability to Threat weapons. Direct-fire antitank weapons are generally deadly for both wheeled and light tracked AFVs. The test results cited here deal mainly with small arms, HE/blast fragments, and land mines. These tests showed that in the 18,000-20,000 pound class, wheeled AFVs are actually less vulnerable to these Threat munitions.

These results are somewhat surprising, to say the least. The tests assumed that armor protection for the crew was similar. This left the running gear for comparison. Advanced combat tire technology allowed the wheeled AFV to retain enough mobility after impact to travel at least a short distance in search of safety, while the tracked AFV was immobilized in each case. These results came from comparing a wheeled armored reconnaissance vehicle prototype (the XM800 ARSV) and an M113 tracked APC of comparable weight.²

Noise Levels. The final technical areas considered are interior and exterior noise levels. Wheeled AFVs are clearly superior in these categories. The tracked AFV is 20-30 percent louder in the crew compartment. The exterior audio signature of the tracked AFV is 120-164 percent that of the wheeled AFV.³ This consideration is very important when the vehicles in question will



V-100 COMMANDOS WERE USED IN VIETNAM FOR POLICE AND CONVOY ESCORT DUTIES.



U.S. MARINES MADE EXTENSIVE USE OF LAVS IN PANAMA.



be used for reconnaissance, as well as combat.

Because neither vehicle displayed any overwhelming advantages, except that wheeled AFVs are clearly quieter, the superiority of tracked AFVs for the light armored role cannot be assumed from a technological standpoint. With this in mind, we'll explore costs, a category in which wheeled AFVs have an absolute advantage.

The cost of AFV technology has become one of the most important factors in choosing a weapons system today. The current trend toward lower costs in both the short term (research, development, and acquisition), and the long term, (operational costs, reliability, availability, and maintainability), requires a cost-effective weapons system that can be used in multiple roles in any future conflict.

Low research and development costs can give a huge advantage to wheeled AFVs if considered in the proper light. Millions of dollars have been spent in the last two decades on research and development of several light armored vehicle programs. The leading examples of these programs are the High Survivability Test Vehicle-Light (HSTV-L), Close Combat Vehicle-Light, RDF Light Tank and the Armored Gun System (AGS). This proliferation of light tracked AFV concepts displays a lack of direction that has been quite expensive. My only question is, why?

American and Canadian companies are producing many effective, wheeled AFVs. They are of-

fered for export and are quite successful with numerous armies around the world. If other armies effectively use them, why spend millions of dollars on unnecessary research and development of sophisticated and expensive tracked AFVs that are only marginally more effective at best? Given an RDF mission profile, expensive sophistication is, in my view, a waste of scarce defense dollars. Other countries, such as Panama, Kuwait, Malaysia and Saudi Arabia, have performed a valuable service for us by field testing our domestic wheeled AFVs. Why not take advantage of this and use effective designs that require little or no additional research and development expenditure?

Contrary to popular belief, the advantage of wheeled AFVs in acquisition cost (cost per vehicle) is very small. The weapons station of any new family of vehicles will be very expensive, so we will assume like weapons stations for both wheeled and tracked AFVs. Therefore, our acquisition cost comparison will involve the hull/automotive areas. The cost differential in this area is approximately 10-20 percent in favor of wheeled AFVs. When this differential is applied to end item cost, the wheeled AFV retains only a 5-10 percent advantage per unit. A comparison of end item costs between the Cadillac Gage V150 Commando and the M113A2 (in 1981) bears out this point. Basically, neither type of AFV has a clear advantage in acquisition costs.⁴

One area of overwhelming superiority for wheeled AFVs is in operational and support costs. Again, we'll assume a common weapons station for our comparison. In five major categories, wheeled AFVs are overwhelmingly superior. The average maintenance cost per mile is three times higher for the tracked AFV. The average

cost of petroleum and lubricants is twice as high for tracked AFVs. The wheeled AFV can go twice as far as the tracked AFV between overhauls. The average cost of parts per maintenance action for tracked AFVs is 50 percent more than the same cost for wheeled AFVs. All things considered, tracked AFVs cost three times as much to operate per year per vehicle as wheeled AFVs.⁵ These are effective arguments in favor of wheeled AFVs, especially given today's thrifty budgetary atmosphere.

Another area of compelling superiority for wheeled AFVs is in reliability, availability, and maintainability (RAM). The RAM factors translate into a higher ratio of wheeled AFVs reaching the battle area at a lower cost. Tests showed that tracked AFVs require twice as much maintenance, can only go half as far between failures and maintain an operational readiness rate 16 percentage points lower than wheeled AFVs.⁶ With this in mind, I will paraphrase a comparison of the RAM factors given in the May-June 1981 issue of *ARMOR Magazine*. The comparison was between two RDF light armored forces acquired for the cost and given a mission at the end of a 100-mile approach march. The first point shown is that 100 wheeled units can be bought for the same price as 90 tracked units. Given the cited operational readiness rates (.76 for tracks and .92 for wheels), 92 wheeled AFVs and 68 tracked AFVs begin the mission. After a 100-mile approach march, 88 wheeled units and 63 tracked units arrived in the battle area.

From this comparison, I draw the following conclusions:

- The unit with wheeled AFVs had 40 percent more weapons to fight.

Light AFV Costs

I. Operational and Support Costs (per vehicle/per year)

Factor	Tracked AFV	Wheeled AFV	Ratio
Maintenance cost per mile	\$2.10	\$0.70	3:1
POL (per mile average)	\$0.27	\$0.14	2:1
Miles to overhaul (average)	10,000	20,000	1:2
Average part cost per maintenance action	\$61.00	\$37.66	3:2
Maintenance cost per year	\$10,500	\$3,500	3:1

II. Ram (Reliability, Availability, Maintainability)

Maintenance ratio	.60	.30	2:1
Mean miles between failure	1100	2200	1:2
Operational readiness (average)	.76	.92	8:1
Mean time to repair	1 man hour	1 man hour	1:1
Reliability, 100-mile mission	.94	.96	1:1

Source: May/June 1981 *ARMOR Magazine*

Figure 1

- The wheeled units arrived 27 minutes sooner.
- The crews of the wheeled units were less fatigued.
- The wheeled force had support costs 67 percent lower than the tracked force.

These comparisons show that wheeled AFVs are more cost effective than tracked AFVs of less than 40,000 pounds. Given this conclusion, we should put the U.S. Army's prejudice against wheeled AFVs to rest once and for all.

Role. Earlier, I touched briefly upon fitting the vehicle to the role in order to avoid wasting money on unnecessary testing and sophistication. Less-expensive wheeled AFVs could provide a full range of armor and cavalry support for the RDF and LIDs when committed to a low-intensity conflict. Existing wheeled AFVs of under 15 tons could be rapidly deployed and could provide our light forces with mobility, firepower, flexibility, and timely battlefield intelligence. In higher-inten-

sity conflicts, light armored forces equipped with wheeled AFVs can complement the MBT/attack helicopter team by providing a wide range of support to these heavy forces in combat. Light armored forces could perform reconnaissance and counter-reconnaissance, rear area security, and guard forces for the main battle elements. The effectiveness of the light armored forces in a low-intensity conflict, and their ability to supplement our heavy forces during higher-intensity conflicts, make the light armored forces proposed here very cost effective. The article by LTG Andre J. F. Sciard, a French Army officer, in the March/April 1986 issue of *ARMOR Magazine* is a good explanation of the multi-role capabilities of wheeled light armored forces.

Available Weapons Systems. Once we have decided to use wheeled AFVs to equip our light armored forces, we must choose a suitable system. Our criteria should be:

- The vehicle must be produced by a domestic company.

- There should be variants available to equip the entire force on one chassis.

- One variant must be capable of mounting a gun of 76 mm or larger.

- At least one country must be using the system.

Given the above criteria, four systems could easily fill the requirements of our light armored force:

- The Cadillac Gage 4x4 V150 Commando.

- The Verne/Arrowpoint 4x4 Dragoon 300.

- The Cadillac Gage 6x6 V300 Commando.

- The General Motors of Canada 8x8 LAV (produced in Canada but used by the U.S. Marine Corps).

Each of these families of vehicles has variants that would allow the entire force to be mounted on the same basic chassis. This will greatly ease potential problems with spare parts, repair, and training.

My choice is the V300 Commando 6x6 family of AFVs. This family of AFVs could provide us with two primary fighting vehicles armed with 25-mm and 90-mm turrets. The missions of these versions would be comparable to those of the CFV and M1 Abrams of the current armored cavalry regiments and armored battalions. Specialized variants offer a full range of combat support and combat service support vehicles including TOW antitank, APC, mortar carrier, ambulance, recovery vehicle, cargo/ammunition carrier, command post vehicle, and air defense vehicle armed with gun or missiles. The improvement in repair, maintenance, and training ef-

Light Armor Force Organizations

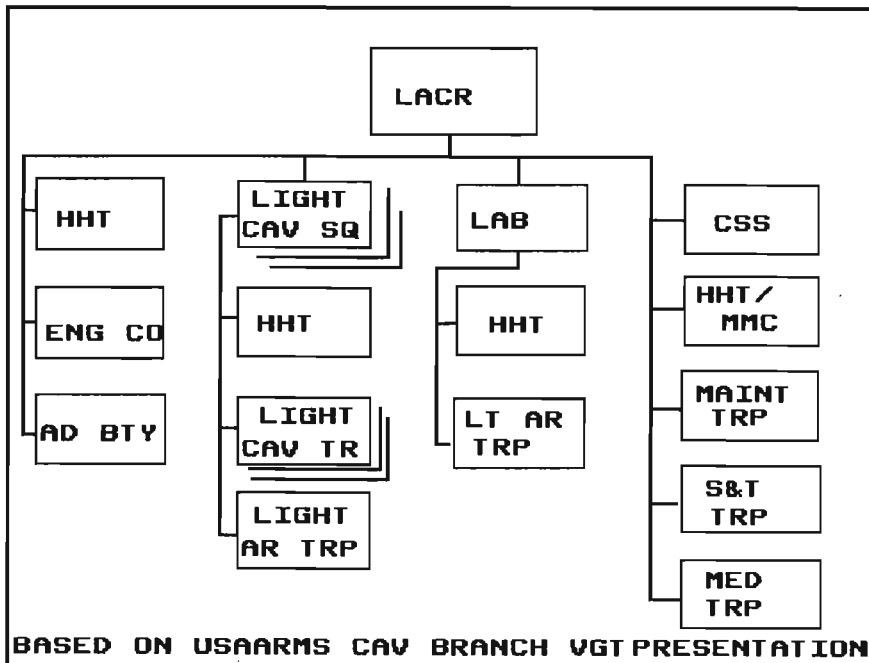


Figure 2

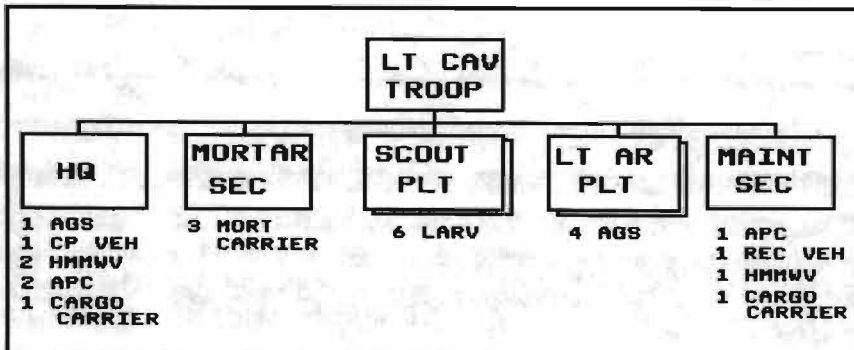
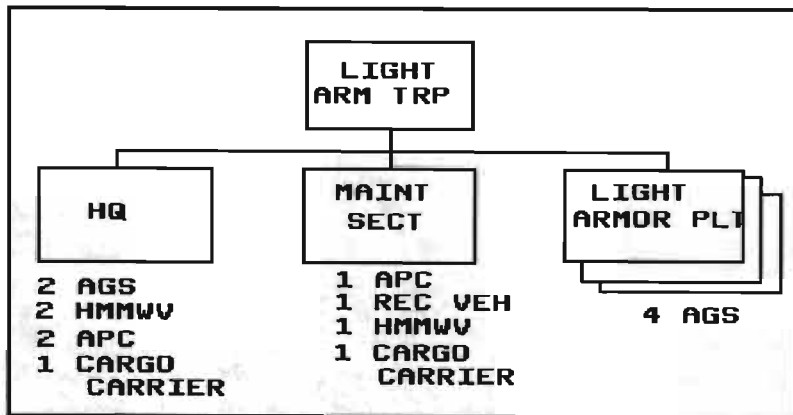


Figure 3

forts should be obvious. Also, the V300 can carry troops, adding a degree of battlefield mobility for light forces that would be very welcome and could not be matched by current light tank designs.

The adoption of any of the four candidates suggested here will furnish most of the same benefits as the design I have chosen (The V150 Commando, however, could not carry troops). The problem is not a shortage of options but an unwillingness to recognize a simple, cost-effective solution to our problem. Comparatively inexpensive designs are available. We need only make the decision and move ahead.

Unit Organization

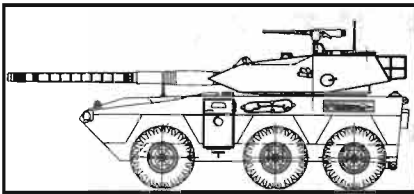
We should organize our light armored force into two basic units. These are the light armored cavalry regiment (LACR) and the light armored battalion (LAB)

Figures 2 and 3 illustrate my proposals for organizing these units. These tentative organizations are based upon a current proposal made by the Cavalry Branch of the U.S. Army Armor School.⁸ The proposal of the Cavalry Branch is, I believe, a good one. The weakness of its proposal is recommending the High Mobility Multi-Purpose Wheeled Vehicle (HMMWV) as the Light Armored Reconnaissance Vehicle (LARV) and dependence upon an Armored Gun System (AGS) as yet not developed. The key factors in my disagreement with these vehicle selections are:

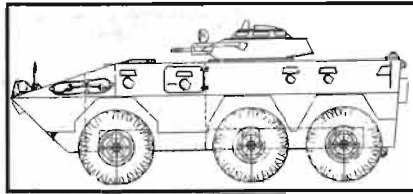
- This option would require two completely different chassis.

- To use the HMMWV would limit ability to fight for intelligence.

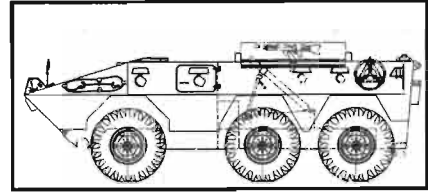
- To depend on the expensive, sophisticated, and unproven AGS



105-MM TURRET VEHICLE



40-MM/50-CAL TURRET



81-MM MORTAR VEHICLE

Some Variants of the V-300 Commando

is unwise under the current fiscal circumstances.

Instead, we could easily use the 90-mm-armed version of the V300 as the AGS, and the 25-mm armed version as the LARV, making use of relatively inexpensive, already-proven designs.

One light armored cavalry regiment and three to five light armored battalions would be sufficient to provide enough armored support for the RDF and the Army's rapid deployable light infantry divisions.

The primary obstacles to fielding any new light armored force will be the procurement dollars for the vehicles and the personnel to fill the spaces in the new units. Both of these problems are very delicate and not within the scope of this paper. These two problems (however great) should be the only ones we encounter. Testing of new equipment and indecision over the viability of light armored forces should not be issues.

Conclusion

Wheeled AFVs can fill the requirements for armor or cavalry in a low-intensity conflict. The South African Army makes particularly heavy use of wheeled AFVs of all types. The Soviet Union, France, the U.K., Spain, Brazil, Malaysia, and many other countries depend heavily on wheeled AFVs. Why do we continue to ignore this cost-effective method of providing armor support for light and rapidly deployable for-

ces? The Marine Corps has recognized the capabilities of wheeled AFVs and has acquired the LAV family of vehicles. We, in the Army, should also take advantage of this cost-effective alternative.

Obviously, the sophisticated and expensive MBT will be the primary weapon of decision when two powerful and well-equipped enemies clash. But, should we prepare to fight only powerful, well-equipped enemies? I think it much more likely that our light forces will be deployed to a "hot spot" or potential "hot spot" to stabilize or restore the political situation.

Our sophisticated and extremely expensive MBTs, CFVs, and IFVs are not the most cost-effective weapons for "brushfire" war scenarios. We have developed light, rapidly-deployable infantry forces to meet this need, but we've not given them any armor. We could use wheeled AFVs for armor support in these "brushfire" wars, retaining the expensive MBTs, CFVs, and IFVs for use in the "main event."

As we've seen, wheeled AFVs are eminently suitable for use in low-intensity conflicts. We could also use our wheeled light armored force in high-intensity conflict in support of heavy forces. In either case, wheeled AFVs provide the most cost-effective use of our increasingly scarce procurement and operating dollars.

The Army is entering a new period of enforced austerity. Any trend toward increasingly expensive

weapons (especially for light forces) is unrealistic. Weapons will have to be less expensive to procure and operate, as well as be capable of fulfilling multiple requirements. Wheeled AFVs have a place in any modern multi-role force. Let's move now and save both time and dollars.

Notes

¹Clifford D. Bradley, "Wheels versus Tracks," *ARMOR Magazine*, May-June 1981, p. 25.

²*Ibid.*, p. 26.

³*Ibid.*, pp. 26-27.

⁴*Ibid.*, pp. 27-28.

⁵*Ibid.*, p. 28.

⁶*Ibid.*

⁷*Ibid.*, pp. 28-29.

⁸The Army Chief of Staff, General Carl Vuono, approved the new 10-vehicle scout platoon organization on 21 December 1989.

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The Raising of the Iron Curtain

by Captain James M. Milano and Captain Timothy J. Quinn

Few events this century have been as significant as those witnessed recently along the barrier that for more than 40 years has separated East and West Germany. On Thursday, 9 November 1989, at 1900 hours, the government of East Germany unexpectedly opened the Iron Curtain, permitting citizens virtually unrestricted travel to the West. The shackles of communism, repression, and apathy had at last been loosened, changing forever the lives of a great many people, people living not only in East and West Germany, but worldwide, including the soldiers and their families in the 11th Armored Cavalry Regiment.

The barrier that divides East and West Germany has undergone many changes since the communists built the wall in 1952 to stem the tide of refugees seeking escape to the West. Three million East German refugees had fled from the Soviet sector into the British and United States' sectors between 1945 and 1952. These people represented the future of East Germany — the workers, farmers, and industrialists needed to reconstruct the country after the war, but who chose not to

live under Soviet domination. After realizing the dire consequences of this "brain drain," the Soviets attempted to stem the exodus. Three generations of changes and upgrades to this barrier have resulted in the Iron Curtain as we know it today.

The physical barriers of this Iron Curtain are highly sophisticated and effective in preventing East Germans from attempting to flee to the West. The actual border itself is fairly innocuous in appearance — it is marked only with red-tipped white poles (blue-tipped in Bavaria) and 150-year-old stones. But beginning five kilometers east of the border is a belt of manned checkpoints. Access into the border region required special permits, tightly controlled by the state. Residents within the five-kilometer zone were required to possess these passes at all times. The East German border police strictly enforced this policy.

