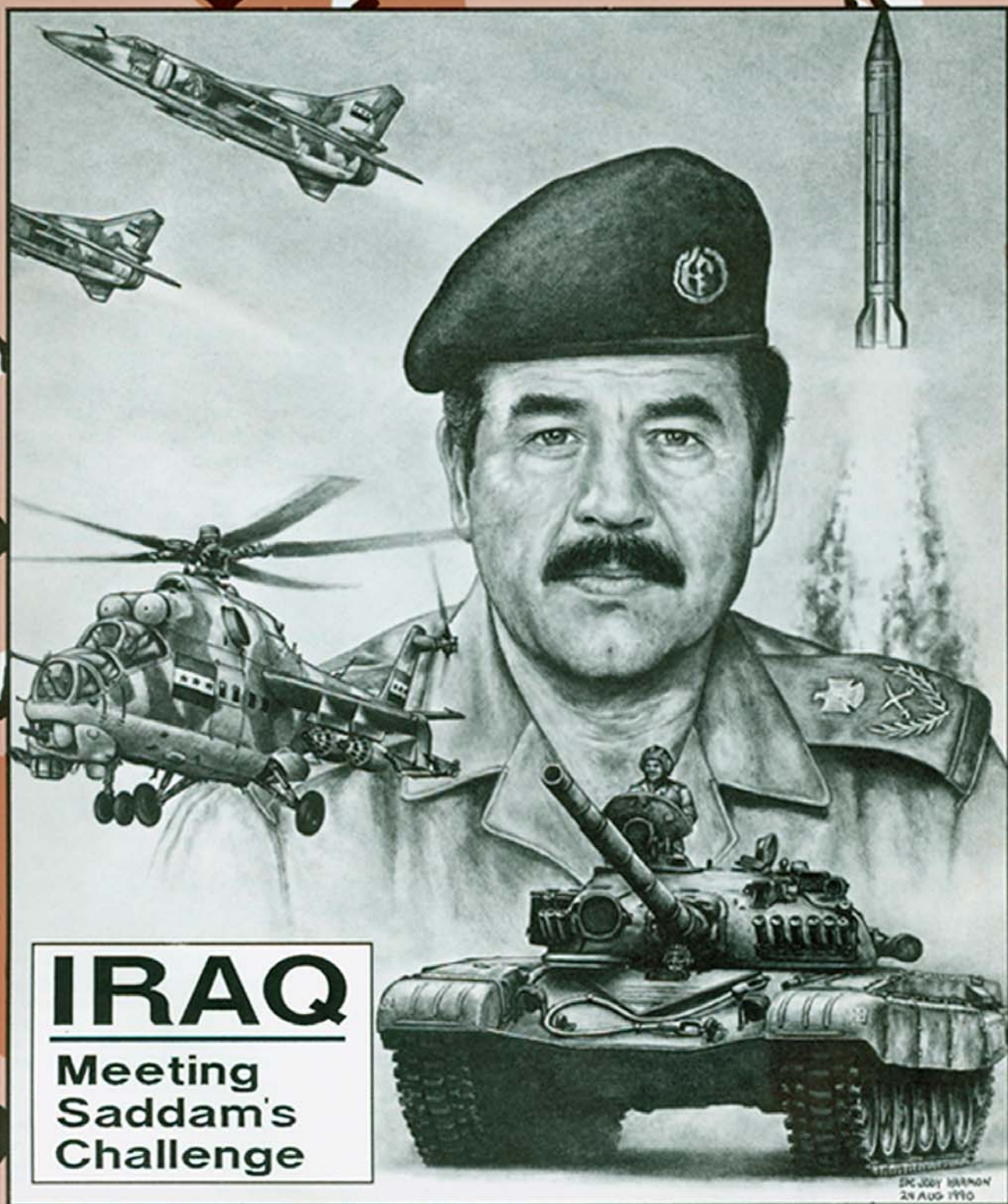


ARMOR



IRAQ

Meeting
Saddam's
Challenge

This publication approved for public release; distribution is unlimited.



These are incredibly extraordinary times in which we live. External forces are pushing and pulling the Army to and from so many directions simultaneously that we are forced to put the sign that says "Business as usual" into the same drawer that already contains articles on how to fight the Central European war and threat charts on Warsaw Pact armies.

- Germany is once again a single nation. Only a year ago this notion was unimaginable. And when the protests and agitation began, who predicted that unification would follow within 10 months? We congratulate our friends in the *Bundeswehr* and their countrymen on this accomplishment and offer our best wishes in the task they face, which is unique in history. You know the impact of this historic event on our force structure.

- We are in the midst of the largest overseas deployment of U.S. forces since the Vietnam War. The threat posed by the man on our cover came suddenly and has led to the first substantive deployment of armor and cavalry units to a hostile theater since the late 1960s, and the first call to active duty for Guard and Reserve units since that time.

- We are witness to the largest and most complicated multinational military effort since WWII. For the first time since 1945, Americans and Soviets stand side by side. Whether the crisis is resolved diplomatically or through military action, it will certainly be most interesting to read the accounts this operation will spawn on logistics and command and control.

How would you talk to a Syrian commander in his T-72 from the turret of your M1? How do you identify friend or foe targets on the ground or in the air?

- Someone has said that half the Army is involved in DESERT SHIELD, while the other half is downsizing. Proof of that statement's veracity came at the end of September at a ceremony here at Fort Knox. The 194th Separate Armored Brigade is probably a fair cross-section of the Army. While hundreds of the brigade's soldiers have deployed to units in support of DESERT SHIELD, the remainder of the brigade's combat units downsized from an infantry battalion, an artillery battalion, and two tank battalions to one combined arms task force. I know of no other instance in our history when parts of a unit deployed, while other parts folded their colors.

Even if the Mideast situation is resolved soon, there should be some long-term effects.

- NBC training and equipment are receiving a lot more than lip service.

- The pressing need for strategic air and sealift have been underscored.

- The on-again, off-again Armored Gun System program looks like it is on again, and with top priority.

Godspeed to all our guys and gals over there.

-PJC

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

Official:
THOMAS F. SIKORA
Brigadier General, United States Army
The Adjutant General

ARMOR

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LETTERS

CSM on Target!

Dear Sir:

CSM John M. Stephens, in his commentary, "The Amazing Scouts," in the May-June 1990 issue of *ARMOR* was, as usual, right on target, and most timely in view of the pending drawdown of the total force and with current force requirements in the Middle East!

The article reminded me of a similar hard-hitting commentary by then Brigadier General David K. Doyle in the September-October 1977 issue of *ARMOR*

titled "The Indispensable Scout." General Doyle was then assistant commandant of the Armor School.

The two articles combined set forth the demanding requirements of the scout in a graphic manner — requirements that have changed little over the years other than gaining the knowledge of more sophisticated warfighting as we have "evolutionized" from the days of the western frontier to the 1990s and into the year 2000. The basic ingredient is still to transmit quickly information to the commander gathered with eyes, ears — and perhaps even smell.

At the time General Doyle's article was published, it was my privilege to command the 5th Cavalry Brigade (Tng), which upon mobilization had the responsibility to take raw recruits and turn them into qualified and able 19 Delta cavalry scouts — and I might add, within a relatively short period of time. General Doyle's article became required reading for all my officers and senior noncommissioned officers. During my three-year tour with the brigade, our graduating drill sergeants received a copy of the article as a continuing reminder of their sole mission within the Army — to train "Indispensable Scouts!"

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I urge those officers and senior noncommissioned officers (irrespective of component) engaged in either training cavalry scouts or working with scouts on a daily basis to read and retain as a constant reference each of these two outstanding articles as part of their ongoing professional development!

As General Doyle said, "Whether in the role of the commander who must fight the main battle, or the staffer trying to scope the needs of the battle force — the heart of it all is — the SCOUT!" Then, as stated so well by CSM Stephens, "A TRUE scout is a scout — job requirement (of the scout) should not be taken as a secondary mission. It has to be in his guts!"

I fear some commanders without a cavalry orientation may at times not use their 19 Delta cavalry scouts as intended, probably because they do not understand the unique role of the cavalry scout and that their scouts are "at the heart of it all" and provide "a major contribution to the success or failure of the mission!"

The cavalry scout — a proud member of the Combined Arms Team!

PHILLIP J. ZELLER, JR.
BG, AUS, Retired
Junction City, Kansas

Scouts Clearly Needed

Dear Sir:

In reading CSM Stephens' remarks about the importance of the 19D cavalry scout (May-June 1990 *ARMOR*), I was once again dismayed that his words should even be necessary. If NTC results do not make the imperative need for recon specialists clear, then the entire history of the art of war does. How many battles have been lost due to poor battlefield intelligence? Plenty. Sure, you might get by without scouts, but you can lose just as easily. With Jeb Stuart's scouts absent at Gettysburg, General Lee could have mounted up infantrymen in their place, but it's just not the same, and he knew it.

The amount of skills needed to be a good scout is awesome, as the 19D Soldier's Manual illustrates. And it takes far longer to make an experienced scout NCO than in any other field, including armor and infantry. If the Army has trouble at recon now, what will it be like

without that wily old scout platoon sergeant? I'd say it'll be pretty grim.

I would guess that those who think we can do without scouts have never experienced (or have forgotten) the feeling of standing in the smoky darkness, wearing MOPP 4, and desperately needing to know where the enemy really is. And, then, the squelch breaks and over the radio comes the clear, steady voice of a scout...

RICHARD D. PHILLIPS
CPT, Armor
Philadelphia, Pa.

Caption Correction

Dear Sir:

The excellent article "Waking Up from the Dream: The Crisis of Cavalry" (May-June 1990) by *ARMOR's* managing editor brought pleasant memories, because I enlisted in the 6th Cavalry, Fort Oglethorpe, Ga., in July 1939. I have always been glad that I had the privilege of serving for a time in a mounted regiment in the "Old Army."

The caption under the picture on page 23 states that "6th Cavalry troopers practice crossing a stream at Fort Jackson in 1942." I believe the site of the stream crossing exercise was on the Hiwassee River in Tennessee in June 1941, in which I participated. The 6th Cavalry departed Fort Oglethorpe on PCS to Camp Blanding, Fla., 14-16 February 1942, "less animals and all equipment pertaining to animals." At Blanding, the unit was reorganized as a mechanized cavalry regiment. We were not at Fort Jackson with horses in 1942.

T. L. RANEY
COL, USA, Ret.
Fairfax Station, Va.

Improvements in Fuel Efficiency for M1A1

Dear Sir:

CPT Stephen C. Melton's excellent article on the future of Armor puts in print a very rational and well thought out analysis of the future of Armor in today's changing environment.

I would take issue only with the first point under CPT Melton's proposed TOE.

CPT Melton's premise that retrofitting the M1A1 hull with diesel engines for fuel efficiency fails to recognize improvement in fuel efficiency obtainable by retrofitting the existing M1A1 turbine engine with digital controls. A new digital electronic fuel control (DECU) has just been developed and tested at Fort Knox that demonstrated standard idle fuel savings of almost 20 percent. The DECU has entered production with first deliveries scheduled later this year. The U.S. Army is also considering auxiliary power units (APUs) and fuel bladders to extend range. The cost of retrofit and the high O&S costs of diesel engines would not present an acceptable cost and performance trade-off.

Further improvement in efficiency and space claim can be obtained with a transverse-mounted version of the current engine and even greater savings obtainable from the next generation turbine engine.

The TACOM-developed Advanced Integrated Propulsion System (AIPS) turbine engine will also reduce fuel use by over 40 percent for a battlefield day and will be very competitive in fuel use with the most modern technology diesel system. The turbine also possesses inherent advantages of long life, multifuel and cold weather capability. Further, one must consider the weight limits of the current M1A1 system. The best diesel system would add up to a ton of additional weight to the tank over an AIPS turbine system. Because the M1A1 is very close to the absolute weight limit, a better approach for sustained operational maneuver capability would favor improving the existing turbine engine or replacement with the AIPS system.

We may not see many new major weapon systems fielded before the turn of the century, however, EM/ET gun technology and active armor will ultimately provide that overwhelming improvement capability. These systems, along with continuing emphasis on lightening the force, demand the high power densities of lightweight turbine systems.

FREDERIC D. HYATT
Director
Textron/GEAE
Joint Program Management Office
Stratford, Conn.

The First Tank West of the Rockies?

Dear Sir:

I was particularly interested in the article, "U.S. Army Tank Development — 1925-1940," in the May-June issue. And regarding the statement (p. 22) that the U.S. Army had only 28 tanks in 1939....let's make that "29."

Thought you might be interested in tank production on the West Coast in that era.

Back in the fall of 1935, a call went out from the office of the Chief of Cavalry, Maj. Gen. Leon B. Kromer, to all cavalry regiments to design and manufacture an armored vehicle from items on hand or readily available. At the Presidio of Monterey, Calif., the 11th Cavalry dispatched scouts out all over the peninsula to cover junk yards, the back lots of cannery row, and the city dump to scour for pieces of boiler plate, iron scrap, or other items suitable for armor.

The basic vehicle selected for this excursion into the era of armor was a venerable Liberty truck, still percolating along in spite of its age. Troop carriers were diverted from their usual duties to cut, weld, and shape these diverse pieces of metal into a concoction that would protect the occupants of the vehicle from any penetration from modern weapons. The result was a sight to behold...ponderous, awesome, and truly terrifying. The yellow legs were universally proud of their creation and vied to be among those who were selected to try out this monstrosity.

Fortunately, the manufacture and birth of this pilot model took place in a troop stable on the top of Presidio hill. On the appointed day and in the presence of a wild-eyed multitude, IT (no name was ever bestowed) was started and edged out of its cocoon, pointed down the hill. Great shouts of victory rose skyward and throngs followed along behind, as it raced down the hill. But one flaw developed. At the bottom of the hill, down by the Sloat monument, the driver turned his charge around and pointed the nose UP the hill for the return trip. And the crowd waited. AND waited. The "tank" wouldn't budge. Like the venerable post fire engine, placed on blocks in the firehouse at the top of the hill so that it could respond quickly to any emergency, no amount of coaxing could encourage the engine to perform as expected up hill.

And thus, the first excursion of the 11th U.S. Cavalry into the age of armor ended in this dismal performance. To this day, old timers prefer not to talk about the matter, and it has escaped mention in all the history books.

Regretfully submitted,

THOMAS D. GILLIS
COL, USA, Ret.
Ex-Yellow Leg
Greenbrae, Calif.

"Supertank" or Not, The T-64 Met Soviet Needs

Dear Sir:

I was glad to see Mr. Goldfarb's response in the September-October 1990 Letters column to Captain Warford's article on the T-64 (March-April 1990), and commend Mr. Goldfarb's desire to check things out before drawing conclusions. A few points should be made, however, concerning the T-64, and Soviet tanks in general.

There is not now, and never has been, a "supertank." As long as there are tanks, there will be people trying to defeat them. Today, antitank guided missiles (ATGMs) are in abundant supply, inexpensive (compared to a tank), and when used as designed, will defeat a tank as soundly as another tank. The key to weaponry is in using it in the way for which it was designed. The T-64 was produced in the 1960s to give certain capabilities to Soviet forces. The T-64 was unique in that it sported a 125-mm main gun and had an autoloader. The large main gun made up for minor deficiencies in ballistic performance, and the autoloader enabled a reduction in tank crewmen to three, which permitted a smaller turret and hull, thus reducing vehicle weight.

The Soviets do not think of tank warfare in terms of tank versus tank. In the attack, Soviet doctrine requires a correlation of forces of at least 3:1. Though exceptions could occur, they will not purposely attack a platoon position with less than a company. The preferred method of fire in Soviet tank units is platoon and company volley. With such a volume of fire, victory is statistically guaranteed. The T-64 was designed for this type of combat.

Later versions of the T-64 have antiradiation liners, laser rangefinders, smoke

projectors, and the ability to fire an ATGM through the main gun tube, as well as increased armor protection. Though not a "supertank," the T-64 has a number of features, many of which are still absent in Western tanks. Mr. Goldfarb cites Soviet tankers who were unimpressed with the T-64. Soviet tanks are not designed for crew comfort, and maintenance is an overall problem in the Soviet Army, so that comment is not surprising. An 18-year-old conscript who probably left the army after two years is not, however, the best source of information on the quality of T-64s, even if he spent his one-and-a-half years of actual tank time inside one.

It is a mistake, however, to write off the T-64. Any tank, no matter how relatively obsolete, is a threat if used properly. As for Mr. Goldfarb's comment equating tanks and computers, the answer is one of emphasis. The Russian Empire emphasized the arts, and produced great music, art, and ballet. The Soviet Union of the 1930s emphasized collectivization and abolished an understanding of the free marketplace. The Soviet Union of the 1960-80s emphasized the buildup of its armed forces, and produced the T-64, T-72, and T-80, all of which are good tanks in their intended roles.

THOMAS R. HAMMETT
Threat Specialist
U.S. Army Armor School
Ft. Knox, Ky.

Letter a Little Off Target

Dear Sir:

I am writing in response to Mr. Goldfarb's letter that appeared in the September-October 1990 issue of ARMOR. I would like to thank Mr. Goldfarb for his comments on my article "The Tank That Could Have Won The Next War: An Assessment of the Soviet T-64 Premium Tank," and for his comments concerning the T-64 in general. Although interesting to read, his points are more than a little off target.

First of all, the term "supertank" is a term used by Mr. Goldfarb and was not used in my article. If a true "supertank" does exist, it's doubtful if such a tank would appear in Soviet markings. It seems that Mr. Goldfarb failed to keep the 1967 debut of the T-64 in mind when he wrote his letter. The well-known problems

Continued on Page 48

Armor in the New World Order

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

Our Armor Force is meeting the unprecedented challenges of Operation DESERT SHIELD with the skill, determination, and professionalism that have characterized its long service to our nation. Armor has always been and will continue to be important to our nation's needs. We are a fundamental part of Army forces either deployed abroad or based in the United States, ready to project power on short notice. A large portion of our force is currently doing just that in Saudi Arabia. It is there to provide those force characteristics that only an armored force can offer. This deployability requirement for Armor is not new, but it will be increasingly more important for the remainder of the decade. What is new is the environment around which DESERT SHIELD was executed.

Armor's challenge is to be trained and ready for contingency deployment. At the same time, we are undergoing an unparalleled builddown to help the Army reshape itself for the future. Many units have already begun this process. Some have finished. The result will be fewer units. Some will be shaped into smaller, yet highly capable units. The 194th Separate Armored Brigade is a case in point. It efficiently downsized, enthusiastically formed new units, and just as enthusiastically supported the challenge for an armored contingency operation. In several short months, it went through the process our Army will undergo over the next several years.

On 28 September 1990, here at Fort Knox, an inactivation and reorganization ceremony was held for the 194th Separate Armored Brigade. Four of the brigade's battalions (1st and 2d Battalions, 10th Cavalry; 4th Battalion, 15th Infantry; and 1st Battalion, 77th Artillery) and two of its separate companies (D Troop, 10th Cavalry; and 522d Engineer Company) encased their colors and guidons. In their place, Task Force 1/10th Cavalry was formed. It is a combined arms maneuver battalion consisting of three tank companies, two mechanized infantry companies, and one artillery battery. Because this unique organization will be the subject of a future article in *ARMOR*, I want to place the 194th experience into the context of the current world situation and the future of the Army.

It was ironic to many that we were downsizing such a potent armored force at the same time we were deploying other armored units to DESERT SHIELD. It was even more ironic that many of the soldiers from the inactivated units were transferring to deploying units. With heavy hearts, they encased their colors, knowing that the spirit and skills honed in their old units would never die. And with new enthusiasm and the quiet sense of professionalism that is characteristic of Armored Force soldiers, they flew off to join friends and comrades in DESERT SHIELD units on the far distant shores of Saudi Arabia. They are experienced, dedicated men and women who

demonstrated to the world the flexibility of the United States Army. What other army could downsize, while executing as major an operation as DESERT SHIELD?

Because of men and women like these, a new world order is emerging. The traditional threat from the Warsaw Pact is ebbing, but it is still potent. At the same time, new threatening nations and alliances are forming.

We sometimes forget that the key word in the 194th unit title is "armored," not armor. In the last 50 years of American history, "armored" has held a very specific and special meaning. It has described a combined arms team of tanks, infantry, cavalry, artillery, engineers, and logistical support organized as a tight, cohesive team. Armored units include soldiers of all branches focused on swiftly destroying our nation's enemies and striking fear into the hearts of those who would become our enemies.

That fear in our enemies has succeeded; bullets were unnecessary. Our primary mission of deterrence has been accomplished.

Now, in 1990, we honor the soldiers of the Armored Force. Their efforts in the long fight for freedom and liberty have been rewarded. The Iron Curtain has collapsed from the weight of the ideals and values that have been protected by the Thunderbolt and kept powerful by units like the 194th Armored Brigade. Memories and skills honed

at places like Fort Irwin and Hohenfels, Germany, will live and be carried to other units on other posts and in other countries. Proud units never die. They infuse vitality into others.

In every endeavor and in the face of every challenge, the firm dedication of soldiers of the 194th has been surpassed only by the active support and admirable unity of the spouses and families of the brigade.

In every crisis and in every deployment, including support of DESERT SHIELD, the total 194th family has been a beacon of strength. While we may downsize the Army, we can never downsize the importance of our families. The opposite is true. Now more than ever we need strong, cohesive families.

The soldiers and units of the 194th and the Army must look to the fu-

ture. The brigade is smaller, as the Army will be, but it is no less an awesome fighting force. The Total Armor Force will continue to look to the 194th for support, and most particularly, to remind us of the spirit of the armored combined arms team. Rest assured the brigade will continue to be our "Proud Legion."

Forge the Thunderbolt!

MQS... What It Is How It Will Work

by Center for Army Leadership

The Military Qualification Standards (MQS) system, the Army's new system to develop officers as leaders, provides officers, school commandants, and commanders with a framework for common and branch-specific training, education, and professional development. MQS I encompasses precommissioning training, MQS II covers company grade officer training, and MQS III applies to field grade officers.

The MQS system identifies common and branch training requirements for officers. It has two components, a military task and knowledge component that provides the critical tasks on which officers must train, and a professional military education component that focuses on improving cognitive skills.

MQS and Leader Development

Leaders develop by progressive and sequential education, training, and experience. The process starts in the precommissioning phase of training; continues through commissioning, branch education, and operational assignments; and stops only when the officer completes his military service. Institutional training, operational assignments, and self-development all play a part.

School commandants (and other proponents) are most directly involved with institutional training, which includes training company grade officers in the of-

ficer basic course, officer advanced course, and the Combined Arms and Services Staff School. Unit commanders are most directly involved with operational assignments. The MQS System provides the link between institutional training and operational assignments. It helps the commander construct his unit training plan and design his junior officer development program to complement the training of his unit METL. Self development is the responsibility of the individual officer. It includes professional reading and self study.

MQS II

MQS II, which applies to company grade officers in the Active Army, U.S. Army Reserve, and Army National Guard, prepares leaders to accomplish wartime tasks, provides the basis for promotion to major and attendance at Command and Staff College (CSC), and prepares officers for service in positions of greater responsibility. It guides officers through the first and second milestones, or passage points, in their careers. The requirements leading up to the passage points include completion of appropriate branch schools and developmental assignments, demonstrated proficiency on common and branch tasks, and completion of specified portions of the Foundation Reading program. An officer reaches the first passage point when he enters his branch advanced course. The second passage point occurs when he completes his company grade career and either enters resident CGSC or enrolls in non-resident CGSC.

MQS II organizes military tasks and knowledge into common task areas, which are essential for all company grade officers, and branch-specific task areas. The professional military education component of MQS II consists of a reading program and, for selected officers, advanced civil schooling. MQS provides commanders with the flexibility they need to tailor their leader development programs to their METL-based unit training. Unit leader development programs focus on warfighting and the Mission Essential Task List (METL). Therefore, commanders must tailor both their MQS task training program and their professional reading program to support their METL-based unit training plans. MQS does not require commanders to train tasks that do not support their unit METLs.

A common manual and branch manual will support MQS II implementation. The MQS II common manual will be distributed in December, and the MQS II branch manuals in January to March 1991. Each lieutenant and captain will receive a personal copy of the MQS II common and branch manual, which will be fielded through pinpoint distribution, so, commanders should ensure that pinpoint accounts accurately reflect both lieutenant and captain authorizations, by branch. The U.S. Army Publications Distribution Center will ship the new manuals based on specific unit requirements identified on unit DA Form 12-99.