Five hundred meters from the border on the east side is the signal fence, electrified and equipped with acoustical and pressure-sensitive warning devices. These devices

provided early warning. Between the signal fence and the actual border lie the most visible indications of the East German government's determination to prevent escape. Fifty to 100 meters from the border is a single metal grid fence, approximately 12 feet high, which until 1985 was armed with SM-70 anti-personnel mines emplaced at various heights. On the east side of this fence is a 4-foot-deep anti-vehicular ditch, reinforced with concrete and designed to prevent someone from crashing through the fence. Beyond the ditch is a 10-meter-wide dirt strip, kept plowed to reveal the footprints of anyone attempting to cross. For additional early warning and security, dogs were tethered to 200-meter lines in this 500-meter restricted zone. In addition to these barriers, there were guard towers, similar to prison towers, and two- and three-man armed roving patrols of East German border police continuously monitoring the entire East German border system. There are approximately 126 second- and third-generation towers in the 11th ACR sector. This elaborate barrier, however, has its price. Building and



WEST GERMANS ASK THAT BORDER BE OPENED



11TH ACR'S OP ROMEO



TRABANTS ROLL WEST

maintaining this barrier cost an estimated one million deutsche marks per kilometer, a remarkable figure in view of the East German GNP.

The barrier proved to be a sound investment: there were only 19 successful escapes along the entire 314 kilometers in the 11th ACR sector during all of Fiscal Year 89. There were only 16 the year before. There is no way to determine the number of unsuccessful escape attempts.

On 9 November 1989, the world heard of the historic events taking place along the entire Iron Curtain. It began that evening with an announcement on East German television. As the rest of the world watched and listened, 11th ACR soldiers observed first-hand, reported, and in many cases participated. Blackhorse soldiers went on alert, and their battle staffs convened to issue guidance.

Our mission was straightforward: continue to observe across the border, and assist the West German border agencies, where necessary, to control the crowds of East and West German people flocking to the border. We assumed a low profile, allowing this historic process between these sister countries to unfold.

Where before 9 November there were only two legal crossing sites in the 11th ACR sector, within 48 hours, there were 20. When this article was written, in February, there were 53. Within 72 hours of the opening of the border, over three million East Germans, approximate-

ly 20 percent of the East German population, had crossed into West Germany to experience their new freedom. Moving into the West at hastily-erected crossing points, East Germans endured 30- to 40-kilometer traffic jams enroute to experiencing this new freedom. Some attempted to rejoin family and friends who had previously crossed through Czechoslovakia and Hungary. West German border units, overwhelmed by the numbers of East Germans, had no time for lengthy border processing. Ultimately, they just waved East Germans through the crossing points. They gave those who wished to resettle written directions to the nearest refugee processing point, but over 90 percent of the East Germans stated they were only visiting.

From the crossing points, many of the East Germans moved quickly to nearby banks to collect the 100 DM that the West German government provides annually to any East German who comes to the West to claim it. Many East Germans were interested in purchasing scarce consumer goods: toilet paper, fresh fruit, ketchup, and numerous books and other reading material unobtainable or banned in the East.

In contrast to the champagne-popping celebrations and dancing on the Berlin Wall, many East Germans moved quietly and deliberately to nearby towns and villages to locate friends and family members separated 45 years earlier. Brothers and sisters were reunited. Friends who had lived less than two kilometers from each other,

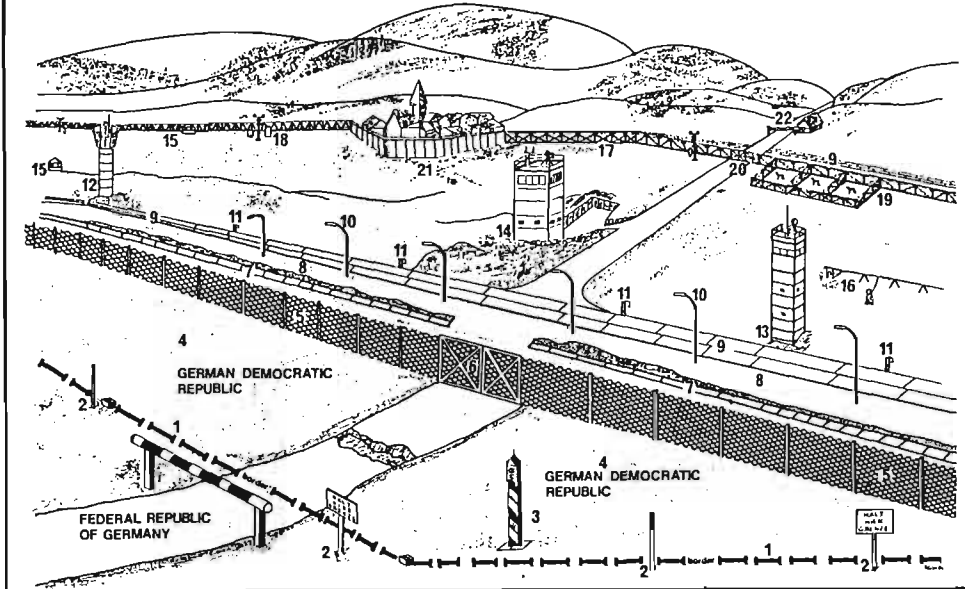
separated by the Iron Curtain, had a chance to meet again. Often, the search for relatives ended in vain, or the reunions came too late. Many found the names of family and friends carved in the headstones in nearby cemeteries.

East Germans who lived in direct view of our 11th ACR OPs greeted our soldiers with flowers and gifts. In one case, an elderly couple from Geisa (in direct view of OP Alpha) found their way to the OP. From OP Alpha, they pointed out their home to the Blackhorse soldiers, and told how, each day, they had looked through the East German fences and barriers at the OP.

The five-kilometer zone was abolished, and East Germans were allowed access into the 500-meter restricted zones. East German special purpose border forces appeared less frequently, as the local residents walked about the elaborate barriers and guard towers. In the absence of their superiors, many East German border troops waved and yelled to U.S. and West German forces; other maintained their stoic expressions and grave demeanors.

Many of the crossing sites opened without any advance notification to East or West German border authorities. In other instances, residents of West German border towns moved to the border to demand the opening of additional crossing sites so they could rejoin friends and family in nearby East German towns. In one small East German town, townspeople moved

SYSTEM OF GDR BORDER FORTIFICATION



KEY

- 1 BORDERLINE WITH BOUNDARY STONES
- 2 BORDER DEMARCATION SIGN OR POST DIRECTLY IN FRONT OF THE BOUNDARY
- 3 GDR MARKING POST (1,80 M HIGH, BLACK-RED-GOLD WITH GDR EMBLEM)
- 4 STRIP OF TERRAIN (DEFORESTED AND CLEARED)
- 5 SINGLE METAL GRID FENCE
- 6 GATEWAY IN METAL GRID FENCE
- 7 VEHICLE BARRIER DITCH (REINFORCED WITH CONCRETE SLABS)
- 8 ABOUT 8 OR 2 METER CONTROL STRIP (DETECTION STRIP)
- 9 PATROL ROAD (PERFORATED CONCRETE)
- 10 LIGHT BARRIER
- 11 CONTACT POINT FOR UNDERGROUND BORDER REPORTING NET
- 12 CONCRETE OBSERVATION TOWER (BT 11)
- 13 CONCRETE OBSERVATION TOWER
- 14 CONCRETE OBSERVATION TOWER (PARTIALLY WITH COMMAND POINT)
- 15 OBSERVATION BUNKER
- 16 RUNWAY FOR DOGS ON THE LEASH
- 17 RESTRICTED ZONE FENCE WITH ELECTRICAL AND ACOUSTIC ALARMS
- 18 INSTALLATIONS FOR POWER DISTRIBUTION AND SWITCHING AT THE RESTRICTED ZONE FENCE
- 19 DOG RUNWAY
- 20 GATEWAY IN RESTRICTED ZONE FENCE
- 21 CONCRETE WALL/SCREEN
- 22 ENTRY CONTROL FOR RESTRICTED ZONE

to the fence and demanded the East German border guard open the gate. The East German guard, without any guidance, opened the gate, and then asked West German border authorities for assistance in ensuring that the East Germans were back across the border by midnight.

Travel across the border was not in one direction only. West Germans were allowed to cross into East Germany at the numerous crossing sites that were opening up. Initially, the East Germans required a travel visa and payment of 25 DM per day, but in late December, they dropped that requirement. West Germans experienced the frustrations of the typical East German mode of travel — the "Trabi." Powered by a two-stroke engine with little gusto and few aesthetically appealing features, the Trabant proved no match for the hilly terrain or the sleek West German BMWs cruising the Autobahn.

Americans as well as West Germans opened their homes and hearts to the East German visitors and refugees by donating clothes, money, food, and shelter. These goods, together with the overwhelm-

ing hospitality and receptiveness of their new-found friends, contributed immeasurably to the welcome feeling many of the visitors experienced.

What does all of this mean for the 11th ACR troopers and family members serving vigilantly on freedom's frontier? The covering force continues its most important task of training while maintaining a high state of readiness. Our hallmark has been and will remain: "We came to train!" We still produce a seasoned leader and a reliable soldier who both remain in great demand Army-wide.

For the soldiers and families of the 11th Armored Cavalry Regiment, the opening of the Iron Curtain has been a momentous event to witness and take part in. And it is a tribute to the two million soldiers who have proudly served our Army in Europe these past 45 years. This historic series of events has been a victory for our Army and our nation, a victory that will forever hold a special place in the Blackhorse's long and distinguished history of service to our nation while serving on freedom's frontier. For those who served, we salute you — freedom prevailed!

Captain James M. Milano was commissioned in 1979 from Lafayette College. He served as a platoon leader and tank company XO at Fort Hood, and as a tank company and combat support company commander in Korea. The regimental adjutant of the 11th Armored Cavalry Regiment, he is to attend the C&GS College this summer.

Captain Timothy J. Quinn, a 1979 graduate of Montana State University, served as S2 of the 1/9 Infantry in Korea and DIVARTY S2 at Fort Lewis, Wash. He has served on the JCS and Army staffs, and commanded an AIT company at Fort Jackson and an M1 company at Fort Lewis. He is scheduled to command an M1 company in the 11th ACR.

Here Be Dragons...

Mapping a Post-Perestroika Role for the U.S. Army

by Brigadier General Grail L. Brookshire, USA, Ret.

The following address was delivered in December at a 3d Armored Cavalry dining-in by Brigadier General Grail L. Brookshire, USA, Ret., 56th Colonel of the Regiment.

As the saying goes, "the times, they are a changing." In the last few months, we have watched a huge and threatening military power literally fall apart. The Cold War, which got very hot at times, is ending. Our side won. The efforts of those in the tactical forces who fought the Korean and Vietnamese Wars, and manned the defenses in Europe and other vital locations paid off, as did those of the strategic forces that provided our nuclear umbrella. We avoided an all-out nuclear war, and probably saved the world as we know it.

Where does this leave the profession of arms? Should we convert our weapons into implements of peace? There is no doubt in my mind that the immediate future will bring major changes. In ancient times, when a cartographer came to the end of his known world, he lettered "Here be dragons" on his map. There be dragons in the unknown parts of our changing world, and we had best be ready to do some dragon slaying.

The big dragon is the uncertain situation in the Soviet Union. I am personally convinced that Mr. Gorbachev is sincere, and that his reform movement will probably win out. We should hope that it does. But I'm not certain of that, and no one else is, either. The Soviet Union



is a nuclear-armed power. Instability in its government and social structure has to be viewed with concern, even if the probable outcome of that instability is a new system more to our liking. Until stability is restored, and the character of the new power structure in the U.S.S.R. is better understood, we must remain able to guarantee the safety of the West by our own capabilities, not by faith in others.

I would also draw a dragon on my map in the area of Central and South America. This area's political instability, rapid population growth, regional rivalries, and drug produc-

tion have to be of concern to us. We share a long, poorly-defended land border with this region of the world. While a "reformed" Soviet Union would reduce outside meddling, problems in this sensitive area are not going to go away suddenly.

The Middle East certainly rates a dragon on my map. It's a challenge to share the planet with a large number of people who insist that women must look ugly and God wants the United States destroyed. (I place both these beliefs in the capital crime category.) Even though these nations do not represent much real military power, they have a demonstrated ability to disrupt modern society with terrorism and will probably continue to do so.

To summarize my introduction, let me say that despite the encouraging signs we see about us, it would be imprudent to assume that man's favorite sport, war, is about to fade permanently from the world scene. Soldiers have never been particularly good at predicting how and where the next war will be fought, and are most often accused of training to fight the last one. It is a safe bet that war in some form will continue, however, and certain factors have always been present in forces that fight wars successfully.

These forces are equipped with effective and reasonably reliable weapons. Disciplined soldiers, commanded by competent leaders who employ effective tactics, man these weapons. These commanders have an established means to communicate orders and information to their subordinates, and to receive information in return. They gather, consider, and disseminate intelligence about the enemy and the terrain over which they fight. These forces have the mobility necessary to assemble in sufficient numbers at decisive locations in a timely fashion.

I submit that in this time of rapidly-changing requirements and great uncertainty, your task remains clear. You must produce a ready unit and prepare to lead it into combat, regardless of the type of war we may fight. I would like to talk briefly about the leadership needed to produce a successful unit and to lead it in combat by reviewing a few techniques that may be helpful to you both now and on some future battlefield.

Successful combat leadership starts with training. A training schedule should be demanding. A unit will fight as it trains. No one has improved on Frederick the Great's famous statement "More sweat on the drill field means less blood on the battlefield."

I put discipline at the head of my short list of important leadership techniques. A leader who fails to instill a habit of obedience in his unit is in charge of a disaster looking for a place to happen. A study of military history, both ancient and recent, reveals that when a force suffers a real disaster on the battlefield, a breakdown in discipline occurred. Many of your subordinates will believe that the motivation brought on by the dangers of combat will prevent the lapses of discipline one sees on maneuvers

and on training exercises. Don't believe that for a minute! The same foul-ups that occur in training occur in combat. The difference is that men die because of them. Combat motivation will help, but only constant practice and the personal involvement of the unit leader will develop the level and habit of discipline necessary for success on the battlefield. Discipline, like any other skill, must be practiced constantly.

Develop both tactical and technical proficiency in your command. This is a statement of the obvious, but I mention these two subjects together because they must receive equal emphasis. Often the emphasis reflects the strong points or personal preference of the commander. Without individual and crew technical skills, we cannot realize the full potential of the very powerful but complex weapon systems we are producing. These same skills are needed to keep them operating, day after day, with constant use in adverse weather and terrain. It is a waste of national resources to put weapons in the hands of soldiers whose leaders have not developed their technical skills to the point where they can use them effectively.

Balance is the key word here. History shows us battlefields where good usable weapons lie among the bodies of the defeated soldiers who were proficient in their use. Most often they were betrayed by poor teamwork, faulty tactics, and lack of discipline. Here in the 3rd ACR, you have an excellent opportunity to train your units to a high level of both tactical and technical proficiency. The terrain, facilities, and time are here. All you need add is determination.

It is important that you share the dangers and hardships of your troops, and that they know you are doing so. To a cavalry scout, the squadron command post is a safe

and comfortable location. The regimental CP is heaven. You can direct a battle from a lot of places. The leading has to be done where the soldiers are. If you are smart and lucky enough to develop a reputation among your troops as a successful and resourceful commander, and you share their dangers and hardships, you can reasonably expect and demand immediate and unquestioning obedience to your orders. They will know that you have considered the obstacles and dangers before giving your orders. I don't suggest that the best location to control a cavalry squadron moving through a mined area is at the head of the column with the mine detector teams. I do suggest that if you are going to order your troops to move faster in these circumstances, you should have done this at some time and know just what you are demanding.

I urge your personal involvement in all aspects of your command. A unit succeeds because of the coordinated actions of many people doing very different things. The most powerful influence you can have on events is your personal attention, presence, and interest. It is a serious mistake to think that you can turn responsibility for entire areas over to someone else. A few minutes of the commander's personal attention is worth hours of a staff officer's time. During battle and training exercises, a commander will devote most of his time to tactical operations. He must not forget his logistics. In modern war, a logistical blunder can lose a battle as quickly as a tactical one. No one has ever said it better than General Bruce C. Clarke: "A unit does well only what the commander checks."

Check and double check. It is not a sign of distrust to check. It is a sign of a prudent and concerned commander. In both combat and training, many details have to be ac-

"The ultimate purpose of an Army is to fight and kill if told to do so. There is a certain reluctance to come to grips with this."

completed. They get overlooked for the same reasons: fatigue, limited time, and misunderstanding. Learn early to not accept qualifiers on answers. If you ask "Have all crews rearmed and refueled?" and the answer comes back "Yes sir!" and then a lowered voice adds something like "as far as I know" or "they should have," don't accept that answer. What you are being told is that the person answering really does not know.

This type of report is worse than worthless; it is dangerous. If you make it a habit to not accept qualified answers, your subordinates will quickly learn that they must check their areas of responsibility before giving you a report. Be suspicious of qualifiers.

Concentrate your efforts in those areas where you have the most influence. When you start off in the service, your area of influence is rather small. As you increase in rank and responsibility, it gets bigger. Over the years, I have seen a lot of wasted energy from people who always seemed very concerned about how things were done several layers above. If you are a platoon leader, you really shouldn't waste a lot of energy worrying about how the commander runs the regiment. While we all have a valid right to be concerned that our leaders are doing a good job, you have very little influence at these levels.

By way of contrast, you have great influence in the unit you lead. This is where your main emphasis needs to be. Try to make your unit or section the best you possibly can. If you can get most of the leaders in your outfit concentrating in their areas of influence, your accomplishments will be legendary, in peace or war.

I have saved this next point for last, because I think it is the most difficult one to address. The first combat encounter for a unit, or an individual replacement to a unit in combat is critical. Casualty rates for early engagements are significantly higher than for later ones, given near equal intensity of combat. This is understandable when you consider that we bring up our children to believe that killing another person is wrong. We then bring them into the Army and very quickly must convince them that it is not only right, but very desirable. In the face-to-face environment in which ground forces fight, this can be a problem.

In addition, we necessarily train under very restrictive safety rules. Consequently, most soldiers fire their first shot worrying about killing, concerned that they are shooting at the right people. These concerns can cause hesitation and timidity, and hesitation and timidity can get a soldier killed in battle.

You must psychologically condition your troops for this moment without sounding like some kind of nut who can hardly wait for the next war to begin. It is important to make them understand that your purpose is not to teach them "marketable civilian skills." Rather, it is to teach them skills that will allow them to do their job on some future battlefield and to survive.

The ultimate purpose of an Army is to fight and kill if told to do so. There is a certain reluctance to come to grips with this, but if you are going to produce a unit that is actually ready to fight and win, you have to build realism into your unit's training and to condition your troops for their first combat encounter.

To help you with this conditioning, I would like to leave you with two final thoughts. In my opinion, war has only two redeeming qualities. First, it is the greatest adventure in which most men ever will participate. Second, it is always to be preferred to subjugation.

Brigadier General Grall L. Brookshire was commissioned in the U.S. Army from North Georgia College in 1953. In a 30-year career, he served as a commander from platoon through regimental level, and as both a troop and general staff officer. He served two years with the 11th ACR in Vietnam, as commander, 2d Squadron, and regimental S3 and S2. In 1973 and 1974, he served as XO of the 3d ACR. In 1976 he returned to the regiment as its 56th colonel. He was promoted to brigadier general in 1977 and served in succession as the J1 and IG of U.S. European Command; ADC of the 4th Mechanized Division; and commander, U.S. Army Combat Development and Experimentation Command. His military decorations include the Distinguished Service Medal and the Silver Star. He retired from the Army in 1983. Since retirement, he has completed an undergraduate degree in Geology with a minor in Computer Science at the University of Texas at El Paso. Currently, he is employed as Director of Planning Research Corporation's Scientific Support Laboratory at Fort Ord and Fort Hunter Liggett, California.



Waking Up from the Dream: The Crisis of Cavalry in the 1930s

by Jon Clemens, ARMOR Managing Editor

Reading the *Cavalry Journal* of 1939, the year World War II broke out, one cannot help but be amazed at the distance that separated the United States and the changing world across the Atlantic. Safe behind the rampart of an ocean, insulated from these changes by distance and a habit of isolationism, the United States — as a nation and as an Army — was slow to wake up.