Officers should ensure that they receive a copy of the appropriate manuals by checking with their units to verify that copies are on order. Once the manuals are fielded, follow-on distribution (to newly commissioned officers) will be accomplished through the officer basic course.

*CSM Jake Fryer
Command Sergeant Major
U.S. Army Armor Center*



To Command, "Fire!"

Seventy-five percent of our tank fleet is commanded by noncommissioned officers. Ninety percent of our IFV fleet is commanded by noncommissioned officers. These few select noncommissioned leaders, out of our 43,017 enlisted strength inventory, are very special and highly prestigious soldiers. They have the opportunity to issue the ultimate command of "FIRE."

Before giving the command of execution to "FIRE," and allowing ordnance to be delivered from their respective weapon systems to ultimately create destruction and kill an adversary, there are several things that have to occur.

A leader has to make a clear and deliberate decision to initiate the command of execution, "FIRE." After the target acquisition process has been completed, the proper types of ammo chambered, and the final lays and ranges completed, only then can the tank or scout commander exercise his authority to allow the weapon system to be fired. We expect these key leaders to initiate their actions quickly and instinctively to achieve success in the servicing of their respective tar-

gets. A successive, rapid thought process goes through his mind before this most important command: — friend or foe — target lethality — range — acknowledgment of initial fire command by other crew members — friendly dismounts in the area (clear from SABOT) — wingman's actions — what type of signature will my system create, and how does it affect follow-on mission?

All of the above are ingredients of the decision-making process before the fire command, yet few of them are taught in a classroom.

Who commands the tank? We have a few tank commanders who, by virtue of their leadership style, their proficiency, their indecisiveness, and their gunner's experience and confidence, delegate their authority and allow their gunner to command the tank.

The next time you're observing tank crew evaluators on live fire exercises, or participating as an (IO) in a COFT exercise, be observant of a few indicators that clearly identify a tank commander who doesn't command his tank: — he announces

"FIRE" before the gunner has ranged — announces "FIRE" when a multiple return bar is indicated, and the range is obviously incorrect — announces "FIRE" before the gun is placed in electrical or mechanical safe — fails to "override" his gunner for a gun lay that is quick and precise — announces his fire commands in a voice that's characterized by fear, by panic, and at a speed that's not comprehensible — fails to properly prep his station for combat (brow pads, equilibrated commander's weapon station (CWS), occluded GPSE and commander's sight, leg and arm guards, etc.) — fails to transmit to his crew commands that are clear, concise, and generally accepted throughout the armor community ("traverse left, steady, on," as opposed to "come left more," etc.).

Not everyone gets the privilege to command a tank and to be entrusted with the authority to give the ultimate fire command, the command of execution, "FIRE." For those who are privileged, we must readily accept and fully use their ability to make sound and decisive actions, not only in commanding the tank, but in everything they do!

The Sword of Saddam, An Overview of The Iraqi Armed Forces

by Major John F. Antal



An Iraqi T-72B captured during the Iran-Iraq War is examined by Iranian soldiers.

*"Therefore I say: Know your enemy and know yourself; in a hundred battles you will never be in peril. When you are ignorant of the enemy but know yourself, your chances of winning or losing are equal. If ignorant both of your enemy and of yourself, you are certain in every battle to be in peril."*¹

Sun Tzu, 500 B.C.

In the early morning hours of 2 August 1990, the Iraqi Army executed a successful coup de main over the country of Kuwait. Kuwait's defense forces consisted, on paper, of 20,300 men, 275 tanks, 190 armored cars, 330 armored personnel carriers, 86 self-propelled 155-mm howitzers, 70 combat aircraft, and 18 armed helicopters.² Achieving strategic surprise, Iraqi forces launched a coordinated attack across the virtually unguarded Kuwaiti border, and Saddam Hussein's military machine rolled through Kuwait without serious opposition. The Kuwaiti Emir fled moments before Iraqi forces captured Kuwait City. By 3 August 1990, Iraq controlled the entire country along with its portion of the world's oil reserves, and threatened Saudi Arabia.

American forces deployed on 7 August 1990, and, as of this writing, are poised in Saudi Arabia to defend against further aggression by Iraq. Only time will tell whether this conflict escalates into a shooting war for America or is miraculously settled by peaceful means. The bottom line remains that American soldiers and Marines may now be involved in a major land war in the deserts of the Middle East. It is imperative that we understand our adversary and learn how he fights.

During defensive operations, the Iraqis proved inflexible in reinforcing and redeploying forces once their defensive lines were breached. To make up for this inflexibility, Iraqi units sought greater survivability by digging in their armor whenever they stopped.

This article, developed from entirely unclassified sources, provides a quick overview of the Iraqi military, how it is equipped and how it fights.

The Iraqi Military Machine

Iraq possesses the fourth largest army on earth. With a population of 16,278,000, she has fielded a military of more than 1 million men. Iraq generates this force through conscription, and it is the duty of every young male Iraqi to serve a term in the armed forces. Exceptions from military service are rare. The terms of service in the Iraqi military are 21-24 months, but these terms can be extended during times of war.

The Iraqi Air Force has more than 500 combat aircraft, consisting mainly of modern Soviet fighters, fighter bombers, and bombers. The Iraqi Air Force is organized into 13 squadrons of fighter bombers, 16 squadrons of fighters, two squadrons of bombers, and two squadrons of air transport aircraft.

The Iraqi Navy is primarily a coastal defense force. Its main bases are at Umm Qasr, at the mouth of the Persian Gulf (Arabian Sea), and Basra, inland along the Shatt el Arab outlet to the Gulf.

The Army is the mainstay of Iraq's military power. Consisting of 955,000 active duty personnel, and possibly an additional 480,000 reservists, the Iraqi Army is clearly the largest military force in the Middle East. Even the Iranians boast an army of only 305,000. With this intimidating force at his disposal, Saddam Hussein wields immense prestige among his Arab neighbors.

The Iraqi Army

The Iraqi Army is an impressive force composed of many units that have been battle tested in the long eight-year war with Iran. The Army is organized into seven corps headquarters, with seven armored/mechanized divisions, 39 infantry divisions (including the Peoples Army militia), four Presidential Guard Force divisions (three armored, one infantry, and one commando battalion), and 20 + special forces brigades.

The Iraqi Army in Action, Lessons of the Gulf War

On 23 September 1980, Saddam Hussein launched five Iraqi divisions in a quick drive into Iran to seize the oil-rich Khorramshar and Abadan regions. His intent appears to have been to conduct a limited war to grab the Iranian oil fields before Iran — weakened by revolutionary turmoil caused by the Ayatollah Khomeini's bloody rise to power — could react. The Iranians, however, rallied to the defense of their homeland and fought Hussein's forces to a standstill.

Iraqi tactical mistakes and poor logistics were largely the cause of the failure of Saddam's units to achieve a quick victory in 1980. The Iraqi armored tactics were rigid and inflexible, and the Iranians made good use of restrictive terrain and built-up areas to wreak havoc on Iraqi armored for-

mations. "Iraq consistently failed to concentrate its armor in the initial stages of the war and consistently lost advantages of time and space."⁵ The overly rigid command style of the Iraqi Army was a major factor in preventing the Iraqis from using their reserves effectively. During defensive operations, the Iraqis proved inflexible in reinforcing and redeploying forces once their defensive lines were breached. To make up for this inflexibility, Iraqi units sought greater survivability by digging in their armor whenever they stopped. "According to one report, this ...has consistently led to Iraqi tanks digging in so well that they could not dig out, and their being outflanked and outmaneuvered by Iranian infantry."⁶ The biggest failing of the Iraqi Army during the early stages of the Iran/Iraq War, however, was the inability to employ combined arms.

By 1982, Iraqi forces had been driven back to their own territory, and it appeared that they would soon lose the war. Hussein immediately sought peace with Iran but was rebuffed by the Ayatollah, who demanded Hussein's removal

Iraqi Forces

Branch	Personnel
Air Force	40,000
Air Defense Artillery	10,000
Navy	5,000
Army	
Active	955,000
Reserves	480,000
Total	1,490,000

Note: In addition to these regular forces, Iraq has a Peoples Army (paramilitary militia) of 650,000 men and 4,800 Frontier Guard Security Troops.

Figure 1

Iraqi Military Inventory

Combat Aircraft

Mig 23	Mig 21
Mirage F-1EQ5	Mig 25
Su-7	Tu-22 bombers
Su-25	Tu-16 bombers

Armor

T72 ³ (500)	Chieftain MK 3/5/ M-60/M-47 (150)
T54/55/62 (4,500)	M-77 (60)
T59/69 II (1,500)	PT 76 (100)

Mechanized Infantry

BMP-1 (1,000)	EE-32 Jararacas
BRDM-2	BTR 50/60/-152
FUG-70	OT 62/64
ERC-90	M113
MOWAG Roland	Panhard M-3
EE-9 Cascavels	

ATGMs

AT-3 Sagger (Soviet)	SS-11 Milan (possibly)
AT-4 Spigot	French HOT (possibly)

Artillery*

Self-Propelled	2S1 122-mm (Soviet)
	2S3 152-mm (Soviet)
	155-mm Howitzer (U.S.)
Towed	122-mm D-74, D-30, M-1938
	130-mm M46
Mortars	120- and 160-mm
MBRLs	BM-21**

*The artillery forces consist of more than 5,500 pieces, mostly towed Soviet-made artillery.

**The Iraqis also have in excess of 200 multi-barrel rocket launchers including several batteries of the ferocious Soviet 122-mm, 40-barrel BM-21, capable of clearing a map grid per battery volley...⁴
See sidebar story on page 12.

Air Defense Weapons*

	23-mm ZSU 23-4 SP
	ZSU-57-2 SP
	37-mm M1939, twin 57-mm
	various 85-, 100-, and 130-mm guns
Surface-to-Air (SAMs)	SA-2 (120)
	SA-3/SA-6/SA-7/SA-9/SA-14 (150)
	Roland (60)
Additional	Frog-7 (30)
	Modified Scud B (capable of launching either conventional or chemical warheads)

*Iraqi air defense systems are primarily Soviet manufacture consisting of some 4,000 air defense weapons.

Helicopters*

Mi-24 Hind w/AT-2 Swatter missile (40)
SA-342 Gazelle, some with French HOT missile (50)
SA-321 Super Frelon, some with Exocet air-to-ship missile (10)
SA-316B w/AS-12 air-to-ship missile (30)
BO-105 w/AS-11 ATGM (56)
Hughes (86) — 530-F (26), 500-D (30), 300C (30)

*The Army controls the employment of helicopters and is reported to have approximately 150 armed combat helicopters of both Soviet and European manufacture.

Transport Helicopters

Mi-6 Hook (10)	Mi-4 (20)
Mi-8 (100)	SA-330 Puma (10)

Navy*

Frigates (4)
Patrol/Coastal Combatants (38)

*Most of these craft are Soviet designed and fire Soviet Styx ship-to-ship missiles.

Figure 2

as a condition to any peace agreement. Unwilling to let Hussein get away with his aggression against Iran, the Ayatollah ordered Iranian forces to invade Iraq. Six bloody years of seesaw attrition resulted. Iraq was propped up with a huge influx of military supplies and weapons from the Soviet Union, the United States, France, and several Arab states. The war now began to resemble the trench warfare of the First World War, waged with World War III-type weapons.

In 1985, the Iraqi High Command began to use more flexible and mobile tactics. It was learning how to fight a modern war. At this time, Iraq began using chemical weapons, mainly mustard gas and nerve agents, against the Iranians. These weapons were usually delivered by aircraft and proved very effective against the largely unprepared Iranian forces. The Iranians were unable to strike back effectively with chemical weapons of their own. Unable to protect its Revolutionary Guards from chemical agents, the Iranians took tremendous casualties trying to break the Iraqi defenses.

By 1987, the new tactics used by the Iraqi Army began to turn the tide. The Iranian drive into Iraq culminated during the vicious battle for Basra, Iraq's second largest city. Iran prepared for the offensive for over a year, threw every available resource into the fight, and failed against a staunch Iraqi defense. Iran's army bled to death in front of the defenses of Basra, losing an estimated 50,000 men killed or wounded in two months of fighting. Iran had lost the initiative to Iraq. Seizing the initiative, Saddam's High Command employed elite

units of Presidential Guards to spearhead several offensive operations to drive the Iranians out of Iraq. Iranian will was flagging, and the Iranians were desperately short of supplies and equipment. "For the first time in seven years, the Iranians did not mount a winter offensive in 1987-88. They were unprepared for the Iraqi assault of April 1988 to retake the Faw Peninsula. This offensive marked a new Iraqi policy — a change from static defense to hard-hitting offense."⁷



An Iraqi APC lost during a 1985 offensive in the Iran-Iraq War.

Five big Iraqi offensives in 1988 finally brought the Iranian Army to its knees and forced the Ayatollah Khomeini to bitterly accept the United Nations ceasefire terms. With little armor and practically no air force left, Iran was no longer capable of serious military action. The end result made Saddam Hussein the prominent power in the Persian Gulf, with a new, battle-tested, modern equipped military almost five times the size of his 1980 force.

The Iraqi Army of 1990

Before the invasion of Kuwait in August 1990, the Iraqi Army was organized as follows: The First Corps (on the Kurdish or northern front), the Fifth Corps (south of First Corps, assigned to the northern front), the Second Corps (assigned to the north central front), the Fourth Corps (central and south-central front, covering Baghdad, 70 miles from the border), the Third

Corps (southern central and southern fronts), and the Seventh Corps (southern front, or Basra to the Gulf). An Iraqi corps usually consists of four divisions, with each division consisting of approximately 10,000 men. An Iraqi corps, therefore, normally consists of between 40,000 and 45,000 troops.⁸

The Presidential Guard units play a vital role in the tactical employment of the Iraqi Army. The Presidential Guard is an elite "mini-corps, with 30,000 men, commanded by General Hussein Rashid."⁹ Consisting of 16 brigades of the most politically reliable troops, equipped with the best and latest weapons, the units of the Presidential Guard forces will act as the shock troops of any major Iraqi operation.

An analysis of the Gulf war points to a demonstrated inability to integrate close air support and to integrate artillery fires with maneuver. This trend shows the greatest weakness of the Iraqi Army: employing combined arms tactics. The Iraqi army also demonstrated the lack of a solid combat service support organization to maintain the tempo of

offensive operations during the Gulf war. The operational mobility of the Iraqi Army beyond 150 kilometers, therefore, has not been proved. This is a vulnerability that an adversary can exploit with air superiority.

Conclusion

The Iraqi soldier is a tough and resilient foe who is equipped with modern weapons and capable vehicles. The average Iraqi unit, according to observations during the Gulf war, is capable of an aggressive and dogged defense, while the more elite units will be reserved for counterattacks and offensive operations. The Iraqi command system, tested in the Gulf war with Iran, has improved over the years, and has proved capable of directing mobile operations against Kuwait.

The Iraqi Army has expanded rapidly in a short time. The state of training of the average Iraqi unit is still a question for debate. The Iraqis' most recent enemies, the Iranians and the Kurdish rebels, were predominantly foot-mobile and generally outclassed by Iraq's modern armored forces. The Kuwaitis, surprised and overwhelmed in hours, did not even slow the Iraqi columns down.

Saddam Hussein has demonstrated a ruthless ability to apply military force. The Iraqi military has proved its skill against its neighbors in the Persian Gulf. Iran and Kuwait both underestimated Iraq's capability to wage modern war. It



Iraqi T-72M1 tank

would be foolish for the United States to underestimate Iraq's military potential.

The Iraqis, no matter how good they look on paper, have critical tactical vulnerabilities that can be exploited. How well the Iraqis will hold up against a modern combined arms force, equipped with close air support, remains to be seen. As Sun Tzu said, over 2,500 years ago: "what is of supreme importance in war is to attack the enemy's strategy."¹⁰ It is vital to understand the sword of Saddam, in order to take advantage of Sun Tzu's wise advice.

Notes

¹Sun Tzu, The Art of War, trans. by Samuel B. Griffith. New York: (Oxford University Press, 1963). p. 84.

²The International Institute for Strategic Studies, The Military Balance 1988-1989, Director Francois Heisbourg. Great Britain. (The Eastern Press Ltd., 1988), p. 101. All figures on Iraqi military strengths were derived from this source.

³Brian Duffy et al., "The World's Most Dangerous Man," U.S. News and World Report, June 4, 1990, p. 38.

⁴Mark Lloyd, Modern Combat Gear. Hong Kong: (Longmeadow Press, 1988), p. 181.

⁵Anthony H. Cordesman, "Lessons of the Irani-Iraq War: Part Two, Tactics, Technology, and Training," Armed Forces Journal International, (June 1982), p. 73.

⁶*Ibid.*, p. 74.

⁷John Laffin, The World in Conflict, 1990, War Annual 4, London: (Brassey's UK Ltd., 1990), p. 99.

⁸Richard Jupa and Jim Dingeman, "How Iran Lost/Iraq Won the Gulf War," Strategy and Tactics, Cambira, Calif., (Number 133, March-April 1990), p. 51.

⁹*Ibid.*, p. 51.

¹⁰Sun Tzu, p. 77.

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Iraq's Modern Artillery Assets

In assessing Iraq's military capabilities, a lot of attention has centered on Saddam Hussein's very large tank force and his past willingness to employ chemical weapons. But Iraq's interest in acquiring modern artillery systems also poses a threat to forces deployed in the Mideast.

Attention was focused on this interest recently when authorities in Britain and Italy discovered that Iraq had contracted for the manufacture of the components for a "supergun" in their countries and attempted to import them. The project was apparently based on the theories of Dr. Gerald Bull, a Canadian-born ballistics expert who was mysteriously assassinated in Belgium last March.

Among Dr. Bull's more conventional projects were improved heavy artillery systems. After South African weapons imports were embargoed, he helped advise that nation on the design of the G5 towed and G6 wheeled 155-mm systems. His concepts were also used in several very modern 155-mm guns developed in Austria, China, and Belgium, where his firm was based.

According to Jane's Armor and Artillery, all of these systems greatly out-range the U.S.-standard M109 family, which is now about 30 years old. The maximum range of the Austrian GH N-45, the Chinese WAC-21, and the South African G5/G6 is 30-39+ km depending on whether standard or enhanced range rounds are fired. This compares with the 18-24 km range of the M109 and 17-24 km range of the Soviet standard 152-mm gun.

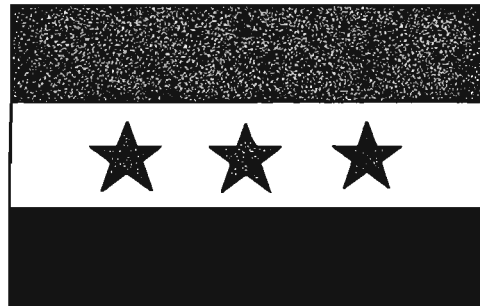
Jane's notes that the G-5 is "in service with Iraq" and that Austrian GH N-45s were shipped to Jordan and re-shipped to Iraq. The Austrian arms deal also led to a scandal in Austria, according to a recent story in International Defense Review. Brazil, which supplied billions of dollars worth of armaments to Iraq during the Iran-Iraq War, is also licensed to produce the 155-mm design.

The Italian military magazine, Rivista Italiana Difesa, noted that a G6-type system and a larger 210-mm wheeled, self-propelled system, called the "Al Faw," were on display at the Baghdad arms exposition in April 1989.

—ARMOR Staff

A Military Analysis of Iraqi Army Operations

by Aaron Danis



The Iraqi invasion of Kuwait on 2 August has shown that Iraqi President Saddam Hussein's army is the premier Arab military force in the Persian Gulf. The attack, led by the elite Republican Guards Corps, took 8-12 hours to cover roughly 80 miles and secure Kuwait City. This performance has led many Western analysts to believe that Iraq's army is unbeatable by any Mideast army — except the Israelis. Certainly, in an era when offensive prowess by Arab armies has been nearly nonexistent, Iraq looks to be the exception.

This analysis will attempt to evaluate the present-day Iraqi Army's operations and tactics, and highlight its strengths and weaknesses. In order to do this, it will look at the Iraqi Army in the Iran-Iraq War during its defensive operations from 1981-88 and its stunning offensive victories during the spring and summer of 1988, victories which brought Iran to the peace table after having the upper hand in the war the previous six years. Though the Iraqi Army of 1988 and later is in many ways more professional and battle-tested than it was during its ponderous 1980-81 offensives,¹ it has glaring weaknesses which a U.S. armor-heavy force could exploit.

Iraqi Force Structure

Though the Iraqi Army has over 5500 tanks, the majority of its force structure consists of more than 40 infantry divisions, the mainstays of

Iraqi defenses. The offensive punch of the Iraqi Army is concentrated in the Republican Guards Corps (referred to in some sources as the Presidential Guards). During the greater part of the Gulf War, the corps was merely a brigade/division-sized force, which was held in reserve to spearhead critical counterattacks. This force was expanded in 1987 to three armored divisions, one infantry division and one commando/special forces brigade for the spring 1988 offensives. For the Kuwaiti invasion, the Guards further expanded with three infantry divisions and a special forces division, giving it a total strength of eight divisions and 120,000 troops.² The Iraqis also have another seven armored/mechanized divisions, which are used for operations in support of the Guards.

Finding a tactical table of organization and equipment for units in the Iraqi force structure is nearly impossible on the unclassified level.³ In general, Iraqi divisions are 12,000-15,000 strong, with each headquarters usually controlling three brigades. The Guards are much more flexible. A division headquarters controls up to four (and possibly more) brigades, with independent helicopter, artillery, and chemical units attached.⁴

The rapid withdrawal of the Guards units from Kuwait in late August, to a central location near the Iraq/Kuwait border, in exchange for regular army infantry units

shows the Guards' importance to Iraqi offensive/counteroffensive plans.⁵

Perfecting the Defense: 1981-1987

After the initial Iraqi territorial gains of 1980-81 against Iran, the Iranians wrested the initiative from Iraq through a series of large-scale offensives. The war became a defensive one for the Iraqi Army, which went on the offensive only to maintain the integrity of the defense. Tactically and operationally, the Iraqi Army had ample opportunities to practice defensive operations, usually against Iranian human-wave assaults largely unsupported by armor, artillery, or close-air support. The Iranians made up for the lack of supporting arms by using infantry infiltration tactics in attacks conducted at night and across the numerous water obstacles that crisscross southern Iraq near the city of Basra and the Faw Peninsula.

Iraqi tactics and operational doctrine for the offense and defense were based on the Soviet model and instruction from Russian advisors. In the 1980-81 offensives, this hurt the Iraqis because they did not learn to execute the doctrine correctly and junior officers and NCOs, though brave, lacked initiative and often waited for higher headquarters to provide direction. Defensively, however, when the Iraqis started to defend their home soil after losing their initial Iranian gains, Soviet-prepared defensive tac-



tics were critical to success by providing a strong "crust" to protect Baghdad.

If the Iraqi Army lacked anything for the defense, it was strategic depth and manpower reserves. Because Baghdad is about 150 kilometers from the Iranian border, trading space for time was out of the question, and any battle with losses less than three-to-one was considered a defeat (Iranian population in 1980 - 45 million, Iraqi - 15 million).

Iraqi defenses usually consisted of three dug-in defensive bands about 10 kilometers in depth. Each band had platoon- to company-size, triangle-shaped strong points, which provided all-around protection through the use of alternate firing positions and tanks dug in to hull defilade. Strong points had interlocking fire, and were covered by massed artillery and close air support. Iraq maintained air superiority throughout the war.⁶ The Combat Engineer Corps, one of the great as-

sets of the Iraqi Army, constructed concrete fortifications, minefields, and other obstacles. It also built lateral roads to reposition forces. Iraqi units had shown an inability early in the war to reinforce and redeploy once their positions had been outflanked due to poor command and control.⁷

Despite Iraq's great technological, mobility, and firepower advantages, Iranian human wave assaults, on several occasions, nearly succeeded through numbers alone to break open the front, with penetrations up to 16 kilometers. The lack of mobile reserves prevented the Iranians from exploiting their successes, and the massive use of Iraqi air support, including Mi-24 and Gazelle attack helicopters, in conjunction with local counterattacks, usually restored the line.⁸ As a last line of defense, Iraq turned to chemical weapons. The first use occurred in 1982-83, when Iraq used mustard gas to disrupt night human-wave assaults, and became necessary whenever the Iraqis were greatly outnumbered.