In so many ways, the Army's cavalry branch reflected the nation's inertia. Stubborn and sleepy, steeped in

the tradition of a dream world of ritual, ceremony, and privilege, our cavalry seemed locked in a decisive engagement with reality, an engagement it finally lost in 1940, when the Chief of Staff of the Army took the major responsibility for mechanization from the cavalry branch and ordered the creation of a separate Armored Force.

Surely by September of 1939, one would think, the shape of the future would have been obvious. In a matter of weeks, the new German ar-

mored divisions had shredded the Polish Army, which included the largest force of horse cavalry in the world. At that point, the pattern of German expansion was clear - the Rhineland had been reoccupied three and a half years earlier, Austria had been blackjacked into the Reich in March 1938, the Germans had marched into the Sudetenland — part of Czechoslovakia — in the fall of 1938, and the following spring, at Munich, the Allies had given Hitler the rest of that country without a fight.

Poland was only the most recent installment, and remarkably, the *Cavalry Journal* covered the action: an article in the November-December issue reported the triumph of blitzkrieg in Poland in some detail. But it was written by a staff officer of the German Army!

A picture of the cavalry emerges in that same issue, and it is a pastoral picture, indeed. Military critics often complain that armies train for the last war, but in page after page of articles and notes and "organization activities," the *Journal* reflected the thoughts of a branch that seemed to deny World War I had ever taken place, or that if it had, it was somehow an aberration. As the Chief of Cavalry begged Congress for more horsemen, he seemed plagued by a terrible amnesia that denied the machine gun, the gas barrage, and the totally obliterating power of modern artillery that had altered the geography of Belgium 20 years earlier.

What could have been happening here? Wasn't this the nation that pioneered the mass production of the motor car? And that had been 10 years, even 15 years, earlier. Yet here was a report, in the "Notes from the Cavalry Board," of problems in tests of horse gas masks (the tests weren't going well), field tests of a new unbreakable syrup pitcher, reports of changes in dismounted drill for horse soldiers, accounts of horse shows and polo matches, the retirement at Fort Bliss of Sergeant White (who had traveled with Buffalo Bill's Wild West Show), and the 8th Cavalry's participation in the filming of Paramount Pictures' "Geronimo."

It was not clear then, as it is today in hindsight, what caused the cavalry to cling to the horse, but history hints that the reasons were not military. Mechanization's threat to

horse cavalry involved more than military obsolescence; to let this change happen would destroy a world of social rituals based on the horse and the romance of the cavalry. As long as one could justify a military role for horse soldiers, the polo matches, the fox hunts, and the horse shows all fell into place as perfectly appropriate — good training — as if it would always be this way.

This life of ceremony and ritual had a certain attraction in the rapidly changing world of threats and "isms" that epitomized the Thirties. At a time when millions of intelligent, able-bodied Americans were reduced to selling apples and pencils on street corners, there was some security and safety in being a Cavalry soldier. And for the Cavalry officer, there was much more. Insulated from the Depression, the life Patton and Truscott and others describe at cavalry posts like Fort Riley and Fort Myer was truly a dream world accessible to very few. At Fort Myer, especially, a young cavalry officer close to the social whirl of Washington must have felt very secure, so close to the rich and famous and powerful that one might easily imagine he was one of them.

In one of Patton's correspondences as post commander at Fort Myer, he was writing to the Chief of Cavalry to recommend four officers for attendance at the War College. But one of these officers, he said, might be excluded: "He is of more value to the Cavalry in his present position as a riding companion to Mrs. Roosevelt than he would be at the War College, at least for the next few years."

Patton wrote the memorandum in September 1939.

Another correspondence written that same month appeared in the *Cavalry Journal* in November. It is

significant but anonymous. It is an opinion piece, unsigned, from a soldier who identified himself as "an Earnest Grouch." It is titled, "Time to Wake Up," and it is about Poland, rather than polo.

"Germany has recently overrun Poland," he began, as if speaking to an audience that might have missed this news. "What had Poland for defense? According to *Time Magazine*, over two million men, a tremendous army. Poland also had a very considerable time to prepare herself, for the Germans gave ample warning of their intentions...The prime mover of the German attack may be said to have been the gasoline motor, in the air and on the ground; the basis for the Polish defense was the man, propelled only by his legs or by a horse...There is no intention here of laying the entire blame for the Polish defeat upon her cavalry, but it is nevertheless apparent that 40 regiments of regular cavalry, aware of the threat of enemy mechanization and therefore presumably trained to fight it, were unable to delay the enemy sufficiently to permit the infantry to prepare anything approaching 'impregnable' positions. Now consider the United States Cavalry..."

He goes on to criticize the readiness of our cavalry in the 1930s and suggests methods of training to fight mechanized units.

Throughout the article, there is a sense of urgency. It concludes: "Somehow, German mechanization managed to push the Polish Army and its cavalry all over the map. It's time we developed an aggressive defense that will prevent the same fate from overtaking us. As a grouch, I think it's time to wake up."

But there were dissenting voices in that same issue of the *Journal*,

"Should it happen that the French and British armies are forced to retreat by a sudden powerful thrust by German forces on the Western Front in Europe, as happened in 1914, the Allies will rue the day when they suppressed their cavalry."

among them BG Hamilton S. Hawkins, Ret., the vice-president of the Cavalry Association, who remained a stubborn proponent of horse cavalry over mechanized cavalry.

He begins his column in the November-December issue: "I have been told that I am considered by the enthusiasts for mechanization as hostile to the development of mechanized force in our Army. This is not true. But I am decidedly hostile to the ideas of those who would replace cavalry by mechanization....It may be true that a few organizations resembling the German Panzer Divisions might be useful. Especially so, if the opposing forces have no cavalry properly armed and trained and with sufficient numbers."

In the following paragraph, he is eerily prophetic about the course of the war in Europe, although history might argue with his conclusion:

"Should it happen that the French and British armies are forced to retreat by a sudden powerful thrust by German forces on the Western Front in Europe, as happened in 1914, the Allies will rue the day when they suppressed their cavalry."

The column was titled, "Obvious Conclusions."

Six months later, the panzers would roll into France and the Low Countries. At that point in World War II, the United States Army

would have fewer than 300 tanks, only 28 of them fit for combat. Four years later, on a war footing, American industry would produce 29,497 tanks in a single year, but in late 1939, the only really obvious conclusion was that the Arsenal of Democracy was empty.

Why did the United States Army have only 28 usable tanks in 1939? Twenty years earlier, during WWI, the Army had fielded a self-contained tank brigade, mounted in French tanks, and its soldiers had fought in Allied tank units. In the postwar flush of victory, tanks were seen by the popular press as one of the reasons for Allied success, a wonder weapon that had broken the tyranny of the trenches. Cartier, the great French jewelry concern, had even designed and dedicated a special wrist watch to the valiant, "Treat 'Em Rough" boys of the American Tank Corps.

But as memories of the war faded, so did the will to pay for tanks and guns and soldiers. It soon became apparent that, while the design of the horse had been more or less frozen during millions of years of evolution, mechanical beasts could evolve quickly. What you built today would be obsolete tomorrow. There was some wisdom in waiting, as long as you didn't wait too long. The nations of the world had seen this costly phenomenon work itself out before, in the great battleship arms races, and like battleships, tanks were very expensive, specialized vehicles of their kind.

A flurry of activity in the late 1920s refocused attention on tanks, notably the British experimental mechanized force that incorporated all branches in motorized vehicles, and the American Experimental Mechanized Force that the British unit had inspired. This force, based

at Ft. George Meade, Md., was seen as "a new arm," not an extension of the traditional infantry or cavalry arm, according to a 1928 news account. The newspapers called it, "the gasoline brigade."

By the early 1930s, the Depression forced all institutions of the government to contract, including the Army. There was no money to fix the aging equipment of the Mechanized Force or buy new equipment. When senior officers went up to Capitol Hill for funding, they knew that little money was available to try new things, so they tended to ask for what they could get. By 1931, the mechanized force had been disbanded, and General Douglas MacArthur, the Chief of Staff, urged the separate branches to do all they could, in reduced circumstances, to foster mechanization.

The natural proponent for mechanization was the cavalry branch, the branch that most required mobility for success and survival. Some clearly saw that the employment of tanks in WWI paralleled the traditional exploitative role of cavalry, and even many traditional horse cavalymen saw some possible future use for mechanized units, but given the reliability of the equipment of the time and the limitations of both tracked and wheeled vehicle suspensions, it was reasonable to keep a grip on the reins until mechanization matured.

It would have been better, of course, to try to develop both horse and mechanized units, but in the nation's straitened circumstances, the generals could not have both. Asked which they would prefer, the chiefs of cavalry held on to the reins.

But there were exceptions and exceptional people ready to exploit them. Adna Chaffee was certainly

one of them. He served with the 81st Division and III Corps staff in the American Expeditionary Force in WWI, during the St. Mihiel and Meuse-Argonne offensives. He was a brilliant rider and horseman (he had attended the French Army's cavalry school before WWI) and was known as a high-goal polo player. In 1927, he was assigned to the General Staff and was one of the officers who prepared the 1928 report of the War Department Mechanization Board. This far-sighted document urged the need for a separate armored force, a branch apart, led by its own chief. This force of all arms and services was to be mechanized, from tanks to signal troops. This self-contained mobile regiment would cost about \$4 million.

Although the Secretary of War approved the concept, there was no money in the budget to pay for it. The independent nature of the force made the other branches nervous, too. Why buy expensive new gadgets when soldiers were so poorly paid?

In his revealing memoir of the Cavalry branch, "The Ten Lean Years" (Serialized in *ARMOR* in the first four issues of 1987), MG Robert Grow argues that Cavalry lost its opportunity to lead the Army into the future when it insisted on keeping its horses and resisting the shift to mechanization. Grow defines cavalry as men who fight mounted, whether in machines or on horseback. He implies that what became the independent armored force could have been the successor to traditional cavalry, that cavalry could have dominated mechanization if its leaders had been willing to let go of the reins.

Grow concludes: "The Armored Force had been created, not be-



Despite the creation of the Armored Force in 1940, the horse cavalry didn't just go away. Here, 6th Cavalry troopers practice crossing a stream at Fort Jackson in 1942.

cause a new arm was necessary, but because Cavalry did not grasp the opportunities that were available....The Chief of Cavalry...staunchly refused to give up a horse unit. So he lost it all."

There is evidence that while Grow and other cavalry officers saw mechanization as simply an extension of traditional cavalry roles and missions, the wartime Chief of Staff of the Army, General Marshall, realized early on that the mech force would have to be a force of combined arms. We know that Herr and General Lynch, his counterpart in the Infantry, had refused to back combined arms divisions (they called them "panzer divisions") in September and October 1939, and were still opposing such organizations as late as the spring of the following year. But Marshall's mind may have already been made up. He was using the phrase "armored divisions" in a radio address in early 1940, noting that the Louisiana Maneuvers would test the concept.

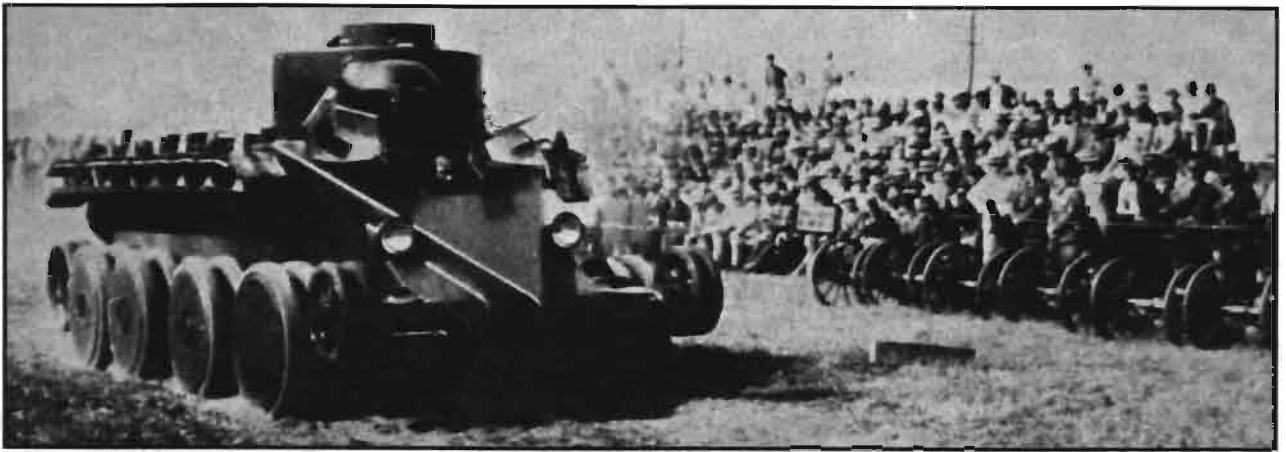
Perhaps by that time, Marshall had simply given up on the traditional branch chiefs and felt that only a new organization could overcome the bitter branch insularity and turf

fight that had stymied progress in the 1930s.

Herr was still opposing a separate armored force in June, 1940, when Marshall called the key figures in mechanization together in Washington. At a meeting June 10, he announced that the agenda was open, but that there would be no debate on one point: the United States would create two armored divisions. The maneuver in Louisiana that May had satisfied Marshall that the combined arms armored division would work, and for the war looming up, would be essential. The order to create an armored force was issued July 5.

By October, the Armor School at Fort Knox was activated and the first troops arrived the following month.

Jon Clemens, managing editor of *ARMOR* since 1984, entered the Civil Service after almost 20 years as a reporter, editor, and columnist on two daily newspapers. A graduate of Union College, Schenectady, N.Y., he served in the Army from 1964-1966.



A T3 CHRISTIE RUNS ON ITS WHEELS AT A DEMONSTRATION AT ABERDEEN PROVING GROUND IN 1932.

U.S. Army Tank Development – 1925-1940

by Konrad F. Schreier, Jr.

Current U.S. Army tanks are magnificent machines, but few realize how much they owe to developments from 1925 to 1940. Before 1925, designers continued to work on World War I developments, but then the entire tank development program was overhauled. Over the next 15 years, the Army developed many of the features that are a part of the tanks of today.

The program began with the T1 Medium, built by Rock Island Arsenal in 1922. This was a 22-ton machine, powered by a 200-horse-

power engine, and it could run 22 miles per hour – very fast for its day. The turret mounted a medium-velocity 57-mm gun, with a cupola-mounted .30-caliber machine gun. The T1 Medium was the last tank with any World War I design heritage, but it was a vastly improved machine. After being used to try many modifications, it was retired about 1935.

The next model was built by the Cunningham, an automobile company. The T1 Light Tank of 1927 was a 7.5-ton vehicle powered by a

105-horsepower engine, giving it a speed of 20 miles per hour. The engine was in front, with the drive in the rear. Its turret mounted a .30 caliber machine gun. The turret and some of the armor was welded, rather than riveted. Three additional T1 chassis were built for self-propelled artillery, weapons carrier, and cargo vehicle experiments.

In 1928, Cunningham built four improved T1 Lights, called the T1E1. These weighed 8.9 tons, and their 132-horsepower engines gave them a speed of 22 miles per hour. Several additional T1E1 chassis were built for self-propelled artillery and other experiments. In 1929, a T1E2 Light incorporated additional changes, but it had the same power and speed as the T1E1. These T1s were all very similar, and they were used for many experiments well into the 1930s.

In 1930, Cunningham built one T2 Medium, basically an enlarged T1 Light that weighed 15 tons, had a 320-horsepower engine, and a top speed of 25 miles per hour. Many of



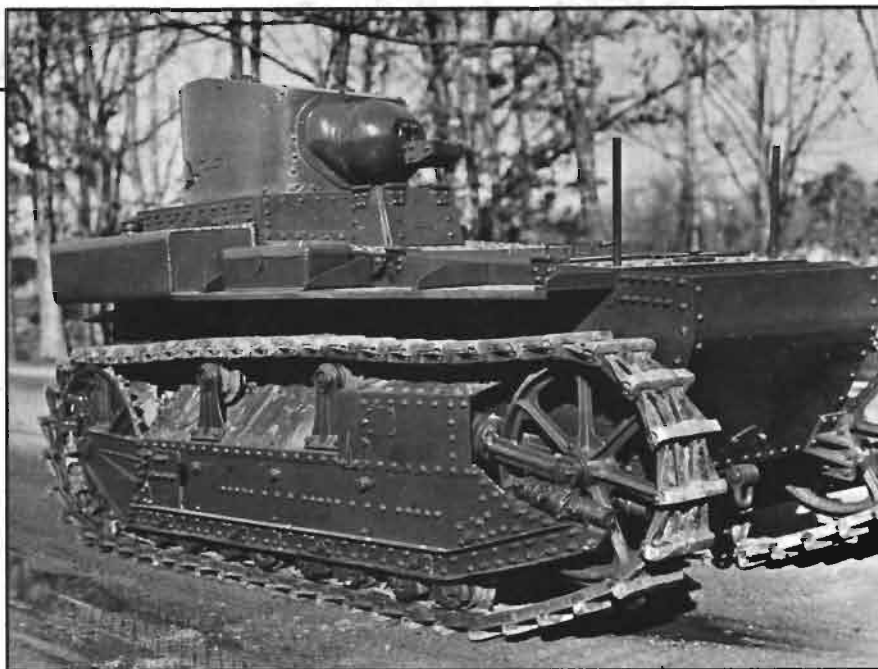
THE T1 MEDIUM UNDER TEST IN 1928.

its parts, including suspension and track assemblies, were the same as those on the T1 Light. The T2 Medium mounted an experimental, high-velocity 37-mm gun. Like all these machines, the T2 went through many experimental modifications until it was retired in the mid-1930s.

Beginning in 1930, several T1s were completely rebuilt into almost completely new machines. The T1 got a new power train and turret mounting the same 37-mm gun as the T1 Medium. In 1932, one was rebuilt as the T1E4 to test the British Vickers-Armstrong suspension. Another, the T1E5, was used to test other components. The last to be rebuilt, the T1E6, was used for engine tests.

While all the machines mentioned so far were considered successful, the Army wanted to test some European tanks. The Army borrowed from Vickers-Armstrong of England a "6-tonner" and a Carden Loyd Light. These were the first foreign tanks the Army tested since World War I, and while they had some good features, the Army found them unsuitable. In many respects, they were not as good as the Army's own experimental machines. In 1931, the Army purchased a group of tanks designed and built by the fabled J. Walter Christie. He was 66 years old at the time, and famous for his pre-World War I front-drive racing cars, front-drive conversions to motorize horse-drawn fire engines, and his World War I-era experimental tanks and self-propelled artillery designs.

Christie had developed his so-called "convertible tank," which could run on tracks or on its own road wheels, in 1928, but he called this remarkable innovation the "Model 1940" because he felt it was

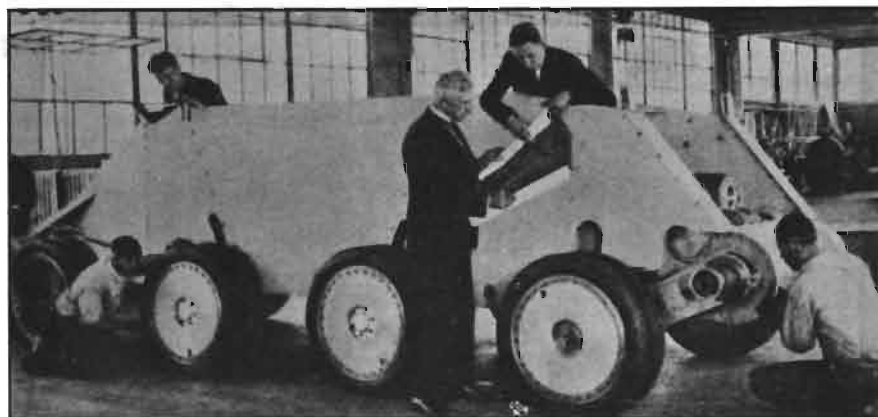


THE T1E1 LIGHT, USED AS AN ARMOR TESTBED IN THE 1930S.

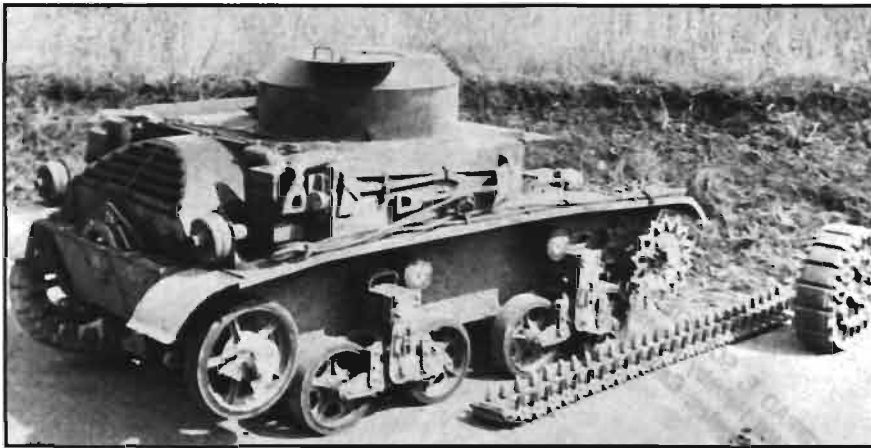
years ahead of its time. This was not a complete tank because it lacked any armament and had no turret, but it was an astounding machine that could run 45 miles per hour on its tracks, and 70 on its road wheels! This was possible because it only weighed 8.6 tons and it was powered by a 338-horsepower Liberty aircraft engine. Christie's Wheeled Track Layer Corp. only built one Model 1940, but it did so well in tests that the Army was determined to obtain a perfected version. The Army bought seven redesigned Christie tanks in 1931. To comply with federal law that limited tanks to the Infantry Branch, three were designated In-

fantry Medium Tanks T3 and the other four "Cavalry Combat Cars T1," but they were all practically identical. They weighed 10.5 tons and had the 338-horsepower Liberty engine. They incorporated the Christie convertible principle, and could run on either their road wheels or on tracks. They used Christie's unique coil-spring suspension. The Army had to build their turrets because Christie did not design ordnance systems.

The Christies proved only marginally satisfactory. The tank's complex dual-road-wheel-drive, steering-track system was troublesome. So was the chain final drive. With its



J. WALTER CHRISTIE GOES OVER BLUEPRINTS WITH HIS SON J. EDWARD, IN 1931-32.

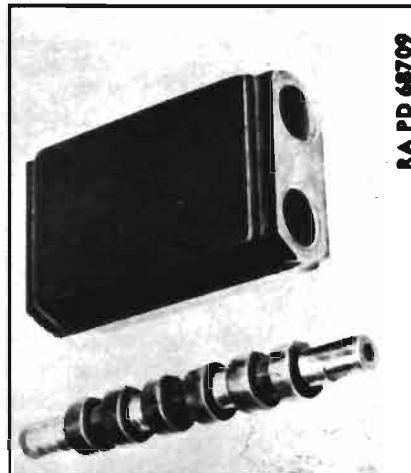


THE T2E1 LIGHT TANK, THE FIRST TO USE RUBBER-BUSHED TRACK.

suspension components, each Christie independent road wheel extended almost a foot out from either side of the hull, crowding the interior and making turret mounting difficult. The track life, like that of most tanks of the period, was poor — only some 500 miles. And the Christies tended to throw tracks in violent maneuvering.

Rock Island Arsenal used many of Christie's ideas in its 1931 T2 Combat Car. This 8.5-ton machine used a novel power plant: a 165-horsepower Continental radial air-cooled aircraft engine. Although this tank was extensively rebuilt as the T2E1 in 1933, it was an unsuccessful vehicle. A similar T3 Combat Car was designed in 1932 but never built because of the failure of the T2.

In 1932, there was a track development that went unnoticed at the time, but revolutionized tank track performance ever since. This was the rubber-bushed track. Since the first tanks were built, they had used "dry pin" tracks, invented for use on tractors of the "caterpillar" type. Dry-pin track had a very short life — never more than 500 miles — because dirt got into the track pin bushings and wore the pins out. The T1 rubber-bushed track, developed in 1932 by the Army and the Timken Bearing Co., used flexible rubber bushings to replace dry track pins. Even the first rubber-bushed



THE RUBBER-BUSHED TRACK, DEVELOPED AROUND 1932, INCREASED TRACK LIFE FROM 500 TO 5,000 MILES.

tracks ran a thousand or more miles. They are still a basic element in U.S. Army tank track design.

The second tank innovation introduced in 1932 was the volute spring suspension. This is a bar coiled on edge like a clock spring. One end is the inner coil, the other the outer. Its big advantage is that it is very rugged and it is the most powerful compact spring there is, so it took up the least possible space in a tank suspension system, a fraction of what a leaf, coil, or torsion bar spring requires.

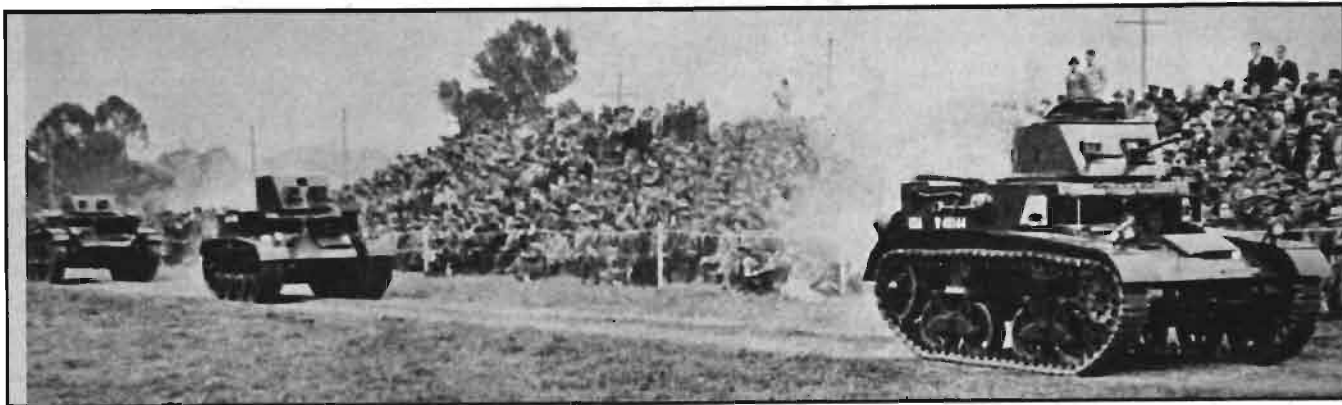
While the new components were undergoing test and development, the Army was also pursuing Christie's designs. In 1933, Rock Island Arsenal redesigned the T1 Combat Car/T3 Medium. The Army

believed Christie's ideas had merit, but his designs were far from perfect. The Army decided to pursue several other lines of development besides Christie's because of these problems. This turned out to be a very far-sighted decision, in light of the problems both the British and Russians experienced with their Christies in World War II.

At about this time, Gladeon M. Barnes, later an Ordnance Department major general, patented the torsion bar suspension. The torsion bar suspension takes up room in the bottom of the tank hull, instead of along its side. In 1934, the Army redesigned the Christie and had American-LaFrance — the fire truck manufacturer — build one T3E4 Medium. While it was a vast improvement, it was not as good as other experimental tanks built about the same time. Shortly after this project was underway, Rock Island Arsenal built a T4 Medium, a 13-tonner which was supposed to be the T4 Combat Car, but weighed more than the regulations allowed a combat car to weigh. The T4 medium was later rebuilt as the T4E1 to try out a special casemate top hull, but neither T4E1 or the T3E4 Medium Christie were considered very successful.

In 1934, Rock Island Arsenal also built the T2 Light, a turreted design with a 37-mm gun, rear engine, and front drive. It weighed 6.5 tons, and its 120-hp engine gave it a speed of about 25 mph. It used a version of the suspension on the British Vickers-Armstrong 6-ton tank. It was a reasonably good vehicle, but not nearly as good as another design built at the same time.

Two experimental tanks built at Rock Island Arsenal in 1934 had a tremendous influence on the development of U.S. Army tanks used in World War II. One was the



At a 1938 demonstration at Aberdeen Proving Ground, three different tank suspensions were on display. Tank in the lead has the volute spring suspension widely used during the war. The second is the first U.S. experimental tank with torsion bar suspension. The last tank in the column is a late Christie convertible design.

T2E1 Light Tank, the other the practically identical T5 Combat Car. These machines combined for the first time the rear-mounted, air-cooled, radial aircraft engine with a front drive, a volute spring suspension, and a rubber-bushed, long-life track. They were a fantastic success! They could do 45 mph, which made the convertibility of the Christie design unnecessary. They had excellent mobility. Track life proved to be over 1,500 miles, and the tank did not throw tracks during violent maneuvering. Their overall performance was unheard of in any other tanks of their day.

In 1936, an improved twin-turret model of the T2E1 Light was standardized and put in production at Rock Island Arsenal as the M2 Light Tank. Along with it, a single-turret version was standardized and went in production as the M1 Combat Car. These tanks were identical,

except for the turret arrangements, and they were the first in the highly successful World War II light tank series. Until the the M2 Light and M1 Combat Car were standardized, the only standard tanks still listed in the Army's inventory were World War I types, the 6-ton Model 1917 of the French Renault design and the 40-ton Mark VIII of the British type. The Army was still using them, along with some of the earlier Army experimentals, to train and educate tank troops!

Another experimental tank, built at Rock Island Arsenal in 1934, shared the same new design features. Called the T3 Light, it was a turretless 3-ton machine which worked well, but it was never pursued because the Army had no requirement for it.

The Army still thought the Christie convertible idea had merit, so in

1936 one last model was designed, the T6 Combat Car. However, due to the success of the other new designs, it was not built. However, one last Christie was built. In 1936-1937, Rock Island Arsenal took an M1 Combat Car hull and mounted it on a Christie convertible suspension. This was the T7 Combat Car, but testing proved it inferior to the new production model tanks. In 1939, the U.S. Army discarded the Christie design in favor of the much better tanks it had in production.

The Army, having a standardized light tank and combat car, needed a medium tank, and in 1937, Rock Island Arsenal designed and produced the T5 Phase I Medium. Its powertrain was derived from the M2 Light and M1 Combat Car, with a rear engine, front drive, volute suspension and rubber-bushed track. In addition to a 37-mm gun in the turret, there were four corner



Three light tank designs at Aberdeen in 1940 included, from left, the 37-mm gun-armed M2A4, the twin-turreted, machine gun-armed M2A3, and the M1 Combat Car.

casemates mounting .30-caliber machine guns. It had a 350-horsepower radial air-cooled aircraft engine, and it could do over 26 miles per hour. Its suspension and track parts were the same as those on the new light tank and combat car. It was a success.

Later variants of the medium tank project included the T5 Phase II and T5 Phase III of 1938, the latter employing a wider, improved, volute suspension and rubber-bushed track. In 1939, this design was standardized and put in production as the M2 Medium.

In 1939, a production M2 Medium was used to test the Guiberson radial, air-cooled diesel engine as a power plant. This was called the T5E1.

By 1939, Rock Island Arsenal was producing the M2 Medium and working on the T2E2 Medium. The T2E2 used the lower hull and power train of the M2, but it had a unique new top hull with a machine gun turret on top, a 75-mm pack howitzer in the right front corner, and machine gun casemates on the rear corners. It was never intended to be anything but an experimental machine to test the mounting of a large-caliber cannon in the hull, and it proved to work well enough.

World War II began in September 1939, and gave the Army a whole new insight into its tank needs. Of course, the Army concentrated on producing and improving the new standardized models. By 1940, the Army concentrated on designing and specifying the combat tanks needed in the near future. As a result, the Army did an unprecedented thing: a new tank was placed in production without ever assigning it a "T" experimental number. These machines were the M3 Mediums ("Lee" or "Grant"), mounting a 75-mm gun at the right hand corner of



The M2A1 Medium was father to the M3 Grant-Lee and grandfather of the famous Sherman M4.

the hull and a 37-mm gun in a top turret. This tank was designed in 1940, and it was the first World War II Allied tank mounting a 75-mm gun.

When the British employed it in combat in North Africa, it proved

that the U.S. Army tank program had turned out to be outstanding.

Even as the M3 Medium was being rushed into production, the Army was working on the T6 Medium, using the lower hull,



General Barnes, at left, and General Christmas, right, are seen in this 1940 photo with the wooden mock-up of the M3 Medium that would later serve in North Africa.

power train, suspension, and tracks of the M3, but with a 75-mm main gun in a full turret. The T6, when standardized and ordered into production in 1941, became the famous M4 Medium "Sherman," and it is the only World War II tank still in service!

Another less successful development begun in 1940 was the T1 Heavy "supertank," a 60-ton monster even by present standards, mounting a 3-inch, high-velocity anti-aircraft gun in its turret. It had a 1,000 horsepower engine and a speed of 25 miles per hour.

Although it was standardized as the M6 Heavy in 1941 and production was begun, this most powerful tank of its day was never used in combat because of problems in shipping it and using it on the roads and bridges of Europe. In 1941, the Army also began production of its new M3 Light Tank, mounting a 37-mm gun in its turret. It was a better armored and armed version of the M2 Light.

One last non-convertible Christie was also built as the 57-mm Gun Motor Carriage T49, but it was not



The M18 "Hellcat" Tank Destroyer, its suspension based on research done in the 1930s, was the first U.S. production vehicle to use torsion bar suspension. This one is seen crossing the Moselle River in 1945.

successful. Based on designs begun in 1940, the 76-mm Gun Motor Carriage T67 was built in 1942. This was the first U.S. Army armored vehicle using a turret-mounted gun and the torsion bar suspension invented in 1933. It is sort of an interesting footnote that, while the the U.S. Army's volute suspension, introduced in 1934 and so successful that it is still used, takes up NO interior hull space, it was replaced by the torsion bar suspension which uses a good hunk of interior hull space.

The first production vehicle using torsion bars was the 76-mm Gun

Motor Carriage M18 ("Hellcat") introduced in 1943, and developed from the T67.

The torsion bar suspension was also used in the later M24 Light ("Chaffee") and the M26 Heavy (later M26 Medium "Pershing"). U.S. Army tanks through the M60 were developed directly from the M26 Pershing.

The rubber-bushed track, introduced in 1932, is still in use. As far back as World War II, sets ran as far as 5,000 miles before replacement, and as yet there is nothing better.



The M6 Heavy tank, at right, seen in comparison with the M3 Medium. Although a production tank, the M6 - at 60 tons - was thought to be too heavy for fighting in Europe and was never in combat.

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M2 MEDIUM TANK DURING THIRD ARMY MANEUVERS IN 1940.

1940 Louisiana Maneuvers Lead to Birth of the Armored Force

by John Cranston, Armor Center Historian

Cited as "the longest and most pretentious troop concentration since the World War," the Louisiana Maneuvers of May 1940 marked the first peacetime use of combined arms at the division and corps level, and prepared the way for the development of the Armored Force.

The creation of the Armored Force also owed much to the persistent efforts of a small cadre of U.S. Army officers that had been active in armor's behalf for over a decade.

In 1928, Secretary of War Dwight F. Davis had urged the creation of "an experimental armored force." A mixed brigade of tanks, infantry, and artillery was subsequently established at Fort George Meade, Maryland. In October 1930, an independent mechanized force of 15 tanks and 10 armored cars was transferred to Camp Eustis, Virginia. In 1931, the dream of a united and mechanized force came to an end, when existing equipment and military personnel were split between Fort Benning (infantry) and

Fort Knox (cavalry). The dedicated efforts of COL Daniel Van Voorhis, commander of the mechanized force at Camp Eustis, and later at Fort Knox, and of LTC Adna R. Chaffee, his executive officer, kept the mechanized force concept alive throughout the 1930s. In spite of the efforts of both infantry and cavalry to keep tanks as a mere supporting arm to these two existing service branches, the two officers, winning the support of others, labored unceasingly, especially in practice maneuvers, to develop a strong

mechanized force. These maneuvers grew in scale during the decade, emphasizing the speed and mobility of tracked vehicles. Considerable public fanfare, including troop movements in or near major urban centers, strengthened the hand of Van Voorhis, Chaffee, and their growing band of supporters.

The first lap in the long race to create a separate mechanized took place at the end of 1932 and early 1933, at the regimental level, when COL Van Voorhis took his Detachment of 1st Cavalry (Mechanized) from Fort Knox to Fort D.A. Russell (near Marfa), Texas, to "unhorse" the 1st Cavalry Regiment there. The 1st Cavalry Regiment was transferred to Fort Knox by truck.

The detachment went through Memphis and San Antonio on the way to Texas, returning via Dallas and Little Rock. Van Voorhis led with his sedan, with trucks following. Crowds applauded all along the way. One truck was lost, slipping off the icy road on the way to Bowling Green, immobilizing the barber and his equipment. (The truck was hidden from public view in a ravine and towed back to Fort Knox.)

In 1934, the 1st Cavalry traveled to Kansas for the "Riley Maneuvers." The new "Armored Car, M1" (in reality a tracked vehicle), led the way. A machine gun troop followed the tracked vehicles in halftracks. Motorcycle scouts swarmed up and down the column, arousing the interest of populations in large and small towns, who lined the highway fences and city streets to watch the impressive sight. At Fort Riley, the tanks and halftracks performed brilliantly against the horsed units of Fort Riley's Cavalry School Brigade. Van Voorhis could claim victory on three other counts: Publicity from



M3 SCOUT CAR CREWS TRAIN IN 1939

the road march was universally favorable. Tracked vehicles at the regimental level had proved their mettle on the battlefield. Finally, an emerging cadre of infantry officers, including COL Bruce Magruder, LTC Alvan G. Gillem, and LTC Guy V. Henry, all very much on the scene at Fort Riley, took up the cause of tracked vehicles in a strong mechanized force.

The M1 tracked vehicle, teamed with artillery, air, radio, ordnance, and quartermaster support, again proved itself in the Allegan (Michigan) road march and maneuvers of mid-1936. The unit band went along, summoning troops to do their best and increasing popular interest and enthusiasm. The mechanized regiment made the journey from Fort Knox to Michigan with much fanfare. When a number of the rubber tires on bogey wheels proved defective and disintegrated, soldiers drove the tracked vehicles on the rims. Bags of ice, often provided by sympathetic onlookers, mitigated the harshest effects of fuel "vapor lock" in the blazing summer sun.

The equipment performed well once it arrived in the cool environs of Michigan. The 1st Cavalry returned to Fort Knox without serious mishap, owing to lessons learned on the warm trip northward. Upon the return to Fort Knox, Van Voorhis and Chaffee requested a mechanized cavalry division, but their request was denied. However, the 13th Cavalry Regiment now joined the 1st Caval-

ry at Fort Knox, creating the nucleus of a mechanized brigade. The 13th Cavalry was the last existing cavalry regiment to be "unhorsed" until January 9, 1942. With the newly-formed 7th Cavalry Brigade, Van Voorhis and Chaffee were better able to make their cause of a separate mechanized force known in Washington.