The geography of the 1981-88 war between Iran and Iraq. The Shatt Al Arab is the waterway that empties into the Persian Gulf just east of the Faw Peninsula.

bered or defending an important position (the Iraqis later used Tabun and Sarin nerve gases and cyanotic agents). Chemicals were not usually decisive in and of themselves, however, because the Iranians developed countermeasures and weather/water effects reduced their impact.⁹

Tank vs. Tank: The Battle of Susangerd

The battle for Susangerd, the only major tank battle of the war (and the largest since the 1973 October War), gives a rare look at Iraqi "mobile" defensive capabilities. In January 1981, the understrength Iranian 16th Armored Division (equipped with 300 British Chieftains and American M-60s) supported by the 55th Paratroop Brigade, conducted a counterattack near Susangerd, Iran, in order to open the road to Ahwaz and lift an

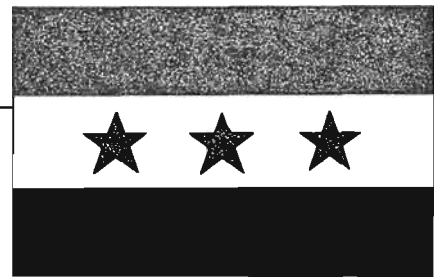
Iraqi siege on Abadan to the southeast. The attack, forced prematurely by political reasons, occurred during the rainy season. The Iranian avenue of approach was a sea of mud, which inhibited Iranian maneuver and resupply. An Iraqi armored division equipped with 300 T-62 tanks had come to a halt, with brigades on line across the proposed avenue of approach. On 5 January, the Iranian force slowly moved from the northeast over the wet ground, with the three tank brigades leading single file and the paratroop brigade following behind. Iraqi helicopter reconnaissance detected the movement, and the Iraqi commander responded quickly by concentrating his three armored brigades based on the village of Achmed Abad on the Kharkheh Plain.¹⁰

On 6 January, the lead Iranian armored brigade ran into the center Iraqi one. Thinking it was only a light Iraqi covering force, the Iranians pushed forward as the Iraqis withdrew, and entered a prepared kill zone. As tank-to-tank engagements raged, most between 200-1000 meters, the Iraqi commander moved his two flank brigades up to form a three-sided trap and faced his units inward. The first Iranian brigade was soon destroyed, losing more than 100 tanks. The second and third Iranian armored brigades, unsupported by their infantry, blundered into the trap on the 7th and 8th of January, respectively. The battlefield had become a morass, and the fighting was at such close range that aircraft of both sides were unable to intervene. The third Iranian brigade, realizing its precarious position and running low on main gun ammunition, withdrew.¹¹

Both the losses and lessons of this battle are open to debate. Each side

began with about 300 tanks, and the Iraqis claimed to have destroyed or captured 214 Iranian tanks, though the Iranians only admitted to losing 88. The Iraqis probably lost 100 destroyed or damaged tanks, but because they retained the battlefield, they were probably recoverable.¹² In the following days, the Iraqis put more than 100 Iranian tanks and armored vehicles on display in Basra and Baghdad, and a trip by journalists to the Kharkheh Plain revealed some 40 tanks still stuck in the mud, along with masses of empty shell casings and three destroyed helicopters.

It is obvious that the Iranian commander was incompetent, feeding troops piecemeal in an attack at 1-to-3 odds at the point of attack. This makes it difficult to judge the real quality of the Iraqi force, though the Iraqi commander does get high marks for his ability to react to the situation as it developed. The battle does demonstrate, however, that both sides were technically deficient in tank-to-tank engagements. Most of the Iranian losses occurred because their tanks got stuck or could not be supplied and maintained, and were abandoned. The lead-computing sights on Iraqi tanks were seldom used, thus lowering the accuracy of the T-62 main gun to World War II standards. Reliable reports indicate that both sides often had to close to within boresight range to be effective.¹³ It is unknown whether the Iraqis have corrected these training deficiencies with their T-72 crews, though they have tried to improve the fire control systems on the tank by using Western rangefinders and computers.¹⁴ It is doubtful, without a legitimate Iranian armor threat, that Iraqi armored units were able to expend the ammunition and time necessary to improve their tank gun-



ner skills, with the Guards as a possible exception.

Back on the Offensive: 1988

After more than six years of stalemate and the primacy of the defense over offensive action (reminiscent of World War I), most gulf analysts believed that neither side would gain the upper hand in the war. Iran was expected to conduct yet another "final offensive" to take Basra in the winter or spring of 1988, one of their major geographical objectives since 1982. However, two subtle yet important actions were taking place in both countries.

- Iran was suffering from mobilization problems in the winter of 1988. Political problems in Iran due to the "War of the Cities," and a shortage of volunteers for the front prevented the expected winter offensive, and may have caused the Iranians to thin their lines.¹⁵

- Iraq began to modify its force structure in late 1987, expanding the Republican Guards as previously noted. These highly seasoned forces practiced offensive combined arms operations before being committed to a successful counterattack against an Iranian salient in Kurdistan in March 1988 in order to hone their skills.¹⁶

Under these conditions, Saddam Hussein decided to launch a major attack to seize the Al Faw (or Fao) Peninsula west of the Shatt-al Arab waterway, which divides Iraq and Iran and allows access to the Iraqi

The Iraqi Army has a lot of experience on the defense, and has excellent engineer support (both offensively and defensively). It has never been subjected to a large, combined-arms assault.

port of Basra. Faw, on the Iraqi gulf coast, had been captured by Iran in 1986 and was their only major gain since 1982. Its recapture would give a psychological boost to Hussein's military. This battle would also be just the first in a campaign of five attacks (two are covered here), which would push the Iranians out of Iraq. The peninsula was defended by only 5,000-10,000 Iranian regulars and Revolutionary Guards because it was such an exposed and untenable position. The attack, titled "Blessed Ramadan," would be launched on the first day of the Moslem month of fasting and would come as a complete surprise to the Iranians.

Part of the surprise was due to Iraq's ability to concentrate its forces quickly before the attack. Using excellent interior lines of communication (both road and rail) covered by air superiority, Iraq moved the Republican Guards from a training area near Basra to its jump-off positions on the gulf coast northwest of Al Faw, 150 kilometers to the south. The Iraqi Army has 1500 tank transporters, which can move armored vehicles at speeds up to 65 kilometers-per-hour. This reflects a lesson of the 1973 October War, when Iraqi tanks sent to Syria to fight Israel drove on their tracks on rough roads and arrived in poor shape.¹⁷

Its commander, Major General Maher Abd al-Rashid, planned the Faw attack as a 4-5 day operation with three phases: breakthrough, exploitation, and mop-up. Starting on the morning of 17 April, the attack

was launched with almost 200,000 troops on two axes down the Faw Peninsula. The main attack, launched by T-72-equipped armored units of the Republican Guards, assaulted 35 kilometers southeast across the relatively dry salt flats of Mamlaha from positions around Al Zubair and Umm Qasr. The Iraqi VII Corps, located 16 kilometers north of Faw City, launched a supporting infantry attack south along the west bank of the Shatt al-Arab. Iraq also apparently launched an amphibious assault of unknown size on the western side of the Iranian positions using the Kuwaiti island of Bubiyan.¹⁸

A short bombardment of Iranian positions, which included the use of poison gas, most probably a non-persistent nerve agent, preceded the attack. Under cover of darkness, Iraqi commandos cut paths through Iranian defensive barriers and minefields, followed by armor, supported by infantry and attack helicopters. Iraq claimed fighter-bombers and helicopters flew more than 318 sorties, helping to prevent Iranian reinforcements from reaching Faw. The attack, which was expected to last 4-5 days, ended in 34 hours.

Iraq rapidly followed up its Faw victory. On 26 June, again taking advantage of their superior mobility, the Republican Guards and III Corps retook the man-made, oil-rich Majnun (or Majnoon) Islands north of Basra in nine hours. At 0330 hours, the Guards launched

the main attack, this time an amphibious one, storming the islands and surrounding marshes from small boats (which both sides commonly used in the war) and amphibious tractors. This was followed by bridges and bulldozers to consolidate the gains won.

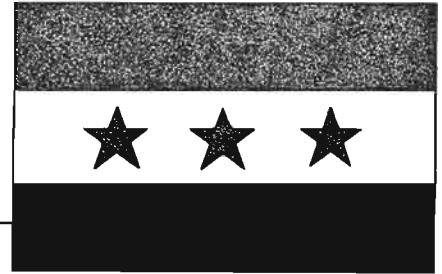
The III Corps, with 2000 tanks and 600 artillery pieces, against fewer than 60 Iranian tanks, cleared the area east of the islands. Supported by a brigade of paratroopers (possibly a commando brigade) inserted inside Iran as a blocking force, the III Corps advanced 32 kilometers into Iran before withdrawing to the international border.¹⁹

It is unknown if the paratroops were dropped or air-assaulted into their objective, though Iraq has enough transport aircraft and helicopters for either style insertion (films of the Kuwait invasion showed an air-assault into Kuwait City in support of the attack). On 20 August 1988, Iran and Iraq agreed to a U.N.-sponsored ceasefire, Iraq having recaptured all land lost to Iran.

Common threads run through these attacks:

- Offensive actions were extensively rehearsed and had a set-piece quality about them (i.e. little free-wheeling maneuver covering limited distances).

- Iraq built up odds, which easily exceeded 6-to-1, and repositioned all logistics.



● A non-persistent nerve strike on front line troops, and mustard gas attack on logistics, command posts, and reserves preceded all attacks.²⁰

● Iraq had overwhelming air-superiority.

● Iranian defenses were thin, with almost no reserves. Every battle was a forgone conclusion before it even began, and except for the chemical strikes, this scenario seems to fit the recent Kuwait invasion quite well.

It is difficult to predict how the Iraqi Army would fare against the United States, based on its performance in the Iran-Iraq War. For most of the war, Iraq faced an opponent who had the majority of its air and armored forces deadlined due to a lack of spare parts and maintenance. By the end of the war, Iran's greatest resource, manpower, had also been drained in senseless human-wave attacks against strong defenses. However, several salient points can be drawn about the Iraqi Army:

● Iraq's elite Guards units have seen a significant amount of combat and have been baptized in a chemical warfare environment. This gives the Iraqi leaders confidence in troop performance under degraded conditions. Non-Guards units and People's Army reserves are of uneven quality.

● The Guards units are good in set-piece attacks over limited distance, when they have been able to rehearse extensively. Non-Guards units may be incapable of performing offensive combined-arms maneuvers due to a lack of training.

Tank gunnery skills are probably still poor across the army.

● The Iraqi Army has a lot of experience on the defense, and has excellent engineer support (both offensively and defensively). It has never been subjected to a large, combined-arms assault, though the Iranians had success with night attacks and infiltration tactics. Due to poor C³, Iraqi defenses may be slow to react to a mobile situation.

● Iraqi troops have always enjoyed friendly planes and helicopters overhead. ADA assets are based on older Soviet missiles, and have not been tested against a legitimate threat. This makes combat troops vulnerable to CAS.

● Due to the depth of the theater and Iraqi air-superiority, the logistics system was rarely taxed. Initial press reports from Kuwait indicate that Iraqi troops on the Kuwait/Saudi border are going hungry, perhaps reflecting a lack of Iraqi logistical experience and capability.

As General Colin Powell stated after the invasion of Kuwait, the Iraqis are not "ten-feet tall." U.S. armor-heavy forces could best exploit Iraqi weaknesses by flanking prepared positions (avoiding kill zones) and engaging Iraqi armored forces in reserve in a free-wheeling mobile battle. Taken out of a set-piece environment, it is likely, as in the Iran-Iraq War, that Iraqi defenses and C³ will be incapable of responding to such a threat, and denied air-superiority, would fold under pressure. Defensively, U.S. forces will submit an Iraqi offense

to a volume of tank fire, ATGMs and CAS much greater than what they faced from the Iranian Army in the Gulf War. It is unlikely that Iraq could sustain an attack for long against U.S. forces.

Obviously, heavy divisions are the best force to challenge Iraq in a ground war, because forces made up of light infantry and airborne troops without extensive anti-armor support are in danger of being overrun quickly by armor-heavy Iraqi forces. The wild card is Iraqi chemical capability, though desert conditions are unfavorable to chemical employment.²¹ Here, too, the mobility and protection offered by a heavy force against such an attack will help ensure success.