In August 1939, the 7th Cavalry Brigade took part in the First Army maneuvers at Plattsburg, New York – the largest such peacetime maneuver ever held in the United States. Tracked vehicles went to Plattsburg by rail. The soldiers went by truck. In mock combat between two corps, Brigadier General Adna R. Chaffee used an envelopment maneuver. The brigade traveled more than 120 miles, at night, without lights, and took the major road center of Peru by surprise. Sending the message, "I occupy Peru. Chaffee," the general ended the maneuvers.

The brigade then made a detour to the New York World's Fair, to applauding crowds. Mayor Fiorello LaGuardia welcomed Chaffee and his soldiers as guests of the city. On 30 August 1939, the brigade bivouacked on grounds near the United States Military Academy at West Point. Many cadets inspected tracked vehicles and talked about tank strategy and tactics for the first time with experienced officers and NCOs. Upon returning to Fort Knox, Chaffee renewed his request for a separate mechanized division – only to be refused again by the Chief of Staff. As before, however, he received compensation. The 6th Infantry Regiment was transferred to Fort Knox from Jefferson Barracks, Missouri. Unfortunately, motorized equipment for the 6th Infantry did not become available until 1940, just four days before the

7th Cavalry Brigade left for maneuvers in Louisiana.

The Louisiana Maneuvers, conducted at corps level, constituted the largest such peacetime maneuvers ever held by the United States. They were the result, at least in part, of the German invasion (six armored divisions) of Poland the previous September. Polish cavalry, fighting bravely on their horses, had utterly failed to stop the tracked German juggernaut. At the request of General George C. Marshall, newly-appointed Chief of Staff, Major General Stanley D. Embick, 3d Army Commander, drew up the plan for the maneuvers.

Embick's interest in armor and mechanization dated from at least 1930. In part because of Embick's interest in mechanization, the maneuvers were oriented toward mobility, rather than combat. Three new "triangular divisions" (each with three regiments, which consisted of three battalions) in IV Corps, fought four "square" divisions in IX Corps.

The 7th Cavalry Brigade, with the 6th Infantry Regiment (Mechanized), was attached to IX Corps throughout the maneuvers. From Fort Benning, a Provisional Tank Brigade under BG Bruce Magruder, was attached to IV Corps for the first maneuver phase, and to IX Corps in the second, or final, phase. In Phase I, the two tank brigades were used against each other. Then, in Phase 2, they fought together. On 48-hours' notice, Chaffee and Magruder prepared an offensive across a 75-mile area, successfully carrying out the goals of speed, mobility, and tank-infantry coordination in the offensive. Despite late receipt of its equipment, the 6th Infantry Regiment (Mechanized) performed well

in its support role. Mechanized brigades emerged as clear winners over the horsed cavalry units in Phase 2.

New converts to the cause of a separate mechanized force included COL George S. Patton, Jr., who served as an umpire during the maneuvers. Writing to his fellow cavalry officer, General Kenyon Joyce, Patton urged his friend to take up the cause of the tracked vehicle and the mechanized force. Joyce stubbornly refused, thereby damaging his career. Patton's training memoranda, intended for Joyce, later appeared in an issue of *Cavalry Journal*.

Immediately after the maneuvers, Patton, Chaffee, Embick, Magruder, and other officers committed to a mechanized force met behind closed doors in an Alexandria, Louisiana schoolhouse. Their "Alexandria Recommendations" endorsed an armored force to embrace all existing mechanized cavalry and infantry tank units (essentially the forces present at the maneuvers), and the creation of four armored divisions, separate from cavalry, one for each field army. These were similar to the recommendations made by Chaffee the year before, after the Plattsburg maneuvers.

General Marshall may have decided in favor of Chaffee before the Louisiana Maneuvers began. He certainly did so after they had ended. Writing to Embick in mid-June 1940, he commended General Embick on the success of the maneuvers, adding that the performance of Chaffee's and Magruder's brigades meant that the Army could press on with the armored division concept.

Over the opposition of Major General John K. Herr, the last chief

of cavalry and the advocate of the "horsed" cavalry regiment, Chaffee left for Washington to confer with Marshall. With Marshall's endorsement, he worked for the creation, by 15 April 1941, of four armored divisions. On 10 July 1940, two weeks after the fall of France, General Chaffee became commander of the Armored Force and I Armored Corps. The goal of a strong, separate mechanized force had finally been attained.

Two recommendations made by Chaffee as a result of the Louisiana Maneuvers were also carried out. The first was increased production of medium, rather than light, tanks. The second was substitution of halftracks for supporting infantry forces.

The term "armored force" stemmed from the Infantry Branch's resistance to the word "mechanized" and Cavalry's scorn of anything using the word "tank." It has proved an enduring term.

By 10 July 1940, the hour for the creation of the Armored Force was very late. France had fallen. England shuddered in the shadow of German ground and air forces. The time for a strong American armor force had come.

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Are We Ready?

Combat Service Support Integration

by Captain Calvin R. Sayles

The tank company commander leaned forward, his elbows resting on the cupola of his tank, his eyes fixed to his binoculars, scanning the gently rolling terrain ahead of his company's positions. A cool wind blew across his neck, as he tried to review in his mind the unit's preparation during the last 48 hours. They were in a hasty defense, and there had been so much to accomplish in such a short period.

The unit had carefully plotted engagement areas and checked them from both sides to ensure they could achieve the desired results. "This is the point on the ground where we can kill them," the boss had said, and everything had gone into ensuring he was right. The engineers had worked nonstop, and the coordination seemed endless. Obstacles were checked continually to ensure they were covered. The FIST seemed to live either in the obstacles or with the platoon leaders, reviewing, updating, and refining the plan. Tankers and engineers had worked side by side, laying wire and mines. Dozers were one of the most prized assets, although there never seemed to be enough blade time, and TCs were never quite satisfied with their fighting position. Range cards, fire plans, boresight, and everything else had been rehearsed again and again.

He looked down at the overlay on his map and the pre-stock sites

caught his eye. While platoons had waited for blade time, they had even rehearsed how they would move to the pre-stock sites, upload, and get back into the battle. Tanks had moved slowly the first time, faster the next, buttoned up after that, and finally buttoned up in mask. The practice had paid off during the night in one last practice run, and hopefully it would pay off again today.

And if all the preparation did not result in perfect execution, and his people did sustain casualties, he felt he had also prepared as much as possible for that contingency. Casualty Collection Points were plotted, and the first sergeant had ensured the medics were integrated into every rehearsal. The medics had done their own rehearsals as well, extracting each other from the XO's tank, teaching crewmen to do the same, and ensuring they could traverse the turret and turn the power on and off. The medical platoon leader had even come up with a way to identify a crewman on a vehicle if he was seriously wounded. Orange panels would be flown from the antenna of his vehicle, or from the highest point a buddy could find. It seemed strange that the pushy, persistent medical platoon leader of a few weeks ago was now one of the most popular men in the battalion.

The Team was well rehearsed, uploaded, topped off, and as ready

as time would permit. There always seemed something else that could be done with just one more hour. He picked up his binoculars and, with a deep breath, continued scanning the terrain before him.

Many of us have been in a situation similar to this. Whether at Ft. Bliss, or the NTC, we have all faced the moment when the preparation is over, and it is the time to test our abilities. Unfortunately, it seems that few of us were able to take that deep breath and say, I'm ready. One of the reasons that keeps us from saying that is combat service support.

I was very hesitant to mention anything about combat service support in the title. To mention combat service support can very quickly end a conversation. Let's face it, to conduct CSS operations is not the reason that most of us joined the Armor Force. CSS operations are not exciting, require much hard work, and only seem to receive emphasis when there is something wrong. The S1, S4, BMO, and other CSS positions are often considered proving grounds for the "really important jobs," rather than essential members of the team.

As a former tank company commander, and even as a CSS observer-controller at the National Training Center, it was easy to have such an attitude. It was easy until

the first time I observed a tank company roll into simulated battle without a single main gun round. After observing such an incident, it is easy to become a CSS convert.

After a year as a CSS O/C, I came to realize that many different units had the same problems.

- Often, they didn't integrate CSS into the TF plan. The XO or S3 gave little guidance.

- Unless there was a specific problem, CSS received little emphasis at battalion level. So, it was not executed well at company level.

- Rarely had the task force CSS teams worked together during a major field exercise. Even if they had, training emphasized maneuver and not CSS.

- Without testing, procedures that seemed sound in garrison did not meet the needs of the task force during continuous operations.

- In some cases, the CSS leadership was not interchangeable, nor did they have a second team to back up key leaders.

- Often the CSS teams simply were not aware of all the missions they were required to accomplish in order to successfully support the task force.

The bottom line is that combat service support missions were often not integrated into task force-level training. In order for the company commander to be able to say, "I'm ready," he must integrate CSS into the TF plan from warning order through reconsolidation.

In preparation for a mission, the first CSS integration must occur when the warning order is issued. Often, at the NTC, no warning

order went to the CSS assets. If a warning order did exist, it was followed by a request for the S4 to come immediately to the TOC to prepare his portion of the operations order. Although the S4 must be a CSS expert, and may be able to prepare paragraph IV alone, his immediate departure to the TOC does not maximize all of the CSS assets.

Consider the following as a scenario/time line that might allow all of the CSS assets to contribute to the success of the task force:

- The S4 receives the warning order for the mission, to include the area of operation, cross attachments, time of operations order, time of move, etc. This would include specific guidance from the XO.

- The S1, S4, BMO, medical platoon leader, all NCOICs and any other attached element's leadership go to the ALC to conduct a quick orders prep. Whenever possible, include the headquarters company commander or his representative. With a little practice, this orders prep should take no more than 20 minutes.

- The S4 and medical platoon leader move to the TOC to coordinate with the XO, S3, and chemical platoon leader, and then prepare paragraph IV.

- The S1 brings the CSS team together, issues a warning order, and gives guidance as to what he expects to be done between that point and the time of the operations order for the combat trains. The S1 then begins executing the tentative plan, to include rehearsals in order to support the TF. This is valuable preparation time and shouldn't be wasted waiting for the S4 to return.

- The S1 or S4 NCOIC contacts the CSS representative in each com-

pany, to include HHC, to verify current supply status and identify specific requirements.

- The S4 and medical platoon leader complete paragraph IV. If time permits, relay a quick SITREP to the combat trains before the order.

- Both the S4 and the medical platoon leader provide a detailed concise briefing on how they will support the task force, as part of the TF OPORD.

- The S4 and medical platoon leader return to the combat trains, and coordinate with the key CSS leadership. The S4 and/or the S1 then give an OPORD, with primary emphasis on how to support the task force. Although it may be important for the combat trains to know what regiment against which they are defending, it's more important to identify how to medically support the scout platoon, or what S1 representative will stay with the jump aid station. The OPORD should also include a sand table and briefback, similar to the TF OPORD, in order to ensure everyone understands their specific responsibility. The CSS preparation to support the task force then continues.

- The S4 meets with the support platoon leader, the BMO, and all of the first sergeants at the logistics release point 15 minutes before the arrival of the LOGPAC to continue coordination and identify additional requirements. If possible, the XO also attends this meeting to provide guidance. This is a standard meeting that continues until the execution of the mission.

This example is not a lock-step time line, nor does it take the place of established doctrine. But, it may aid the integration of CSS doctrine

into the TF plan. The key phase of this time line is the 20 minutes that the CSS leadership spends together immediately after the warning order. Although the task force planning cell may feel it needs the S4 immediately, a 20-minute investment will actually save time. During that 20-minute coordination meeting, the S4 can receive critical information from the CSS staff he will require during the planning phase. Rather than searching for individual answers at the TOC, the S4 will be armed with necessary information upon his arrival. Because the 20-minute CSS coordination meeting is an extremely important phase, it may be necessary to use a few organizational tools to ensure that valuable information is passed, and a tentative plan is formulated. The first tool that may be valuable is a CSS planning matrix.

The CSS staff should begin building the planning matrix by listing CSS concerns about the particular mission. The list will be different for every mission, although some concerns will always be on the list. CSS staff officers should not limit themselves to their particular specialty. For example, if the S1 does not mention the personnel loss estimate, the medical platoon leader might list it. Nor do the concerns need to be in a sequential order. The important thing is to list as many CSS concerns as possible. Again, it is critical to realistic plans that the CSS team receive a good warning order. The mission may change, or the brigade CSS annex may alter the plan, but at least the CSS team will have something from which to work.

When the list is finished, prioritize the items. Assign priorities on the basis of what must be done NOW, what needs to be done before the order (PO), and what needs to be done before the mission (PM).

Finally, an individual must be responsible for each item on the list. This is critical, because it ensures that each task has been covered, and that one CSS leader is not overloaded with a list that would be impossible to complete. Figure 1 is a possible example of a

CSS matrix. It is not intended to be the answer or a comprehensive list. Within doctrinal limits, each unit will have different concerns and priorities.

After field testing, this matrix may become part of the SOP for the combat trains. A defense CSS

CSS Matrix				
TASK	NOW	PO	PM	ASSIGNED TO
Positions of Combat Trains	X			CPT (S4)
Positions of Aid Stations (Single or Split Jump Aid)	X			1LT (MPL)
Graphics		X		CPT (S4)
Defense of Combat Trains (Reaction Force)	X	X	X	SFC (S4, NCOIC)
Emergency Resupply III, V, VIII		X		CPT (S4)
Personnel Loss Estimate		X		SFC (S1, NCOIC)
Critical Personnel Shortages	X			CPT (S1)
Time Required to Reconstitute/ Resupply TF	X			CPT (S4)
NMC Vehicles/Time to Repair/ Recommended Repair Priority	X			CPT (BMO)
Task Organization/ Head Count	X	X		CPT (S1)
Current Class III, V and VIII Status from All Companies and Separate Platoons	X			SSG (S4)
Rehearsals	X	X	X	
Reaction Force	X			SFC (S4 NCOIC)
NBC		X		SGT (DECON)
Reaction to Arty		X		SSG _____
Casualty Evacuation			X	CW2 (MED PLT)
Movement of Combat Trains and Jump Aid			X	1LT (MPL, S1)
Battlefield Equipment Recover		X	X	SSG (SPT PLT)
Radio Checks			X	SGT (COMMO)
Chaplain Services			X	CPT (CHAPLAIN)
Maint In Trains			X	SSG (BMO)
Overlays, (Obstacle, IPB, Fire Support)			X	CPT (S4)
Coordination With Adjacent TF CSS Team			X	CPT (S1)
Safety Brief	X	X	X	ALL SECTIONS

Figure 1

matrix would be substantially different from an offense matrix, although some tasks would, of course, be the same. Carried to its logical conclusion, a CSS matrix could be developed for a series of conceivable missions.

Although the matrix could be made in advance, it would still be appropriate to review the list during the 20-minute prep, and not to assign specific responsibility until that point.

At company level, the first sergeant — as the chief logistician for the team — could also have a condensed CSS matrix to ensure that his areas of responsibility are covered and CSS functions are integrated into the company plan. This matrix could also become part of a company SOP.

There are two additional tools that might be useful. The first is a preprinted list of possible CSS graphics. This is a good memory jogger for the S1, S4, company first sergeants, and separate platoon sergeants during the preparation of their OPORD. An example of a possible list is below.

- Combat Trains Positions
- Main Aid Station
- Jump Aid Station Positions
- MSR/ASR
- LRP's
- Pre-stock Positions
- Casualty Collection Points
- Emergency Resupply Points
- Decon Sites
- EPW Points
- Ammunition Transfer Points
- Ambulance Exchange Points
- Graves Registration Points
- OMCP Collection Points
- BSA/DSA

Paragraph IV, Service Support

- (1) Reports
- (2) Initial combat trains locations, subsequent trains positions, (how the TF will be supported)
- (3) Field trains locations
- (4) Ration cycle
- (5) All units will carry _____ days emergency resupply
- (6) Water point
- (7) CSR
- (8) MSR/ASR
- (9) TF collection points/evac procedures/priorities
- (10) TF aid station and jump aid station
- (11) Maintenance
- (12) Graves registration point
- (13) Civil/military OPS
- (14) Safety
- (15) Miscellaneous

Figure 2

Some might object to this amount of information on the overlay. Granted, along with the IPB, maneuver graphics, fire support graphics, and obstacle graphics, this amount of information would be unmanageable. Although some CSS graphics should be integrated into the maneuver overlay, the CSS overlay should be separate. It is up to each commander which information to put on the overlay, and what information should be on hand, immediately available.

Finally, a preprinted Paragraph IV may also assist at battalion and team level. Again, any preprinted form is not the answer, but can be used as a guide. An example of this is in Figure 2.

Combat service support integration must occur at an individual and task force level. A unit cannot afford to have leaders who define themselves as "operations guys" versus "support guys." The S4 must have a thorough understanding of the commander's maneuver intent

in order to support the TF. Additionally, each company commander must constantly consider CSS concerns in order to survive during continuous operations. CSS Teams must be built and integrated into the training process in the same way a company/team is. If this is accomplished, leaders at all levels, in tanks and M577s, will have taken a major step toward being able to say, "I'm Ready!"

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The Future of Armor

by Captain Stephen L. Melton

It should come as no surprise to followers of current affairs that many changes are underway in the world that will have a profound effect on the Army and the Armor Force. Although it is not yet clear exactly where these changes will leave us, certain of these trends are probably reversible. It is appropriate, then, to examine these trends and their impact on the Armor Force, so that we may continue to play a decisive role on future battlefields.

Current Developments

The following developments are key to understanding the future of armor.

- Reductions in the defense budget will mean a much smaller Army in the near future and decelerating procurement of new weapons systems. This process has been underway for several years already. The Gramm-Rudman formula calls for the annual budget deficit to fall from \$150 billion to zero in the next few years. This may or may not happen on schedule. However, it is clear that the government cannot renege on its pledge to reduce the deficit, and it is equally

clear that DOD will be a major bill-payer. We may well see a 50 percent reduction in the size of the Army by the turn of the century, and we will probably not see any new major weapons systems unless they promise an overwhelming improvement in capability. The impact on the Armor Force will be fewer divisions, equipped mostly with armored vehicles now in the inventory. TOEs could certainly change, too.

- There likely will be deep mutual force reductions in Europe. Both sides have good economic reasons for making such cuts. The Soviet decisions to make unilateral cuts and restructure its forces for defensive operations are evidence that the Soviets truly desire a military de-escalation, perhaps ultimately disengagement, in Central and Eastern Europe. If this is true, current force levels are unnecessary, as well as expensive, and both sides will seek opportunities to lower them. USAREUR will likely lose a corps or more to the upcoming cuts.

- Political changes in Central and Eastern Europe are accelerating,

and, at this time at least, the Soviet Union shows no indication that it will intervene to restore its empire. The current trend would indicate that, by the turn of the century, we will see the end of the Warsaw Pact alliance; the Red Army return home; the creation of democratic, neutral, perhaps demilitarized states in Poland, Hungary, Czechoslovakia, and other countries; and German reunification of some sort.

Of course, this political and military climate could change rapidly if the Soviets decide to reverse course. However, the preponderance of the evidence is that the Soviets are overwhelmed by their domestic political and economic problems and are committed to following *perestroika* wherever it may lead.

One doubts, especially after the events of the past year, if the Soviets have the political will to maintain their empire by military force.

- Infantry antitank weapons and attack helicopters are redefining the role of armor on the battlefield. The

combination of TOW, AAWS-M, and AT-4 will provide the infantry with a credible defensive antiarmor capability for the first time. But what is truly revolutionary is the emerging capability of attack helicopters and artillery to mass antiarmor fires throughout a divisional or even corps area of operations. With ICM, FASCAM, and SADARM, the DIVARTY can disrupt and destroy armor formations faster and more efficiently than the enemy can introduce them onto the battlefield. Aviation brigades can mass much more quickly than enemy armor formations can, and deliver highly lethal and efficient fires as well. While the main battle tank is still a major player in the antiarmor battle, the old adage that the best way to kill a tank is with another tank may no longer be true. On future battlefields, massed fires will be more effective than massed tanks; just as in WWI, machine guns were more effective than massed infantry.