Notes

¹Several works are available concerning the initial Iraqi offensive and why it failed to defeat Iran. See the International Institute for Strategic Studies, Strategic Survey 1980-81, (London: IISS, 1981), pp. 49-52; Edgar O'Ballance, The Gulf War, (London: Brassey's, 1988); John Laffin, War Annual 1, (London: Brassey's, 1986); Anthony H. Cordesman, "Lessons of the Iran-Iraq War: The First Round," Armed Forces Journal International (AFJI), April 1982, pp. 32-47, and "Lessons of the Iran-Iraq War: Part II - Tactics, Technology and Training," AFJI, June 1982, pp. 68-85; and William O. Staudenmaier, "A Strategic Analysis," in Shirin Tahir-Kheli and Shaheen Ayubi, eds., The Iran-Iraq War: New Weapons, Old Conflicts, (New York: Praeger, 1983).

²Michael Evans, "Saddam's Military Strategy Causes Surprise in West," The Times, 25 August 1990; see also John Broader and Douglas Jeal, "Iraqi Army: World's 5th Largest But Full of Vital Weak-

nesses," Los Angeles Times, 13 August 1990; Stephen C. Pelletiere, Iraqi Power and U.S. Security in the Middle East, (Carlisle Barracks, Pa: Strategic Studies Institute, U.S. Army War College, 1990), p. 16. Pelletiere and Cordesman contend that Iraq's 20 Special Forces Brigades come under the Guards control. Cordesman's figure for the size of the Guard is 240,000 with a further 80,000 support troops, to include the Iraqi Chemical Corps.

³The best sources on Iraqi force structure are International Institute for Strategic Studies (IISS), The Military Balance 1989-90, (London: IISS, 1989) p. 101; Anthony H. Cordesman, The Gulf and the West, (Boulder: Westview Press, 1988) p. 82; Mark Heller, Dov Tamari and Zeev Eytan, The Middle East Military Balance, Jaffe Center for Strategic Studies, Tel Aviv University; Aharon Levrant and Zeev Eytan, The Middle East: Military Balance, 1987-88, (Boulder: Westview Press, 1988).

⁴Anthony H. Cordesman and Abraham R. Wagner, The Lessons of Modern War: Vol II, (Boulder, Colo: Westview Press, 1990), p. 355; also Pelletiere, op. cit., p. 16.

⁵Reuters, "Iraq Pulls Elite Troops from Saudi Border, NBC News Says," 23 August 1990; also Michael Evans, op. cit.

⁶William O. Staudenmaier, "Iran-Iraq (1980-)," The Lessons of Recent Wars in the Third World - Vol II, Robert Harkavy and Stephanie G. Neuman, eds., (Lexington, Mass.: Lexington Books, 1985), p. 225.

⁷Helen Chapin, ed., Iraq: A Country Study, DA Pam 550-31, HQ, Dept. of the Army, 1990; and Cordesman, "Lessons of the Iran-Iraq War: Part II," AFJL, p. 73.

⁸David Segal, in "The Iran-Iraq War: A Military Analysis," Foreign Affairs, Vol 66, #5, Summer 1988, pp. 956-957, claims that after 1984, the Iraqis abandoned their static defense in favor of "a more flexible defense." He claims that Iraq used set-piece battles where they regularly and deliberately allowed the Iranians into kill zones and then counterattacked with combined arms forces to cut up and annihilate the penetration. He also claims that the Iraqi Army "handily won nearly all the defensive battles of the past six years," p. 954. He does not state the sources of his information or site any specific instances.

⁹R. Jeffrey Smith, "Relying on Chemical Arms," Washington Post, 10 August 1990; see also Anthony H. Cordesman, The Iran-Iraq War and Western Security, 1984-87, (New York: Jane's, 1987), pp. 19, 63-64, 97.

¹⁰The best account of this battle is in O'Ballance, The Gulf War, pp. 60-63; see also Cordesman, "Lessons of the Iran-Iraq War: Part II," AFJL, p. 70; Efraim Karsh, "The Iran-Iraq War: A Military Analysis," Adelphi Paper #220, (London: IISS, 1987), p. 35; and Anthony R. Tucker, "Armored Warfare in the Gulf," Armed Forces, May 1988, p. 226. The tactics used in this battle sound similar to those mentioned in Segal's article (footnote 4), but they were the exception in the war, not the rule.

¹¹Ibid.

¹²These numbers are from O'Ballance, who was one of the journalists who viewed the aftermath of the battle. Staudenmaier, in "A Strategic Analysis," The Iran-Iraq War: New Weapons, Old Conflicts, p. 40, claims that 300-400 tanks were involved, with the Iraqis losing 50 T-62s, and the Iranians losing 100 Chieftains and M-60s. These numbers were also used in Strategic Survey 1980-81, p. 50.

¹³Staudenmaier, "A Strategic Analysis," The Iran-Iraq War: New Weapons, Old Conflicts, p. 40; Cordesman, "Lessons of the Iran-Iraq War: Part II," AFJL, p. 74.

¹⁴Cordesman, The Lessons of Modern War, Vol II, p. 440.

¹⁵The War of the Cities was an ongoing contest between the Iraqis and Iranians to launch bomb and missile attacks against each other's major cities. It turned decisively in Iraq's favor in the spring of 1988 when modified Iraqi Scud-B missiles began to reach Tehran. Upwards of 150-200 missiles were fired, devastating Iranian morale.

¹⁶Bernard E. Trainor, "Iraqi Offensive: Victory Goes Beyond Battlefield," New York Times, 20 April 1988; and IISS, The Military Balance 1989-1990, (London: IISS, 1989), p. 101.

¹⁷Karsh, op.cit., p. 44; Laffin, War Annual 1, p. 78; Cordesman, "Lessons of the Iran-Iraq War: Part II," AFJL, p. 74; Cordesman, The Lessons of Modern War: Vol II, p. 356. Television footage of the Iraqi

"withdrawal" from Kuwait indicates the importance of these transporters.

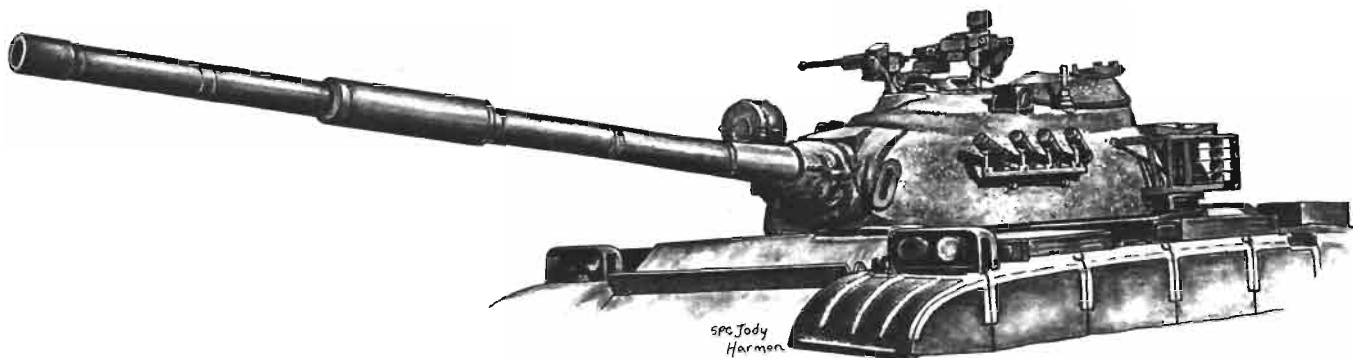
¹⁸The chronology of this battle is pieced together from four accounts: James Bruce, "Gulf Battle Lines Continue to Shift," Jane's Defence Weekly (JDW), 30 April 1988, pp. 838-839; John Laffin, War Annual 3, (London: Brassey's, 1989), pp. 107-108; Patrick E. Tyler, "Iraq Launches Offensive on Faw Peninsula," The Washington Post, 18 April 1988, pp. A17, A22; Trainor, "Iraqi Offensive: Victory Goes Beyond Battlefield," New York Times, and Cordesman, The Lessons of Modern War: Vol II, pp. 373-375. The best consolidated account of the spring offensives are in Pelletiere, op. cit., pp. 25-40.

¹⁹Youssef M. Ibrahim, "Iraqi Troops Recapture Big Oil Field," New York Times, 26 June 1988; Patrick E. Tyler, "Iraq Recaptures Strategic Marshes," Washington Post, 26 June 1988, pp. A22-23; "Iraqi Paratroops' Key Role in Majnun Victory," JDW, 9 July 1988, p. 14; Cordesman, The Lessons of Modern War: Vol II, pp. 388-389.

²⁰R. Jeffrey Smith, "Relying on Chemical Arms," Washington Post, 10 August 1990, pp. A25, 27.

²¹Brian Duffy, et al., "The Guns of August," U.S. News and World Report, 20 August 1990, p. 24. This article claims that the infamous gas attack against Halabja in February 1988 killed only 200 unprotected civilians in a city with a population of 45,000. Casualty claims for this attack range as high as 4000.

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Iraq has modified older T-55s to take the powerful Soviet 125-mm main gun.

The Tanks Of Babylon Main Battle Tanks Of The Iraqi Army

by Captain James M. Warford

In the name of increasing their own defensive capabilities, the armies of several different countries have undergone massive modernization programs. As far as armored forces are concerned, these efforts have been concentrated in two areas; the purchase or production of new, more capable systems, and the modification of well known, currently-fielded equipment. When the various factors of combat experience and combat-proven technology are included, a future threat can become a battlefield reality. The result of this effort is the creation of a capable and modern tank-based, close-combat-heavy force. This is the current situation with the heavily armored ground forces of Iraq, a situation that requires a modern U.S. tank-based (heavy) solution.

According to several unclassified sources, the Iraqi Army currently includes 5,500 to 5,800 tanks. This impressive number is primarily made up of both Soviet and Chinese tanks. There are, however, a small

number of British and American tanks as well. In fact, if the total Iraqi armored force is considered, Brazilian and French armored personnel carriers, ATGM vehicles, and reconnaissance vehicles, as well as some American M109A1 SP howitzers, all add to the massive total of Iraqi armored vehicles. *The Military Balance 1989-1990* lists the Iraqi main battle tank (MBT) fleet as shown in Figure 1.

While this force of MBTs is impressive by sheer numbers alone, two particular groups of vehicles deserve special attention. The first of these is the Soviet T-72 MBTs used by Iraq. There are currently 14 identified variants of the T-72. While some of these variants are much more modern and capable than others, the threat imposed by the export models of the T-72 has become a reality. This well-known and very capable MBT is currently employed by 16 different countries.

Iraqi Armor

Type	Numbers
T54/T-55, TR-77 (Romanian variant)	2500
Type 59, Type 69-2 (Chinese)	1500
T-62	1000
T-72 (T-72B, T-72G, T-72M1)	(approx) 500
Chieftain Mk3/5	30
M-60, M-47 (U.S.)	unknown

Figure 1

This list, which also includes Syria and Libya, is expected to continue to grow. There are also five different countries (including the Soviet Union) that currently produce the T-72.

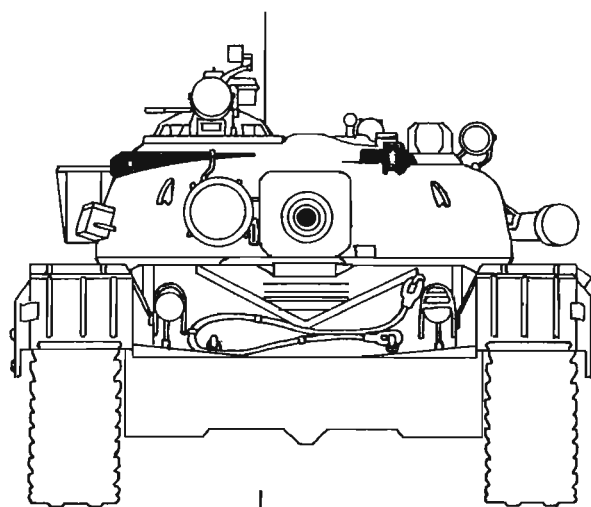
Although first seen by the West when the Soviets paraded it in Red Square in November 1977, the T-72B in Iraqi service remained largely unknown until the outbreak of the Iran-Iraq war. Most of the video tapes of the war clearly show that the Iraqis were proud of their T-72s and were quick to show these tanks to the world. It must be pointed out, however, that some of these video tapes were made during the early part of the war and do not show the two most modern of the Iraqi T-72s.

The Iraqi Army's T-72s

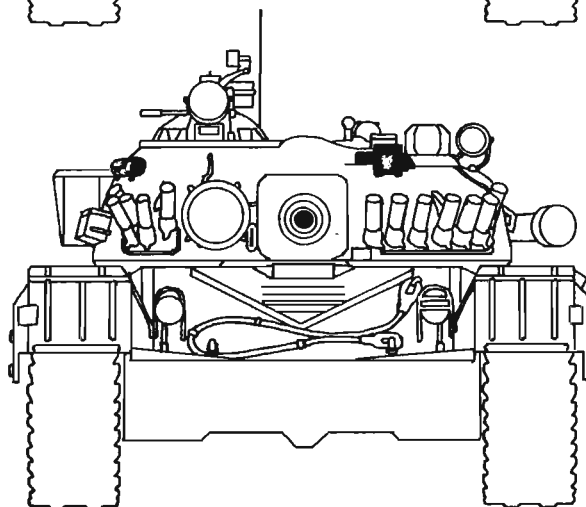
While some of these variants are much more modern and capable than others, the threat imposed by the export models of the T-72 has become a reality.

The Iraqi T-72G and T-72M1 are more modern and more capable variants of the T-72B. All three variants mount the same 2A46 D-81TM 125-mm main gun. The earlier T-72B is fitted with a coincidence rangefinder, while both the T-72G and the T-72M1 mount laser rangefinders. This difference facilitates variant identification: only the T-72B model has the right-side rangefinder "ear," or end-housing, on the turret roof. The T-72G and T-72M1 do not. The three variants are illustrated in Figure 2, at right.

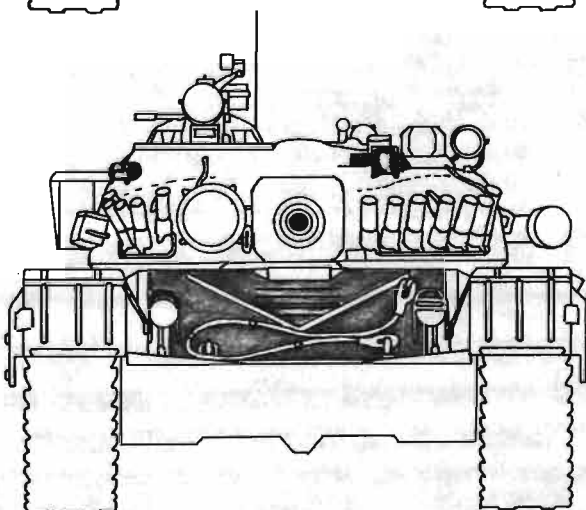
The other significant difference between the variants is their armor protection. While the exact details of the armor composition and capabilities are classified, open sources confirm some general information. The oldest of the three variants, the T-72B, has a conventionally armored RHA turret. The glacis armor, however, consists of a three-layer design with an outer layer of steel, a middle layer of glass-fiber/ceramic material, and an inner layer of steel. Reportedly, the



T72B

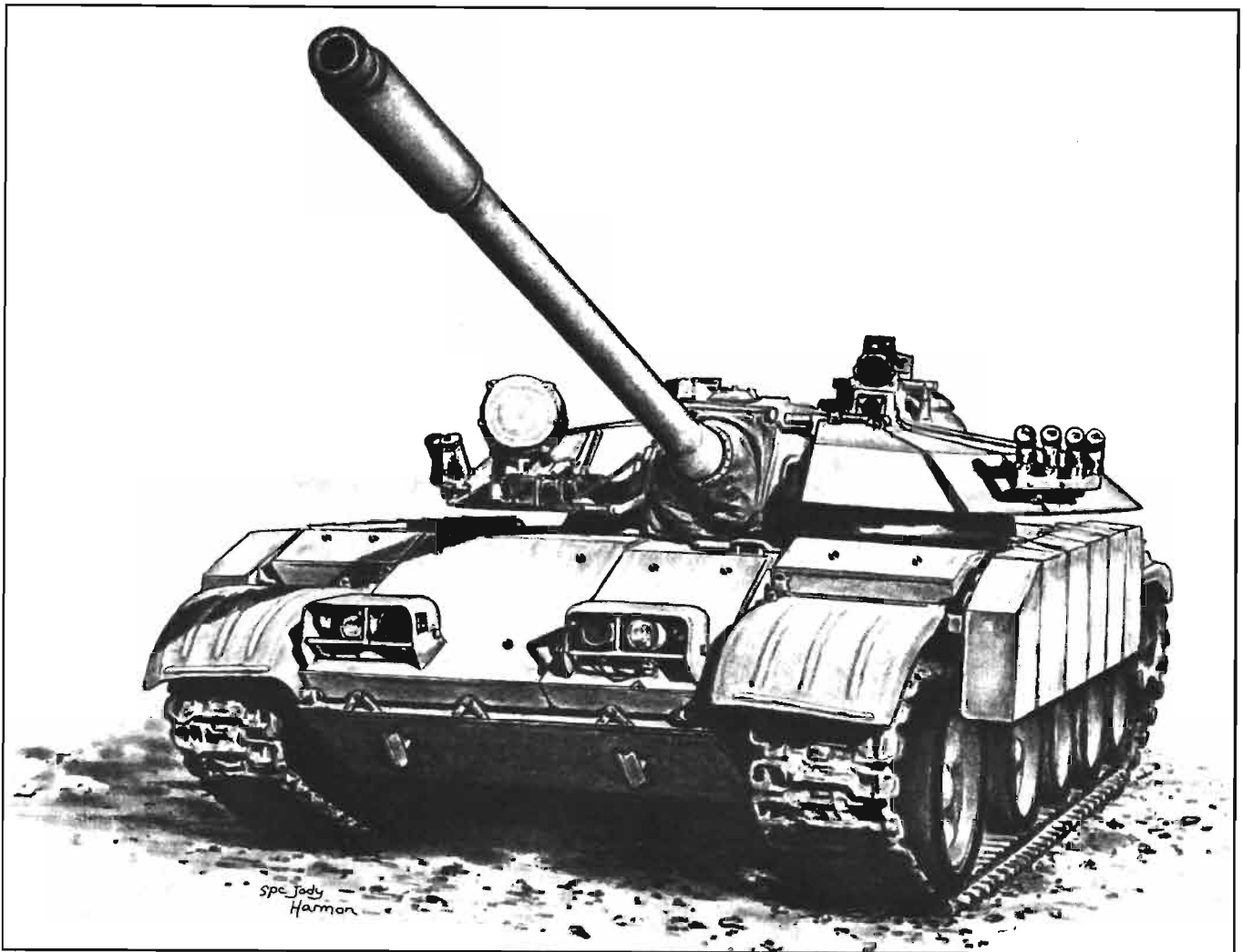


T72G



T72M1

Figure 2



actual thickness of this composite armor is 200mm. Like the T-72B, the T-72G has a conventional RHA turret and uses the same three-layer composite front slope. This pattern of armor protection apparently changed with the T-72M1. The frontal armor is visibly thicker, and composite armor is built into internal cavities on either side of the main gun. With the important exception of the added plate, the glacis armor used on the T-72M1 is similar to the earlier variants, and considered to be at least as effective.

The 30-mm-thick add-on armor "face-plate" on the glacis has two holes cut in it to allow it to fit over the standard tow hooks. The addition of this face-plate improves the already very capable glacis armor

beyond the level of the T-72B and T-72G. Because the T-72G and T-72M1 are very difficult to tell apart, the two holes cut in the added armor plate (as well as the small section of the original glacis visible below the tank's left and right headlights), offer one of the few visible variant identification features.

Additionally, all three of these T-72 variants can be (and normally are) fitted with forward-firing smoke grenade launchers attached to the turret front on both sides of the main gun.

Finally, there is some confusion in the unclassified press concerning the production of these T-72 variants in Iraq. While both the T-72B and T-72G were exported to

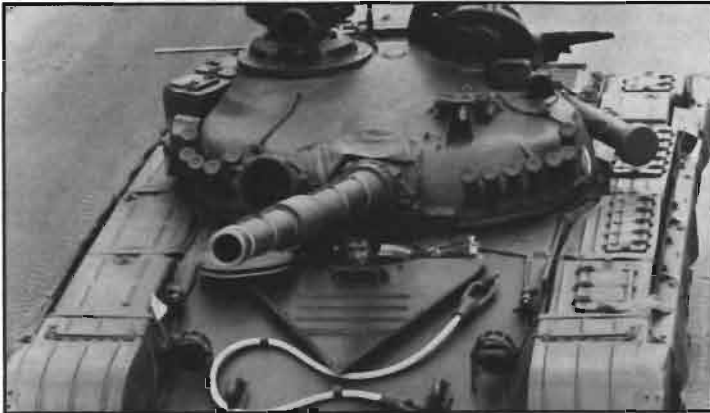
Modified T-55

Fitted with very thick multi-layer (probably composite) applique armor on the glacis, turret front and sides, hull sides, and turret rear. Four large multi-layer armor "boxes" cover almost the entire rear area of the turret, are attached via a large metal bracket, which provides a considerable standoff distance between the add-on armor and the RHA turret armor.

Iraq from the Soviet Union and Czechoslovakia/Poland respectively, the origin of the T-72M1 is not as clear.

Some sources state that the Iraqis are in fact producing the T-72M1, while others report that the Iraqis are only assembling it. It has been confirmed, however, that the Iraqis are producing the T-72M1's main

The T-72: Identifying the Variants



Iraq also uses the T-72G, similar to this East German tank. It has a laser rangefinder (note single "doghouse") and smoke grenade launchers on turret.



T-72M1 resembles the G Model, but has an add-on armor plate covering the front slope. Tow hooks pass through add-on plate. This T-72M1 is Finnish.



T-72B has right side window for earlier coincidence rangefinder. This one is East German.



Close-up shows add-on armor plate on T-72M1 front slope and tow hook openings.

The M-84 version of the T-72 is made in Yugoslavia, was used by the Kuwaiti Army, and, since the invasion of Kuwait, is now probably employed by Iraq. Note unusual gunner's primary sight and wind sensor on the turret roof.



Within the framework of a Persian Gulf scenario, the threat posed by the Iraqi Army cannot be overstated. This threat is based upon Iraq's massive armored force, and, more specifically, the main battle tanks that lead it.

gun, ammunition, and some of the tank's electronic components. In Iraqi service, the T-72M1 is known as the "Babylon Lion."

The other group of Iraqi MBTs that deserve special attention are the indigenously modified Soviet T-55 MBTs. While the massive Iraqi modification effort also includes the fitting of full-length hull applique armor to the BMP-1, the creation of a 160-mm SP mortar on a T-54/T-55 hull, and the creation of a four-tube 120-mm SP mortar on the MTLB (to name a few examples), the centerpiece of this program is clearly the modified T-55. The basic T-55 has been extensively reworked, resulting in two different versions. The first involves mounting, in the T-55, the complete main gun and automatic loading system of the T-72M1. This impressive modification, which also includes new passive night sights, smoke grenade launchers, and a large turret stowage basket, apparently required the turret roof to be raised a few inches to accommodate the automatic loader. Like the T-72 variants, this "new" T-55 is fitted with full-length non-metallic hull skirts and the T-55 crew is reduced from four to three men.

The second modified Iraqi T-55 not only causes problems for vehicle identification, it also gives a good indication of the capabilities of Iraqi military technology. This "new" T-55 is fitted with very thick multi-layer (probably composite) applique armor on the glacis, turret front and sides, hull sides, and turret rear. The four large multi-layer armor "boxes" that cover almost the entire rear area of the turret are attached via a large metal bracket, which provides a considerable standoff dis-

tance between the add-on armor and the RHA turret armor.

The new armor completely changes the look of the T-55, giving it a very "non-Soviet" appearance. Although very little information has been released concerning the composition and capabilities of this multi-layer armor, a quick look at the available photographs reveals some of its potential. Depending on the threat that this new armor was designed to defeat (which could include Israeli and Iranian 105-mm and 120-mm main guns, as well as the massive number of modern ATGMs deployed throughout the area), the Iraqis may have effectively brought this 32-year-old tank into the 1990s. This T-55 still mounts the original D-10T2S 100-mm main gun, although it has been fitted with passive night sights and forward firing smoke grenade launchers. Finally, these modified T-55s (in the hands of Iraqi combat veterans) are not the same MBTs that the Western world has downplayed in recent years. In Iraq, these old T-55s may have re-emerged as capable "new" lions.

Within the framework of a Persian Gulf scenario, the threat posed by the Iraqi Army cannot be overstated. This threat is based upon Iraq's massive armored force, and, more specifically, the main battle tanks that lead it. The alarming size and capabilities of the Iraqi MBT fleet, like those of many other potential enemies, must be countered and defeated (if required) by a superior heavy force.