● The proliferation of arms and heavy weapons throughout the Third World casts doubt on the suitability of our light forces in many contingency situations. Not only is the Third World developing and manufacturing its own tanks, IFVs, armored cars, and missiles, but it has often found access to even the most sophisticated Western and Soviet weaponry. As NATO and the Warsaw Pact disengage, additional surplus weaponry could find its way to potential adversaries. Also, one cannot assume that the weapons industries in both the East and the West will not solve their problems of surplus capacity by selling products to Third World nations. Will our contingency forces, lightly armed for reasons of strategic deployability, find themselves hopelessly outgunned on the ground? Unfortunately, the armor community's fixation on the battle

in Europe has placed us in a position in which, save the Sheridans in the 82d Airborne, the Army has no light, strategically deployable armored vehicles. The Armor Force of the future will have to address this serious deficiency.

Impact on the Armor Force

The Army of the future, as the Army of today, will probably consist of forward deployed heavy forces in Europe and Korea, reinforcements for those heavy forces stationed in CONUS, and rapidly deployable contingency forces, stationed primarily in CONUS. For purposes of discussion, we will assume that the trends discussed above continue without major changes in direction or magnitude, and that nothing happens to change the military situation on the Korean peninsula. What then will be the implications for the armor force in European and contingency operations?

Europe

The Soviet Union still will be a formidable military power and potential adversary, even if it withdraws totally from Eastern Europe. Despite deep force reductions and the creation of a neutral, largely demilitarized zone in Eastern Europe, NATO still will find the Soviet Union too large, well-armed, and politically unstable to ignore. A continued, though downscaled, American presence will still be the best guarantee of continued peace. An American force of perhaps a corps and a reduced USAFE will be the front line of the nation's commitment.

The two world wars in Europe began with spectacular operational maneuvers, then settled into wars of attrition, with the victors of the attrition ultimately regaining an operational initiative which they pursued to victory. The political reality of forward defense caused NATO to

develop a force structure that sought to begin the defense in the attrition phase, denying the Soviets operational freedom and attriting them severely, with hopes that reinforcements from America and mobilization of NATO manpower and industrial might would eventually translate into the ability to take the initiative. Realistically, this was the only workable strategy, given the NATO unwillingness to match the Soviets man for man, tank for tank.

Our heavy divisions in Europe and their reinforcements in CONUS reflect this basic strategy. They are large, firepower-intensive organizations designed for linear, attrition-type defense against an enemy frontal attack. (If you doubt this, just look at the way we graphically portray the battlefield, dividing it into deep, close, and rear battles. Doesn't all of this assume a coherent front line? Hasn't NATO in fact lined its divisions along the German border to force a linear battlefield?)

Our heavy divisions consume supplies at such a fantastic rate that they are forever dependent on continuous resupply from a well-developed theater-level support base and are, consequently, incapable of operational maneuver. For instance, a heavy division conducting maneuver operations could consume more than 550,000 gallons of fuel a day, one-and-a-half times its fuel-hauling capability.

Contrast this to the 4th Armored Division during WWII, which was able to carry seven days of fuel during its deep maneuver at Arzacourt. In the WWII division, mobility was the key design criterion. In today's heavy division, firepower and the ability to survive enemy fires drive force and equipment design decisions.

While the heavy divisions are appropriate for the war of attrition, they are inappropriate for a situation in which the front will be thinly manned by both sides, and the two opposing forces may start off on opposite sides of neutral countries to collide somewhere in the middle in a series of meeting engagements. (I am reminded of the inadequacy of very heavy British armored divisions in Belgium in 1940. They were simply outmaneuvered and made irrelevant.) The ability to perform sustained maneuvers over large distances will be the key to success, as will be the ability to gain contact with the enemy on favorable terms. To achieve the maneuverability goals, the divisions will have to be far lighter. To successfully meet the enemy on the run and provide security during maneuver, cavalry and scout assets will have to increase.

I make the following strawman proposals concerning TOE for the heavy division of the future:

- Four M1A1 tank battalions of 58 tanks each (four companies of 14). The hulls would be retrofitted with diesel engines for fuel efficiency, an absolute requirement for sustained operational maneuver.

- Four mechanized infantry battalions equipped with a family of wheeled armored infantry carriers, some of which would have a Bradley-type turret to provide accurate long-range antiarmor fires. The tracked Bradley hull simply is too slow, too resource consuming, and carries too few dismounts. Nor can it swim easily. Its armor protection cannot compensate for these significant deficiencies.

- The substitution of a wheeled, light armored cavalry troop in place of the scout platoon in each armor and mechanized infantry battalion. This not only would provide greater security and more successful

employment of the tank and infantry forces, but also would provide additional vehicles for the forward observers and FACs to bring in antiarmor artillery fires and close air support.

- Within the DIVARTY, two 155 battalions and two MLRS battalions to get more bang for the buck and, because of the greater range of MLRS, more efficient shifting of antiarmor fires throughout the division's area of operations.

- Maintain the current TOE of the aviation brigade, except that the cavalry squadron would be equipped with wheeled vehicles rather than Bradleys. We should consider including one or two air assault companies in the brigade.

- Throughout the division, we should substitute wheeled vehicles for tracked vehicles wherever possible, to reduce support requirements and enhance operational freedom. Virtually everything, except for tanks and self-propelled artillery, should be on a wheeled chassis.

The Advantages

- Improved operational mobility — the ability to conduct operations deep into contested territory over extended battlefields for extended periods of time.

- Reduced operating costs per mile — important not only in wartime, but in peacetime as well.

- Increased ability to perform scout and security operations throughout the division area of operations, sector, or zone.

- A shift in emphasis from massed short-range infantry and armor systems — maneuver forces — to achieve combat power, and a corresponding increase in the use of long-range firepower — artillery, aviation, and CAS — to achieve

decisive mass at critical points. Such a shift would use maneuver forces to do what they do best — maneuver — and firepower systems to do what they do best — concentrate firepower at decisive points. To reinforce this key concept in division operations, it might be useful to reserve one of the ADC slots for an artilleryman.

Such a division would have the agility and firepower to fight and win in the rapidly changing maneuver environment that would likely be found on the future European battlefield. Consequently, the few remaining heavy divisions in the active component in CONUS would be similarly equipped, as would be their POMCUS sets, because they too could expect to enter the fight early on. The role of the active component would be reduced and refocused as it decreases in size. If deterrence in Europe fails, the mission of the active heavy forces would be to win the war with rapid operational maneuvers or, if that fails, at least to stabilize the situation until the reserve component units can mobilize and deploy to fight the attrition war that will follow. Reserve component heavy divisions would receive the Bradleys and the bulk of the tanks and other heavily armored equipment that will be needed if the war enters an attrition phase.

Contingency Operations

The Army's potential battlegrounds lie not only in Central Europe, but throughout the world. We have designed the Army's light contingency forces for strategic mobility, generally deploying them on Air Force transports. These forces are exceedingly light and, except for the tank battalion in the 82nd, have no armored vehicles. Once on the ground, the infantry units are foot-mobile and have few heavy weapons. They have been designed, it seems, with the assumption that our potential Third World enemies

will also be foot-mobile and only lightly armed. A survey of potential arenas of conflict in the Near and Middle East, Africa, and Latin America reveals, however, increasing levels of modern, heavy weaponry and a proliferation of tanks and other armored vehicles. Even Nicaragua possesses hundreds of tanks and wheeled combat vehicles, and can at least transport its infantry around the country on trucks. It seems that our focus on strategic mobility has caused us to sacrifice tactical utility and operational concerns. Our contingency forces should not be capable of only getting to the battlefield, but also must be capable of conducting decisive operations to force a military and political decision against well-armed opponents.

A deployable armor force must be created within the contingency forces. Each light division should have an organic light armored brigade consisting of an M1 tank battalion, a mechanized (wheeled) infantry battalion, a cavalry squadron, and a self-propelled artillery battalion.

Such a brigade would provide offensive and defensive antiarmor capability, ground tactical mobility, and the ability to rapidly exploit enemy weaknesses. TOEs would be similar to those of the heavy division, except that the brigade would have its own CS and CSS base, much like a separate brigade. We could deploy POMCUS sets in the vicinity of likely conflicts and, during periods of escalating tensions, even on ships at sea to reduce deployability problems.

The armored force could also be tailored to the contingency. For instance, if the enemy has no tanks, the tank battalion or some of its companies could stay at home. If the enemy armor threat is considerable, additional tank battalions could be attached to the brigade.

It is critical to the design of the future force to be able to adjust the light-heavy mix based on military requirements rather than insist on a doctrinaire division of warfare into heavy and light categories.

The Army in the Year 2000

Our down-sized Army will consist of perhaps 12 division equivalents. Assume the following active component force structure:

- A corps forward in Germany
- 2d ID in Korea
- 25th ID in Hawaii
- 101st and 82d Airborne Divisions
- Two heavy divisions, primarily to reinforce Europe
- Three separate brigades at Ft. Benning, Ft. Knox, and Panama
- Three light infantry divisions.

Such a small force, with worldwide commitments, can ill-afford too many units that are single-purpose in nature. Units will have to be structured with the ability to fight a broad spectrum of conflicts and can neither be too heavy nor too light. Secondly, our smaller Army will be unable to sustain attrition styles of warfare, so will have to be capable of conducting decisive operational maneuvers at the onset of hostilities to preclude the formation of a stalemated linear battlefield. Mobility and sustainability — strategic, operational, and tactical — must be built into all units.

Although such a force structure does not now exist, the doctrine for its employment does — AirLand Battle. We have a doctrine that stresses the need for continuous, decisive operations but we do not now have the units needed to execute the concept on future battlefields. I have outlined my thoughts on how the armor community can contribute to the AirLand Battle in a changing world. We must realize that our focus on attrition-based armor-antiarmor

warfare has decreased our ability to conduct decisive operational maneuvers. In a more fluid military environment that we likely will see in Europe in the next few years, to preserve our heavy units as currently structured would not be in our interest. Lighter units with more maneuverability and sustainability will be needed.

Armor Branch cannot continue to regard regional conflicts as the exclusive domain of the infantry. The addition of light armor units to our contingency forces will greatly enhance their capabilities. Just as important, the Army needs to refocus in terms of operational capability. We need to look at our potential enemies and develop operational packages that give us a chance to achieve decisive victory in the opening stages of a conflict, if possible. We can avoid costly, no-win situations and develop a more efficient force if we better define and train to our operational requirements.

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The BPC – A System For Battle Staff Training Enhancement

by Major General Guilford J. Wilson, Jr., USAR

The 75th U.S. Army Maneuver Area Command (MAC), U.S. Army Reserve, took a big training step forward when it opened the doors of its newly-constructed Battle Projection Center (BPC) at its headquarters in Houston, Texas.

The BPC, developed by the 75th MAC, a Fifth United States Army unit, is an innovative first as an Army training enhancement. There is no other training facility like it in any component of the Total Army.

What is a Battle Projection Center? The BPC is a simulation battlefield training delivery system that employs a fixed site control headquarters that is capable of managing and conducting one or more remote battlefield training exercises at the same time. The BPC uses the technology of microcomputers and telecommunication systems.

The BPC functions as a training exercise delivery system. It works by having exercise control data entered into computers operating in a telecommunications network. This allows exercise controllers at remote sites anywhere in the world to access data at control headquarters.

Extensive Expertise

The timing of the BPC couldn't be better because it coincides with the resurgence of "staff training" in the Army's training plans and enables the 75th MAC to use more effectively its extensive expertise in providing staff training.

The BPC system is capable of meeting a commander's training requirements for command post exercises (CPX) or command/ staff exercises, depending upon the facilities available for the conduct of training. Rather than having to send command and control staff members – as well as the people who portray higher, adjacent, and nonparticipating units – to the exercise location, the BPC allows them to remain in Houston. Only small controller teams have to go out to the units in the exercise.

The BPC entails not only a remote exercise simulation, but it also actually projects whole training. With its teleconferencing capability, the BPC not only interfaces with the simulation, but projects the command relationship of that staff to a higher or subordinate headquarters of the exercised unit.

An important advantage of the BPC is that it reduces travel requirements for the unit receiving training, as well as the travel requirements for the trainer (the 75th MAC and its subordinate 95th Maneuver Training Command).

In addition, with proper scheduling, the BPC greatly increases the 75th MAC's capability to provide exercise support, because multiple, simultaneous exercises using the



BPC controllers at Houston site monitor exercise.

same scenario and the same control staff are possible. This portable equipment will communicate with the BPC system in Houston, provide immediate results from the simulation system and also provide a message capability between the BPC and the remote sites.

The portable computer will also provide the remote site a backup automation system to drive the local simulation staff exercise in the event the BPC control computer fails.

In practice, it works like this. The 75th MAC operates the BPC at its Houston headquarters, conducting one or more command post or battle staff exercises using a specific existing Army or joint service battle simulation. The personnel being trained are able to conduct the exercise at their home station using portable 75th MAC equipment.

For example, the 35th Infantry Division (Mech), Army National Guard, has units in Kansas, Missouri, Nebraska, and Kentucky. Personnel from each unit will par-

ticipate in the exercise at their respective home-station armories. The MAC exercise control staff remains at its headquarters in Houston, except for a few MAC personnel who actually travel to the exercise sites to provide on-site control and observation. The Houston BPC staff is linked to the 35th Infantry Division units by voice, data, and video transmissions over telephone and satellite circuits. These circuits are configured to perform and sound like actual tactical communication circuits.

Houston-based MAC controller teams traveling to remote exercise sites carry portable communications and computer equipment, and a portable satellite communications system.

Many Advantages

There are many advantages to using the BPC to conduct exercises in this manner.

They include:

- Reduced travel costs and travel time for both the exercised units and the 75th MAC.
- An increased capability for the MAC to provide exercise support to the Total Army.
- More realism by centralization of the Tactical Operations Center (TOC)/higher level unit control staff, which allows more uniform representation of higher or adjacent units to the exercise participants and concentration of existing expertise into efficiently organized teams, rather than the traditional one-person reactors on an exercise. This results in more accurate exercises in terms of application of doctrine, use of opposing forces, and battle results.
- The capability of networking with the Total Army: Active, National Guard, and Reserve units — both in the United States and overseas —

to conduct classified corps and CAPSTONE exercises.

The first simulation system the 75th MAC used for a combat exercise is the Army's First Battle-Battalion thru Corps (FB:B-C). This simulation exists in both a manual and a personal computer version. Currently, there are two combat simulation systems.

Brigade/Battalion Simulations (BBS). Its purpose is to train and exercise brigade and/or battalion commanders and their staffs in the conduct of the Airland Battle. The BBS is a fully automated system. The computer will do all the mathematics, keep the books for the unit, and control the movement of the unit across an electronic map, which is portrayed on a computer-enhanced graphics system. The BBS operates like First Battle: BC at the battalion and brigade level, except all of the rules and the map board are inside the computer.

Deep Battle Integration Trainer (DBIT). This is a corps- and division-level simulation based on the Corps Battle Simulation (CBS), which is an enhancement to the Joint Exercise Support System (JESS) operated by the Active Component.

Levels of Play

There may be two levels of play for each simulation. If a division simulation is running, both the division and brigade staffs may be exercised, with the battalion staff acting as a role player to feed information from the simulation to the brigade staff. If a brigade simulation is running, both brigade and battalion staffs may be exercised with company-level role players.

Non-combat simulations are under development and will be available in the near future, such as the Combat

Service Support Training Simulation System (CSSTSS).

This system involves combat service support units in theatre Army area commands and corps support commands, down to battalion level.

One of the most important advantages of the BPC is that it allows simulations to be distributed to "Anytown, USA," or overseas. It puts the training where the need is. Distributed battle simulations and projected exercises are necessary to allow Reserve Component units to accomplish necessary battle staff training in the limited amount of time and with the limited resources that are available. The systems being developed by the BPC will be able to challenge commanders and staffs using realistic, simulation-driven, high battle risk, intensive training exercises — of 36 hours or more duration — conducted on drill weekends, with all participants located at their home station training facilities.

The results will be excellent training for the exercised unit and the exercise controllers because it improves the combat readiness of our Reserve Components.

Major General G. J. (Bud) Wilson Jr. is a 1954 ROTC graduate of Texas A&M University. He received a masters degree in 1957 after two years active service as an Ordnance officer. His military career spans 36 years and includes key assignments in the 75th Maneuver Command, which ended in April 1989 after 4-1/2 years as commanding general. General Wilson remains in the Army Reserve in an inactive status. He is president of an independent oil company in Houston.

By improving communications and teaching map-reading skills to the supply sergeants, a battalion can decentralize its LOGPAC and reduce its logistics vulnerability

Decentralization of the Battalion LOGPAC

by Captain Jerome J. Malczewski

A sound logistical resupply system is just as important to a military organization as the combat effectiveness of its front-line units. Any army, regardless of its fighting ability, is useless if it can't resupply itself. In boxing, the adage is that once a fighter's body goes, his head will soon follow. The same theory applies to war. Once a unit's resupply system goes, its combat forces will soon follow. History abounds with examples of battles lost as a result of logistical shortcomings: the Grand Arme'e in Russia in 1812, the Imperial German Army in France in 1914, and the Afrika Corps in Egypt and Libya in 1942.¹

Of course, the logistical considerations of an entire army are quite different from those of a battalion. However, the effects of a disrupted resupply system are equally catastrophic at either level. The current battalion LOGPAC system contains several potentially dangerous shortcomings, which, if uncorrected, make it vulnerable to such disruptions.

FM 71-1 states that company supply sergeants prepare their LOGPACs under the supervision of the support platoon leader, and then move from the field trains to a logistics release point (LRP) as part of the battalion resupply convoy.² LOGPAC operations like these work well for the canned scenarios

used during ARTEPs and REFORGERS, but only because we do not strictly adhere to our "train as you will fight" philosophy. As a result, we rarely scrutinize battalion resupply operations under realistic combat conditions.

A practical examination of our current doctrine, as well as the capabilities of our adversaries, reveals that at battalion level, company LOGPACs should dispatch from the field trains on an individual basis. Despite the fact that our doctrine states that the support platoon leader should not dispatch company LOGPACs individually because of vulnerabilities to attack, misorientation, and loss of communications, an analysis of the weaknesses of the current system and the solutions afforded by a more decentralized operation make the individual company LOGPAC an effective, realistic alternative.³

This analysis of the company LOGPAC system will focus on three areas. The first area will address the issue of communications difficulties within the company LOGPAC and the solutions afforded by the company's own internal vehicles and equipment. The second area will examine the vulnerabilities created by relying on the support platoon leader to get the battalion LOGPAC to its destination. Additionally, it will discuss the critical need, both in training and in combat, to teach

the supply sergeant to navigate a company resupply convoy. Finally, the article will address the problem of enemy ambushes and the decreased vulnerability to such attacks that will result from the use of a company LOGPAC system.

Strengthening Communications

First of all, a loss of communications will not be a problem if company supply sergeants have radios in their vehicles. Company LOGPACs face a potential communications problem only because the battalion-level LOGPAC system creates a situation in which supply sergeants supposedly do not need radios. This line of thinking is itself unrealistic. If the company first sergeant, as a result of radio failure, can monitor only one net, he will surely stay on the company command frequency.

Only when he needs to request supplies or obtain information will the first sergeant switch to the admin/log frequency. As a result, any time the first sergeant's radios fail (which happens often, even during training exercises), the support platoon leader, having the only radio in the LOGPAC convoy, will have difficulty contacting the line companies. This situation occurs time and again during ARTEPs and REFORGERS. The solution, there-

fore, is to provide each supply sergeant with a radio.

The assertion that the company does not have any radios available for the supply sergeant is, quite simply, false. The supply sergeant can use the first sergeant's HMMWV for LOGPAC operations. The HMMWV not only provides the supply sergeant with communications capability, but it also increases his ability to transport supplies, men, and equipment. Although some first sergeants may not readily leave their HMMWVs for the maintenance team's M113 during training exercises, we cannot selectively adhere to the "train as you will fight" philosophy.

The supply sergeant, operating from a HMMWV, will have no problem contacting either the first sergeant, executive officer, or support platoon leader. Giving supply sergeants radios, therefore, eliminates the need for the support platoon leader to maintain contact with each unit. As a result, company LOGPACs do not become vulnerable to losses of communication, but rather have a greater ability to maintain contact with unit first sergeants than does a battalion LOGPAC operation.

Improving Navigation Skills

Another contention of our doctrine, that company LOGPACs are likely to become lost, is nothing more than a commentary on our reluctance to teach our supply sergeants map-reading skills. In a battalion LOGPAC, the support platoon leader usually has the only map in the convoy and is solely responsible for getting the entire column to the LRP. If the support platoon leader dies in an ambush, or takes a wrong turn on the main

supply route (MSR), the entire convoy effectively loses its ability to get to the LRP. By depending exclusively on the navigational skills of the support platoon leader, we not only make the entire convoy vulnerable to becoming lost, but we also fail to develop and use the map-reading skills of our supply sergeants.

As professionals, we should have the ability to teach our supply sergeants how to get from the battalion field trains to the company combat trains. The fact that most of the LOGPAC's movement occurs on well-marked roads and highways makes navigation that much easier. If the supply sergeant can get the convoy to the company trains unescorted, several potential problems will no longer exist. For instance, if the first sergeant cannot leave the battle to link up with a battalion resupply convoy, then the supply sergeant has no way of getting the company's LOGPAC to the proper location. A supply sergeant who can read a map will not have this problem.

Similarly, it is not uncommon for a company LOGPAC to miss the link-up at the LRP for the return trip to the field trains. Numerous unforeseen and unavoidable problems arise during LOGPAC operations that prevent the supply sergeant from getting back to the LRP on time. If supply sergeants can navigate by themselves, then the support platoon leader does not have to escort them back and forth between the field trains and the LRP. This, in turn, allows the support platoon leader to concentrate on issues more pressing to the battalion.

Granted, teaching the supply sergeant how to read a map will add to the already numerous responsibilities of the first sergeant and executive officer. However, the many

advantages that result from the supply sergeant's ability to navigate the company LOGPAC unescorted are well worth the effort.

Reducing the Ambush Threat

Finally, a company LOGPAC, because of its smaller size, is less vulnerable to an enemy ambush. Although this idea sounds contradictory at first, a second look at the company LOGPAC system and the enemy's ability to interdict our convoys reveals that this is a sound concept.

For example, picture a task force that has conducted a movement to contact and, after heavy fighting, begins consolidation and reorganization operations on the objective. Because the task force has traveled a great distance and defeated the advance guard of a motorized rifle regiment, it is critically low on fuel and ammunition. For the first time during the battle, the task force is not in heavy contact with the enemy. The task force XO takes advantage of this lull in the fighting to conduct a LOGPAC operation.

The commander of the enemy regiment, anticipating our urgent need to resupply the task force, plans for an air interdiction against our supply column. An enemy reconnaissance patrol, bypassed during the movement to contact and not yet eliminated by follow-on forces, spots the LOGPAC convoy and reports its location. As the convoy travels along the MSR, two enemy helicopters ambush the column and destroy or damage the majority of the task force support platoon. Not only have the logistical assets of the task force become seriously impaired, but the line companies, already low on fuel and ammunition, do not receive the supplies neces-

sary to withstand the expected enemy counterattack.

Although this is certainly a worst-case scenario, the events are not as unlikely as they may seem. Indeed, if we give the enemy credit for any skill and intelligence at all, this scenario becomes not only possible, but likely. If we can predict the enemy's actions based on a study of his doctrine, then he can surely predict and plan for our actions based on our doctrine. The solution to this potential disaster, therefore, is to avoid battalion-size LOGPACs.

Company convoys can travel over different routes to their LOGPAC sites, depriving the enemy of a major target of opportunity. The enemy will not risk his air assets to destroy five or six supply vehicles, and an enemy patrol operating in our rear area cannot ambush several company convoys traveling over different routes.

Furthermore, a company LOGPAC system would allow the support platoon leader to dispatch individual company convoys at the request of the subordinate units. Only during canned exercises like REFORGER, when all fighting stops at 1800, is an entire battalion capable of conducting LOGPAC operations at the same time. Realistically, during actual combat, continued fighting with enemy forces may prevent a portion of the battalion from receiving fuel and ammunition. Individual company LOGPACs would give the battalion the flexibility to resupply those units not in contact, while keeping the LOGPACs of the other companies on standby alert in the relative safety of the field trains.

Conclusion

A thorough, realistic examination of both our doctrine and the

enemy's ability to plan for and react to that doctrine reveals several weaknesses in the current battalion LOGPAC system. Although FM 71-1 states that company LOGPACs are vulnerable to attack, misorientation, and loss of communication, a sensible look at likely combat conditions in future battles disproves these assertions.

By using the first sergeant's HMMWV, the supply sergeant not only acquires the ability to communicate with the company, but the unit also increases the capacity of its supply vehicles to transport men and equipment. Similarly, teaching our supply sergeants the skills necessary to navigate unescorted from the field trains to the company trains provides the battalion with the flexibility to dispatch individual LOGPACs along different routes at different times. A company-level convoy system, in turn, not only allows the line units to request their LOGPACs at different times based on need and opportunity, but it deprives the enemy of a lucrative ambush target, such as a battalion resupply convoy.

Granted, a resupply system in which the support platoon leader releases company LOGPACs individually will encounter considerable skepticism at first. Our fondness for command and control does not allow us to readily accept the idea of a company resupply convoy traveling unescorted toward the main battle area. The realities of future combat, however, make this decentralized system a necessity.

A company LOGPAC system will free both the support platoon leader and the unit first sergeants from the time-consuming responsibility of escorting convoys to and from LRPs. Additionally, it uses the skills of the company supply ser-

geant and provides both the battalion and the line units with the flexibility to dispatch individual LOGPACs, based on need and opportunity.

Of course, the centralized battalion LOGPAC remains an option when units occupy assembly areas or attack positions in preparation for upcoming battles. The individual company LOGPAC, however, is a much more realistic option when bullets are actually flying. This decentralized system will require a greater training effort on the part of the company executive officer, first sergeant, and supply sergeant, but if we are to adhere to the "train as you will fight" philosophy, this increased effort is vital to our success on future battlefields.

Endnotes

¹Martin Van Creveld, Supplying War (London: Cambridge University Press, 1977), pp. 1-3.

²Department of the Army, Tank and Mechanized Infantry Company Team. Field Manual 71-1 (Washington, D.C.: U.S. Government Printing, 1988), p. 7-5.

³ibid.

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The Soldier Performance Research Project: A Valuable Training Exercise

by Captain Mark D. Troutman

In the early morning twilight, SSG Jones hurried to finish the final inspection of his crew. "Boresight? It's not the best," he thought. He hadn't done a 500-meter boresight in a long time and wasn't sure everything was right. "Oh well," he thought, "it'll have to do." Fuel? Ammo? Yes, he was sure these were right; he had just checked. Now it was time to go.

The support area NCOIC quickly inspected and found the caliber .50 machine gun headspace and timing were incorrect. The NCOIC told Jones to set it again. "Forgot that," he thought. "Good thing he caught me. That could have been fatal in an ambush." SSG Jones reset the headspace and timing on his machine gun, made radio contact with his unit, then departed along the brigade main supply route.

Everything had happened so quickly! He had received orders to the 52d Armored Division when the war first started two days ago. He had just met his crew that morning at the brigade support area. The driver was from his battalion, but they hardly knew each other. The gunner and loader were from different units entirely. As they rumbled toward their release point, SSG Jones talked to his soldiers and ran them through a few quick crew drills. Were they really ready? Yes, he concluded, as ready as the circumstances would permit.

Suddenly, the loader yelled, "TWO TANKS — NINE O'CLOCK — BASE OF THE RIDGE!!" Jones located the targets, grabbed the override, and traversed the turret to the left. So the big test had finally



A TANK CREW FUELS AT THE BSA AS PART OF THE PERFORMANCE RESEARCH PROJECT.

come. "GUNNER — SABOT — TWO TANKS — RIGHT TANK..."

Background

The scenario above is a brief description of the conditions, events, and atmosphere surrounding a Test and Experimentation Command (TEXCOM) Armor and Engineer Board exercise conducted at Fort Knox, Kentucky, during March and April of 1989. Two hundred forty of the Army's MOS 19K soldiers participated in this short-notice combat deployment exercise as part of an Army research project known as the Soldier Performance Research Project (SPRP).

In the spring of 1988, the House Appropriations Committee (HAC) tasked the Armed Services to investigate the impact of recruit quality on military readiness. In response, the U.S. Army Training and Doctrine Command (TRADOC) commissioned the SPRP, tasking Army branch chiefs to test the relationship between soldier mental category and performance of combat critical tasks. Major General Tait, then the Chief of Armor, directed an Armor force study, which consisted of field, simulation networking (SIMNET), and unit conduct-of-fire trainer (U-COFT) portions. This article focuses on the field exercise portion in an effort to relate how commanders can tailor

the exercise to construct an affordable, challenging training event for their soldiers.

Design

The field portion of SPRP was a single-tank, tactical exercise constructed around the Tank Tactical Tables in Chapter 12, FM 17-12-1. The test officer modified eight individual events according to the mission, enemy, terrain, troops, and time available (METT-T). He then adapted them to fit into a deployment scenario to construct the final test.

The deployment scenario involved alerting soldiers from their CONUS-based units and deploying them to a "combat zone" as individual replacements for a division in contact. The combat zone was a maneuver area on the Fort Knox range complex. Set up within the maneuver area was a 15-kilometer maneuver course that each crew negotiated alone, beginning at one-hour intervals. The conditions of each event encountered along the maneuver course placed the soldiers in high stress, decision-making situations. Hidden evaluators observed and collected data, which described soldiers' reactions to these situations. The soldiers' reactions were compared against the standards described in appropriate field and technical manuals to provide the analysis to answer the HAC tasking.

Deployment

The scenario began as a Fort Knox liaison NCO alerted and deployed soldiers from their home units to Fort Knox via commercial aircraft. The liaison NCO purposely kept the situation vague. The soldiers merely received a packing list and notice that they would participate as individual replacements for a tactical field exercise. A second liaison NCO met the soldiers in Louisville, Kentucky, and transported them directly to a field personnel replacement facility on the Fort Knox range complex. At this facility, the soldiers received a short briefing on the tactical situation and slept the night. The following day, the field test began as the replacement facility NCOIC sent the soldiers, in tank commander (TC) and driver combinations, by truck to a brigade support area a few kilometers down the road.

The Test

Event 1 – Brigade Support Area (BSA). The first station represented, as nearly as possible, a BSA deep within a combat zone. The BSA included organizational and limited direct support maintenance and supply assets, protected by concertina wire and armed guards. At the BSA, the TC received an M1 tank from depot battle repair stocks and his additional crewmembers. Unknown to the TC and his driver, the gunner and loader were test "confederates" trained to assist in executing the test. The support area NCOIC gave the TC a verbal operations order (OPORD) which described a grave situation on the forward line of own troops (FLOT). The brigade had successfully defended against an enemy attack the previous evening, but was badly in need of replacement tanks and crews. The BSA NCOIC was to send individual crews forward to the units as he formed them. Some



CREW MOVES ON AFTER DEALING WITH TWO T-72 VISMOS.

enemy units and reconnaissance patrols had managed to penetrate the FLOT during the attack. These stragglers (vehicles and personnel) were loose in the brigade rear, making enemy contact on the way to the unit likely. The air threat was high. The support area NCOIC briefed the TC to prepare his crew then depart along the brigade main supply route (MSR; also the course road) within two hours of the briefing. During the briefing, the NCOIC identified breached obstacles along the route that might slow the crew's movement. The support area NCOIC made a final inspection of each crew before its departure from the BSA and recorded his findings as test data. After the inspection, the crew departed along the MSR to reach its unit.

Event 2 – Surprise Engagement with Disabled T-72 and T-72 in Overwatch. The crew traveled along the brigade MSR approximately five kilometers without event. At a preset point along the route, the loader gave a crew alert of "TWO TANKS – NINE O'CLOCK." The TC saw two Threat visual modification (VISMOD) tanks at approximately 1,600 meters, one disabled and one in overwatch with its main gun pointed in the direction of his tank. The situation required the TC to identify and engage the most dangerous target first, and destroy both tanks while moving. As the

final requirement of the event, the TC radioed a spot report detailing contact with the enemy vehicles to his company net control station (NCS – the test control post).

Event 3 – Antitank Guided Missile (ATGM) Ambush in a Minefield. Along the route, the tank crew encountered a cleared lane through a FASCAM (family of scatterable mines) minefield identified in the OPORD. Midway through the lane, a BMP fired an ATGM at the tank from a partially concealed position at 1,500 meters. The event required the crew to negotiate the minefield and destroy the BMP simultaneously, then send a spot report to the company NCS.

Event 4 – Meeting Engagement with Enemy Stragglers (Loader Killed). Farther down the MSR, three enemy soldiers ambushed the test tank with automatic rifle and RPG-7 fire at approximately 50 meters. As the TC directed machine gun fire on the enemy soldiers, the hostile troops hit and killed the loader. The loader simulated death by squirting arterial blood from a tube and blood bag hidden on his body. The crew then had to remove the loader's body from the turret, stow it in the vehicle bustle rack, and reconfigure as a three-man crew. After sending casualty and spot reports to the NCS, the crew continued its mission.

Event 5 – Military Police (MP) Traffic Control Point (TCP). Shortly following the ambush, the tank approached a road intersection. An MP appeared from a hidden location when the tank came within 50 meters of his TCP. Once the crew recognized the MP as friendly and held fire, the MP challenged the TC and waited for a password. The MP asked the TC to show his location on the map and to identify the unit he was joining. The MP took the loader's body from the TC, then sent the crew down the MSR toward its unit.

Event 6 – Meeting Engagement with T-72 and BMP at 400 meters as a Three-Man Crew. As the test tank turned a bend on the course road, the TC saw a T-72 and BMP blocking his route of march. During the ensuing engagement, the T-72 gave no indication of being hit by the first round fired from the test tank. The TC had to recognize that he had missed the T-72, re-engage it, then destroy the BMP. As with each of the engagements, the TC sent a spot report to his company NCS.

Event 7 – Automatic Weapons Ambush (TC and Gunner Killed). At 100 meters, an enemy infantry squad ambushed the tank with automatic weapons and RPG-7 fire. The gunner (a test surrogate) pulled the TC's intercom cord and showed the TC a card which indicated that they both were dead. The driver had to move the tank out of the kill zone, determine crew status, and submit spot and casualty reports. If he requested instructions, the NCS instructed him to proceed to the release point and join his unit.

Event 8 – End of Course. As the driver neared the release point, he reached a range barrier. The test controller at the barrier issued the challenge, then asked the driver to

show his location on a map. The controller also asked the driver to identify the details of his mission. The test controller then told the crew that the exercise was over and conducted an after-action review of the test with the crewmembers.

Training Resources

One might suspect this exercise required special equipment and simulators; however, only standard Army items were used to create the realistic combat simulations. The opposing forces (OPFOR) crews received a 20-pound CO² fire extinguisher, white HC smoke grenades, and a trash can one-third full of sand, which they mounted on their VISMOD's rear deck. Both OPFOR and test tanks used Hoffman devices to simulate main gun fire. When the OPFOR crew saw the test tank's main gun signature, the OPFOR TC waited one second and "destroyed" his vehicle. To simulate a main gun hit, the crew blew the fire extinguisher for five seconds and set off a smoke grenade in the trash can. The CO² extinguisher alone provides an impressive hit signature and is a sufficient and inexpensive simulator. The test officer added the white smoke grenades to simulate a burning vehicle. The combination produced an excellent simulation of burning diesel fuel and ammunition.

Before each test run, the loader fitted himself with an arterial wound simulator filled with fake blood. Medical units routinely use these items during triage exercises. The sudden sensation of a crewmember spurting blood was enough to startle most crews and drive realistic casualty play. Most soldiers stated that this simulation provided them excellent casualty training, which they normally did not receive in their units.

Figure 1 displays the support resources necessary to run the

SPRP test. The figures represent 200 iterations of the exercise over a six-week period. The first two weeks involved training for the support soldiers and required 80 test runs. The four weeks that followed included 20 test days and 120 runs. These same four weeks included ten days of range downtime, because soldiers were not continuously available from CONUS divisions. Each crew required approximately six hours to complete the field test, which represents a maximum daily test rate of 12 crews. The test officer typically tested between six and nine crews daily, depending on the availability of crews from CONUS units. A battalion with 58 tank crews would require less than half the maneuver area time to construct, rehearse, and have all crews complete a similar exercise.

Evaluation

The test evaluated soldiers on a range of appropriate doctrinal responses to each of the test events. The test officer constructed checklists including a series of yes/no items evaluating required tasks drawn from soldier, technical, and field manuals. The checklists also surveyed the time crews required to complete major tasks along the course, such as destroying targets and reporting. Hidden evaluators placed along the route observed the crews' tactical reactions. Evaluators in the test operations center received and recorded the crews' reports. These individuals also monitored intercom traffic through the use of PRC-77 radios wired into the vehicle AM 1780 amplifier transmitting over an intercom net. The test confederates also had input to the data collection process through information collected during the after-action review.

Constructing the Exercise in the Unit. Commanders wishing to conduct this training in their units

might consider modifying certain aspects of the exercise. The SPRP was a test of the TC and driver only. The gunner and loader were test support soldiers trained to give certain cues and to react in certain ways throughout the test. This concept allowed the test designers to create special, highly-realistic situations without using administrative personnel or referees on the tank. Without obvious administrative personnel, soldiers received no hints about what would happen next. The surprise of unexpected events created stressful decision-making situations for test soldiers. Events remained a surprise through an adequate plan of security.

The test officer maintained security by keeping briefings vague until the last minute and by introducing the confederates as test soldiers from a different unit. Commanders would have to alter the exercise scenario to fit their unit's deployment plan.

OPFOR simulations might be challenging for units to duplicate. OPFOR VISMOS M551 vehicles simulated Threat T-72s and BMPs. The dismounted aggressors were soldiers in OPFOR uniforms. While uniforms are available through the installation Training Support Center, VISMOS are available at only a few posts. Trainers might consider using locally fabricated plywood silhouettes on M113s as substitute VISMOS. Multiple integrated laser engagement system (MILES) equipment would significantly improve the training value of this exercise. The SPRP test did not include MILES equipment because test validity dictated killing the test crew in the same manner every time. MILES and greater tactical freeplay would increase the realism and training value of this exercise.

Finally, commanders might consider applying the techniques and

scenarios described in this single-tank tactical exercise to a section or platoon exercise. The training value of this exercise would greatly increase if conducted for a larger-sized unit.

Conclusions

The SPRP field test had several strong points worthy of consideration. The test officer purposely briefed test soldiers on a general tactical situation, but not on specifics of what they would actually see during the test. Most test soldiers were completely surprised by the test engagements. Consequently, the test produced fear, excitement, and uncertainty similar to what soldiers would experience if they deployed in a combat situation. The exercise was particularly demanding of the TC's expertise and initiative. Throughout the test, the exercise evaluators were hidden; therefore soldiers were free from the feeling of a chain of command or having evaluators hovering over them with clipboards and checklists. Finally, the total cost of this exercise was relatively low. Most battalions and squadrons have in their inventories the resources to conduct this exercise. Unit training funds are sufficient to cover fuel, maintenance, and ammunition costs. Properly modified, units could conduct an exercise of this sort in a smaller local training area if installation major training areas or maneuver rights are limited.

The findings of the SPRP study clearly support Armor's demand for high-quality soldiers, both tank crewmembers and cavalry scouts. The test itself was a challenging exercise that taught soldiers lasting lessons about the importance of combat readiness. After a carefully-con-

Resources for 200 Iterations of the SPRP Field Test

Equipment

Tank, M1:	9 each
OPFOR VISMOS:	3 each T-72, 2 each BMP
Support Vehicles:	1 each recovery M88A1
	1 each fuel HEMMT
	2 each cargo trucks, 2 1/2-ton
	4 each light wheeled vehicle (HMMWV or CUCV)

Ammunition and Fuel

Diesel:	12,000 gallons
Smoke grenades, white:	700 each
Hoffman charges:	2,000 each
Blank M2 cartridge:	12,000 rounds
7.82-mm blank:	30,000 rounds
5.56-mm blank:	4,000 rounds

Personnel

Evaluators:	17 NCOs (SGT or SSG)
Support:	29 soldiers
OPFOR:	19 soldiers

Miscellaneous

Fire extinguishers, 20-lb canister CO₂, 20 each arterial wound simulators and blood bags (obtained from Installation Training Support Center), 10 each simulated blood, NSN 6910-00-729-6161, 50 gallons

Figure 1

structed basic skills training program, this sort of exercise would serve as an excellent unit capstone test or battalion tank commander certification exercise. The test is well worth the preparatory work and would make a lasting contribution toward the combat readiness of any unit.

Captain Mark D. Troutman is a 1983 graduate of the United States Military Academy. He is presently serving as commander of D Troop, 2-10 Cavalry, 194th Separate Armored Brigade at Fort Knox, Kentucky. His previous assignments include service as an armored cavalry platoon leader, regimental liaison officer, and troop executive officer with the 2d Armored Cavalry Regiment. He served as a battalion S1 and then as a test officer with the TEXCOM Armor and Engineer Board at Fort Knox, before assuming command of D Troop.

Soldiers Eliminated From ANCOC Encouraged To Try Again

Soldiers who have been eliminated from the Advanced Noncommissioned Officers Course (ANCOC) for academic reasons are encouraged to try again to get this crucial training.

AR 351-1, Individual Military Education and Training, states that a student eliminated from ANCOC for academic reasons may reenter the course when the unit commander and the school commandant determine the soldier is now prepared to successfully complete the course.

All that is required is the submission of a DA Form 4187, Request for Personnel Action, with these enclosures: a copy of DA Form 1059, Academic Report, and a letter from the unit commander stating the soldier needs this training for advancement and now has the proper motivation to complete the course.

Submit applications through proper channels to the commandant of the NCO Academy at the soldier's proponent service school.

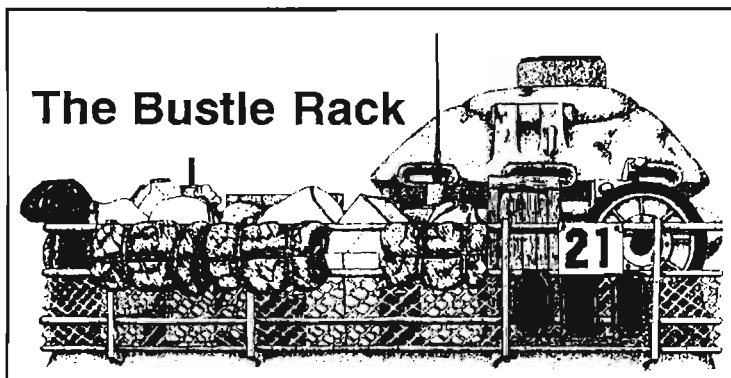
Skill Identifier Added For M3-Qualified Soldiers

The Army-wide modernization of the cavalry force with the M3 Cavalry Fighting Vehicle has required the use of an Additional Skill Identifier (ASI) to track those soldiers trained on the M3. D3 has been designated as the ASI for M3-trained cavalymen.

After soldiers complete Supervised On-the-Job Training (SOJT) with the new equipment training package, battalion or squadron commanders must certify training by initiating DA Form 87, Certificate of Training.

Units must then prepare DA Form 4187, Request for Personnel Action, requesting award of ASI D3, using the DA Form 87 as substantiating documentation.

To get new equipment training packages, units must submit a written request to Commander, M1/M3 New Equipment Training Team, DPTM/G-3, Fort Knox, Ky. 40121.



M60 Master Gunners Urged to Make M1 Transition

All master gunners qualified in the M-60 series are encouraged to transition to the Abrams-series tanks. This action will help current M-60-series master gunners update their skills and assist their unit with force modernization transitioning.

The M1/M1A1 Master Gunner Transition Course is a 30-day resident course taught at Fort Knox, Ky.

Forward all applications through routine training channels. For more information about the course, interested soldiers should see their installation master gunner.

Senior Combat Arms NCOs Sought as ROTC Instructors

Senior combat arms noncommissioned officers are needed to fill Reserve Officer Training Corps (ROTC) instructor positions in all four of the ROTC regions.

Applicants should have served successfully as drill sergeants, platoon sergeants, or first sergeants. Although the Cadet Command would prefer instructors who are graduates of the U.S. Army Sergeant Majors Academy, this qualification is not mandatory.

All NCOs assigned to ROTC must meet the Army's physical fitness and weight standards.

Interested combat arms NCOs should contact their respective career managers at the U.S. Army Total Personnel Command to initiate the application process.

Reunions

The 3rd Squadron, 4th Cavalry will hold a reunion June 29 and 30 at Fort Knox, Ky. For information, write 3/4 Cav Reunion, Box 1165, New Garden Station, Fort Knox, Ky. 40121, or call John Hollern at (502) 351-9777.

The 11th Armored Cavalry's Veterans of Vietnam and Cambodia will hold their fifth reunion August 3-5 at Sacramento, Calif. For information, contact Ron Kreuger, 1819 Raintree Place, Davis, Calif. 95616 (916-758-0351).

The 11th Armored Division Association meets August 15-18 at Portland, Ore. Further information is available from Alfred Pfeiffer, 2328 Admiral St., Aliquippa, Pa. 15001.

The 4th Armored Division Association meets August 30-September 2 at the Omni Hotel, Charleston, S.C. Further information on the reunion is available from Samuel A. Schenker, 1823 Shady Drive, Farrell, Pa. 16120.

The 704th Tank Destroyer Battalion will hold a reunion at Gettysburg, Pa., from September 13-16. Information is available from Rodney Torbich, 166 Linmar, Allquippa, Pa. 15001, or Walter Righton, 29 West Wilkins Lane, Plainfield, Ill., 60544.

Alumni Association

The Army ROTC Department at the University of Cincinnati is establishing an alumni association to support the present corps of cadets through affiliation with previous members. Alumni are invited to send name, address, and phone number to Captain Daniel T. Graff or Cadet Captain Terrence Brandt, Army ROTC, ML-44, University of Cincinnati, Cincinnati, Ohio 45221-0044.

Memoirs of a Horse Cavalryman

The Twilight of the U.S. Cavalry: Life in the Old Army, 1917-1942, by General Lucian K. Truscott, Jr., University Press of Kansas, Lawrence, Ks. 190 pages.

This brief book starts with the old words to "Stable Call" and ends with "Fiddler's Green." And in between, the author, a distinguished cavalryman, recounts the good old days of the horse cavalry. This is a nostalgic look back to the quiet years between the wars when the pace was considerably slower.

They weren't all good days; the Army suffered from political shortsightedness that led to inadequate funding. Staffs were small. Units were often at half strength. Training was haphazard and limited. Quarters were scarce. Transfers were infrequent, and promotions very slow. The Army's school system didn't yet exist. New equipment was slow in coming and new tactical concepts slow to gain acceptance.

There was a great deal of time available for riding. Training recruits, cross-country races, social rides, riding and jumping shows — riding was the heart of the Cavalry, and cavalrymen spent nearly half their time at it. But new ideas were aborning. Mechanization was coming like a juggernaut. Some old cavalrymen tried to stave it off, but progress would not be deterred. Farsighted leaders like Chaffee and Patton recognized the great advantages of mechanized and armored elements performing cavalry missions, and more. Then World War II began, and "the good old days" were gone forever. General Truscott believed that the responsibility of caring for a horse gave each cavalryman a maturity and a sense of pride that other soldiers didn't have, and that this was the source of Cavalry's great elan and spirit. He wrote: "There are all too few who knew the warmth of cavalry life. And our young men today can never know it."

But they do! Troopers today carry not only the standards of the old regiments,

but they also carry on the history, traditions, and esprit of the cavalrymen that served before them. And General Truscott's nostalgic reminiscences are an excellent and entertaining source for an important part of that history.

John R. Byers
COL, USA Ret.

(Formerly of the 2d, 3d, 5th, 7th, and 14th Cavalry Regiments)

The American Experience in Vietnam, edited by Grace Sevy, University of Oklahoma Press, Norman, Oklahoma, 1989. \$24.95

This book, as the editor points out in the introduction, is designed as supplemental reading for a college-level course on the American experience in Vietnam. This course is based upon three other books, one of which is a diplomatic history of U.S. involvement in Vietnam, another is an oral history about the experiences of Americans who served in Vietnam, and the last is a cultural analysis of the war's effect upon American conscience and consciousness. She lists several by title in each category.

Assuming that one has read or is reading these other books, this book can then be used as a supplement to provoke some serious discussion of various facets of the period. The book is organized into five sections, and each section has several articles, some by well known figures such as Martin Luther King, Cecil Curry, and Gabriel and Savage, as well as articles by lesser-known people.

Part One provides background analyses to accompany the reading of a comprehensive diplomatic history of U.S. involvement in Vietnam.

The selections in Part Two provide an analytical context to complement the first-person narratives portrayed in an oral history covering the experiences of Americans who served in Vietnam.

A stubborn controversy left over from the war still provokes angry debate. That controversy is examined in Part Three. Did the press prejudice the attitudes of the American people and thereby exert undue influence on the outcome of the war?

In Part Four, "The Antiwar Movement: Why Was There So Much Opposition?," excerpts and articles offer a view of the war from the perspective of Americans who opposed it and resisted it in one way or another. It is designed to give the reader a lively sense of who these people were, where they came from, why they could not go along with the war, and what they did about it. This section is much longer than Part Two, because there is no comprehensive oral history on the antiwar movement to accompany this reader.

In the last section, Part Five, "The Continuing Controversy: Coming To Terms with a Confusing War," the reading selections complement the reading of Walter Capps' "The Unfinished War," which offers insight into the deep and enduring effects of the Vietnam experience on American culture, conscience, and consciousness.

The Capps book also provides a good, brief review of American history in Vietnam.

In "American Guilt," Richard Falk answers questions on a range of issues. He makes a clear distinction between guilt and responsibility, guilt being the failure to exercise responsibility, and suggests constructive ways of coming to terms with the moral pain experienced by those who feel corrupted by the war.

"Is American Guilt Justified?" is a sharp debate between scholars about a moral issue posed by the war. On the one side, a revisionist argues that immoral conduct must involve immoral intentions, regardless of the consequences. On the other side, opponents of the war argue that support for an immoral regime is immoral.

For them, the morality issue does not have to do with American good intentions, but with whether or not we had a right to be in Vietnam in the first place.

"What Are the Consequences of Vietnam?" is another political discussion between thoughtful people with opposing viewpoints, arguing on different levels, using different values to interpret the same evidence. Those on the right want to come to grips with a military question. How does America effectively use her power abroad? Those on the left want to deal with a moral question. What should American foreign policy goals be? What objectives justify what costs?

This book, then, is little more than a collection of articles that have already been published and which provide additional insight or opposite opinions to those expressed in books on the subject. It does not by itself form a good book on the Vietnam War. For military personnel, it provides little useful information and can only serve as additional reading on the war. For military personnel, the cost of the book would be better spent on one of the three books that this is designed to supplement. For a college professor preparing a course on the history of American involvement in Vietnam, it is a book that should be considered.

For the average person with a limited knowledge of the war, it should be avoided in favor of some other book on the Vietnam experience.

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Soviet Military Doctrine, Continuity, Formulation, and Dissemination. By Harriet Fast Scott and William F. Scott. Boulder, Colo.: Westview Press, 1988.

Harriet Fast and William F. Scott rank among the preeminent experts in the field of Soviet military policy. Their previous works (The Armed Forces of the USSR, The Soviet Art of War) are thoroughly researched, scholarly efforts to explain the organization of the Soviet military and the role of military doctrine in Soviet society. Soviet Military Doctrine builds upon these earlier books and brings their analysis up to date.

The book is divided into two parts, which address, in turn, continuity and change in Soviet military doctrine and the formulation and dissemination of doctrine.

The first section traces the development of military doctrine from the time of the revolution in 1917 to the present. Throughout this period, the authors see more continuity than change in Soviet military doctrine, especially the emphasis on the offensive and, since 1960, nuclear war. The authors also remind readers of the important differences between Soviet and Western concepts of military doctrine. For the Soviets, doctrine has both military-technical and political aspects, whereas we in the West tend to think of doctrine solely in terms of its military dimension. This is an important distinction to keep in mind today as the NATO and Warsaw Pact Alliances evolve into more political structures in the wake of Europe's "democratic revolutions."

In the second part of the book, the Scotts set out the institutional framework for doctrinal development in the USSR. The Communist Party of the Soviet Union has the leading role in all aspects of society, and this is no less true with regard to the nation's defenses. Military doctrine is created or modified based on careful analyses of military, political, economic, and social trends within the country and the world at large. Changes are approved only at the highest levels of Soviet government, which makes Soviet military doctrine official state policy.

Once doctrine has been developed and approved, it is disseminated through a variety of official channels, which include newspapers, magazines, journals, and television programs. In addition, a sprawling network of military schools and academies provide instruction to military men and women. The intended cumulative effect of all these efforts is to produce a homogenous and corporate world view among the members of the armed forces and, because all men are subject to conscription, society as a whole.

The authors remain circumspect about the prospects for true change in Soviet military doctrine. They discount recent Soviet calls for "defensive sufficiency" as largely cosmetic changes designed to mislead Western readers. These observations were made prior to the upheavals of 1989, but the Scotts seem intent on offering a cautionary note on what passes for change to the long tradition of Soviet military doctrine and the ultimate goals of Marxism-Leninism whatever the prevailing atmosphere in East-West relations.

Change in Eastern Europe and the Soviet Union cannot help but affect the future of Soviet military doctrine. What, for example, will the opening of the political

system to competing parties mean for the leading role of the Communist Party in doctrinal development? For 35 years the Warsaw Pact has been the shield of socialism in Eastern Europe. How will the Soviet ship of state "stand guard over peace and socialism" as the unwilling passengers scramble to abandon ship? The answers to these and other questions are not yet apparent. Nonetheless, this work provides a solid foundation upon which to build greater understanding of Soviet military thinking, whether or not one agrees with the conclusions presented by the authors.

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Roosevelt and Hitler, Prelude to War by Robert E. Herzstein, Paragon House, New York, 1989, 471 pages, \$24.95

Few works can portray a slice of history and, at the same time, shed light on modern day political processes that are necessary to conduct the business of a nation. Robert Herzstein's book, Roosevelt and Hitler, Prelude To War, gives a clear insight into the political maneuvering, both on the domestic and international level, that heads of state have to do to try to shape public opinion, create coherent policy and their use of statecraft in the international arena to achieve national or personal goals. The author weaves through many variegated events of the 1930s, leading up to World War II, when the U.S. was in the throes of a gripping depression, and Hitler, riding the rising tide of fascism, was coming to power. He tries to explain how two extreme personalities come to view each other, and what they did in order to achieve success. The book tries to give coherence to the vagaries of the American public at that time. In this era before the war, Herzstein gives a flavor to the many political undercurrents that were beginning to shape the American conscience: the strong isolationism movement, anti-semitism, the hysterics of anticommunism, and the depravity of the depression.

As Hitler gains and consolidates power, we begin to see his view of America, his hatred of Wilson for selling out the German people in World War I, the prominent advisors who give him counsel on American politics, and the policies that different Nazi ministries try to implement to change American public opinion at different levels. These are fascinating schemes that had potential to change the

course of history. The Bund organization, which was designed to develop and cultivate ties between German-Americans and their homeland, could have had political clout. Another ploy from the propaganda ministry was to invite prominent Americans to Germany to see the greatness of fascism and to act as a counterweight to the negative press that the American media were giving Hitler's speeches and news of the Jewish population in labor camps. Charles Lindbergh was a perfect example of an American victimized by this propaganda (although much maligned for his view, he did receive the Distinguished Service Medal for helping the intelligence effort). The most potentially dangerous attempt to subvert the American public was by trying to build political fringe organizations that espoused a mixture of patriotism, isolationism, and anti-semitism. Some of these organizations swelled as the depression whipped through middle-class America.

Mr. Herzstein shows how FDR deviously manipulated the media, the political process, and even friends, to undermine and thwart these subversive efforts. At the same time, he was very active behind the scenes, doing some quiet but intensive

diplomatic maneuvering, trying to contain Hitler in Europe. This part of the reading was fascinating; the author contends that FDR was directly responsible for France and England going to war over Poland, even though the United States could offer no assistance to its allies.

The last part of the book is very interesting in the calculations and perceptions that led up to the United States going to war. After Poland, Hitler becomes more personally involved in policy toward the United States and its President. Hitler's window of opportunity to change the map of Europe under Nazi tutelage could still be reached, but he needed to keep America neutral in case the war became protracted. The book reveals his strategy for avoiding confrontation with the United States and the extraordinary measures he used to do this.

As the Japanese threat loomed closer, Herzstein depicts how FDR's greatest fear was a war with Japan, in which Germany abstained. FDR perceived the greatest threat to civilization as Nazi Germany, not Japan. As FDR tried to win his third election, he was trying to get the United States to find a way around the Neutrality Acts, and at the same time, Hitler was

doing everything possible to insure the law would be enforced. Finally, we see the path Hitler takes in a gross miscalculation that allowed Japan to go to war with the United States and his own decision to declare war against the only nation he knew could bring about his downfall.

Prelude To War is well worth reading for students of military history because it covers the broad political spectrum that eventually leads to war. For the complexity and diversity of the subject, the book is very well researched, documented, and is written in a lively style. It does tend to ramble and is not as organized as it could have been. Sometimes it's frustrating to us in the military that a particular international situation requires military action, yet the situation seems to languish while political leaders seem incapable of decisions. This book helps us to understand the civilian leadership processes and gives a better, broader insight into the creation of policy and the use of the military option.

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Celebration at Fort Knox to Mark 50th Anniversary of Armor Force

Fort Knox will mark the 50th Anniversary of the Armored Force with a day-long celebration, including a firepower demonstration, parade, living history reenactment, and a band concert.

Much of the activity will be centered around the area that includes the Patton Museum of Cavalry and Armor, the NCO Club, and adjacent Keyes Park, where there will be food, beverages, and retail concessions. A static display of current and past armored vehicles opens at the NCO Club parking lot at 1000, followed by a living history demonstration at 1130.

At 1300, buses will pick up spectators for a trip to the St. Vith Range, where there will be a firepower and mobility demonstration.

Dedication of the Armor Memorial Park, adjacent to the Patton Museum, begins at 1630, followed an hour



At left, the Patton Museum's "Hetzer" at Living History demonstration July 4, 1988.



M1 shows its speed at 1988 St. Vith demonstration

later by a parade of current and historic military vehicles. A band concert at the Keyes Park amphitheater begins at 2000 hrs.

The public is invited to join Fort Knox soldiers and Armored Force veterans for the day's events.