The worldwide availability of both imported and locally produced Soviet T-72s, and the increasing ability in several countries to modify and update older vehicles; repre-

sents a heavy armor threat that requires a U.S. heavy armor solution. The firepower, mobility, and protection provided by the M1 Abrams close combat heavy force, currently deploying to the Persian Gulf, is the solution to the Iraqi MBT threat.

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Fighting Under Desert Conditions

by Lieutenant Colonel David Eshel, IDF Retired

"The desert is the tactician's paradise, but the quartermaster's nightmare..."

-GEN VON RAVENSTEIN,

Afrika Korps, WWII

The Israeli Army is probably the only Western-oriented military force that has gained wide experience in desert fighting since World War II. The harsh desert environment has forced many adaptations on both men and machines. For these reasons, our experiences may be of interest and value to the Allied forces deployed in Saudi Arabia.

The Desert Environment

The plains of the desert, in some places broad, and in other areas narrow strips between mountainous areas, can offer good mobility to a tracked, armored force. But desert terrain can vary: what appears to be a rocky hard surface may be underlaid with soft, sandy soil. Flat areas may be dry lakes or salt marshes that may be suitable for camps or airfields, but will not support heavy tracked or wheeled vehicle traffic because they are wet beneath the hard crust. Carefully scout the terrain before moving vehicles across

it. In Saudi Arabia, movement is generally good for tracked vehicles, but there are few paved roads, making logistical vehicle traffic difficult, especially in open areas where there is no protection from air attack.

Careful reconnaissance is essential. What may appear to be a flat surface in an aerial photograph may hide escarpments and steep-walled wadis that will hinder movement, especially at night. Only careful scrutiny of stereoscopic, oblique-angle aerial photographs will reveal the shadows of these land features.

In many locations, traffic is limited to narrow defiles. These can present excellent ambush sites for antitank commando teams inserted by helicopter. In other areas, what appears to be a flat surface may be strewn with boulders that can throw the tracks of tanks and AFVs at critical moments. Tracked vehicles may have insufficient ground clearance to pass through boulder-strewn areas, further impeding mobility.

Heat is the most critical threat to desert operations, as so many recent newscasts have reminded us. But with that heat can come suffocating humidity that is very difficult for westerners to tolerate unless they are acclimatized. This condition can stretch a soldier's tolerance to the very limit. Tanks and armored vehicles act as heat sinks: conditions inside can rapidly become intolerable, and even the exteriors of the vehicles can burn soldiers and cause spontaneous combustion of flammable materials. Crews trained in European climates will take time to adapt to these conditions, probably suffering substantial loss of effectiveness until they get used to the environment. Both British and German troops experienced this effect in World War II during fighting in the Western Desert of North Africa; the climatic conditions in Saudi Arabia and the Gulf countries will be even more severe.

Soviet vs. Western Armor

The Israeli Army has operated both Soviet and Western tanks in desert combat. Our experience indicated that the Soviet vehicles are poorly designed from a human en-



The Israelis "human-engineered" their Merkava tank for desert fighting.

gineering standpoint, especially for operations in very hot environments. Israeli crews in T-55s and T-62s employed in the Sinai experienced severe heat stress and near suffocation because of cramped interiors and poor interior ventilation. These tanks had already been modified considerably by Israeli ordnance experts, but they could do little to improve the weaknesses of the basic designs. During fighting in both the Golan and the Sinai, Soviet crewman abandoned their tanks. Arabs were acclimatized to the desert, but when captured, some were close to exhaustion after only a very short time in action. Captured tank and BMP crews had to be dragged from their deathtraps nearly unconscious after suffering heatstroke. The combination of heat, lack of ventilation, and exposure to toxic fumes from main gun breeches can be more deadly than enemy action.

Western tanks are somewhat better in terms of ventilation, and the layouts of the fighting compartments are more spacious, although much space is devoted to high tech equipment. The Israelis designed the Merkava in light of their experience in desert fighting. It is probably the best tank for fighting in hot climates. The fighting compartment is spacious and well ventilated, there is direct access from the

driver's station to the fighting compartment, and there is a door at the rear for easy exit in an emergency. Air conditioning and easy access to cooled water reservoirs helps endurance: Merkava crews suffered much less heat stress than Israeli crews mounted in other tanks, even during the most extreme weather conditions.

Many Western armies have experimented with cooled tank crew overalls that draw off body heat and permit the crewman to wear chemical protection suits for long periods without compromising efficiency. The suits also prevent dehydration in extreme weather conditions.

Collective NBC protection systems, like the systems in the M1A1 tanks, offer another solution to the heat stress problem, allowing crews in contaminated areas to fight buttoned-up without protective equipment. While this type of protection can make life much easier for tank crews fighting under a sustained chemical threat, the systems also have disadvantages, mainly that the tank must be completely buttoned up for the system to be effective. This reduces visibility. Anyone who has commanded a tank in action knows that this reduces quick reaction to target acquisition, and increases danger from helicopter attack.

The age-old dispute over whether it is better to fight with closed or open hatches will probably never be resolved. Armchair experts will always advise commanders to close the hatches for protection, but the experienced commander will still opt for open hatches, using his binoculars for all-around observa-

tion, rather than depend upon optical equipment, no matter how sophisticated. Many a tank crew has survived by detecting its opponent and bringing its main armament to bear quickly, in spite of the danger from shrapnel and airburst artillery, which remain the most serious danger to tank commanders fighting from open hatches.

Open hatches, of course, do not solve the problem of operating under the threat of chemical attack. The choice has to be made by individual commanders as to which method to use when facing a particular threat.

In our opinion, given the acute discomfort of wearing existing chemical protection suits, the choice is a difficult one, to say the least. But operating in desert climates for long durations, dressed in personal NBC gear in buttoned-up tanks, will tax the endurance of even the best trained crews very quickly, considerably reducing their combat efficiency. The best solution would be the use of collective NBC protection as last resort only, when traveling over rear areas endangered by chemical attack, but using personal protective gear in combat areas, with open hatches, especially for the tank commander. Given early warning of a chemical attack, a tank commander can use his mobility to avoid danger areas. Crews could operate without protective masks until warned of impending attack.

Cooled crew coveralls could significantly extend the endurance of these crews, keeping body temperature at normal levels over long periods. Chemical attacks in a desert environment tend to dissipate quickly and tend to be con-

finied to limited areas, so it would be best for crews in these conditions to keep on the move, exiting the danger zone as quickly as possible.

One must remember that, while the danger of chemical attack is acute, the effectiveness — due to the Iraqis' limited resources — should limit the danger zone considerably, making rapid mobility the best defense.

Not only humans are affected by the humid heat of the desert. Hardware, especially more sensitive equipment, is prone to frequent malfunction, affected by heat, humidity, and especially dust. We are not talking about ordinary city dust, but hard, abrasive grains of sand of widespread particle size. Some of the grains are large enough to cause abrasive damage; the finest dust demands meticulous filtration. In worst cases, the fine dust carries sodium chloride or mineral salts that can attack precision equipment.

The problem becomes more serious during movement — tanks and other AFVs raise clouds of fine dust. Dispersing the vehicles will help somewhat, but spreading out too much can be dangerous, too, if vehicles lose visual contact over vast areas. Then unit navigation becomes a problem. Some solutions are to use antenna flags or pennants to make individual vehicles more visible in daylight, and colored marker lights to maintain visual contact in darkness.

In many cases, the only part of a vehicle that is still visible during a dusty desert road march is the antenna, and it should be used accordingly for identification.

Gunnery in Desert Warfare

Tank gunnery poses acute problems under extreme heat conditions. Solar radiation can substantially influence firing accuracy because gun barrels tend to distort. Firing tests indicate maximum distortion at 1000 and 1600 hours, when there is the greatest disparity between the temperatures along the top and bottom of the gun tube. At midday, the reflective heat off the desert tends to equalize the heat striking the top of the barrel.

Thermal shrouds over the barrel will limit this problem, although it remains to be proved if the shrouds developed for European climates will be adequate in a desert environment. Suffice to say that solar radiation will adversely affect first-round hit probability. Errors in precision tank gunnery have been known to exceed 7 mils, which would result in a miss even though all parameters would be correct in the fire-control system.

Another desert gunnery problem is caused by the shimmering heat waves that disrupt sighting beyond 1000 meters. The effect becomes even more intense when looking through sensitive optical equipment that magnifies the rippling heat waves and can completely blot out target sensing.

Radios

Heat causes great strain on radios and other electronic equipment, which can be extremely prone to malfunction in the desert. Dust and high humidity affects internal components, creating problems that are difficult to isolate and repair. Often,

The desert can be either friend or foe for the warrior. In most cases, especially during early morning or before dusk, visibility is almost limitless over the desert flats. Cover is rare, and every hill, however low, becomes a vital objective for maneuvering forces.

it is better to exchange modules rather than track down faults, but this creates the added logistical burden of keeping line echelon units stocked with replacement modules.

High temperatures inside tanks and AFVs also affect reliability, although air conditioning will reduce this hazard. More at risk are radios mounted in open vehicles where they are exposed to heat and corrosion. Protective covers are essential to keep the equipment working reliably.

Radio communication itself can become erratic during some periods of the day. Dry air and frequent dust storms create static electricity that can disrupt communications completely or greatly reduce the range of FM radio networks. At night, especially after midnight, AM communications can fade severely, also picking up interference from long-range radio stations and jamming short-range communications. Desert veterans have been in situations where musical broadcasts completely dominate the band, blocking out any military messages.

Dust, Grit, and Reliability

Desert operating conditions severely affect tank running gear. Hard grit enters sensitive moving parts, which can virtually explode as they overheat. Dust storms can quickly overwhelm air filtering systems, turning them into a gelatinous mess. Tank crews must monitor operating temperatures to be sure that when

overheating begins, filters can be quickly changed. Care must also be taken with optical equipment. Careful maintenance, to avoid scratching sensitive optics, is critical. Dirty optics or scratched optics can mean the difference between a target hit and a miss, literally a matter of life and death.

Conclusion

This is advice gained from experience of desert fighting. The desert can be either friend or foe for the warrior. In most cases, especially during early morning or before dusk, visibility is almost limitless over the desert flats. Cover is rare, and every hill, however low, becomes a vital objective for maneuvering forces.

Although modern tank gunnery techniques enable quick target acquisition and reaction to gain first-round kills, identification of targets remains a problem even with the best equipment. At desert distances, it is difficult to recognize friend from foe, even if the enemy is using different equipment. Tanks in hull-down, or especially turret-down, positions are extremely hard targets to detect and identify.

To survive in the open desert, devoid of cover, one must keep moving. Remaining static for long can mean a quick death from an enemy tank or tank-killing ATGM crew hiding in a hole. This is why most experienced commanders prefer to fight their tanks from open

hatches, using binoculars to detect movement. Often, there is only a split second available to react. Moreover, the open hatch admits air that is both reassuring and helpful in keeping a crew operating at full efficiency. In addition, every third or fourth TC has to control several tanks as well, so observation is essential to keep his unit intact, something that is very hard to do using optics alone.

As Western forces struggle to adapt to the severe heat of the Arabian Peninsula, they might take comfort in the words of a famous Israeli tank veteran, who said, "Let's face it. Most of the time, you are so scared that you don't even have time to think of the heat." One of the most decorated soldiers in the Israeli Army, Avigdor Kalahani should know.

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Failure of Israeli Armored Tactical Doctrine, Sinai, 6-8 October 1973

by Major Edwin L. Kennedy



M-51 Super Sherman with French 105mm gun.

Short and intense, the Yom Kippur War of October 1973 tested the doctrine of Israeli tank warfare and pronounced a serious verdict. Not only was the tactical doctrine wrong, it was fundamentally unsound. By incredible luck and improvisation, the Israelis were able quickly to reverse their approach to armored warfare organization and tactics. The culmination of their very quick combined arms metamorphosis was the crossing of the Suez Canal with elements that were a tailored mix of combat arms and support elements.

A number of issues evolved from 1967 to 1973 to cause the Israelis to fail miserably during the initial battles in the Sinai. One of the most significant doctrinal problems was the fixed organization of the armored units, from battalion to brigade level, in "pure" formations instead of task organized units. The cause of this reorganization was the result of a number of influences.

In this article, I will describe how the Israelis suffered one of their worst defeats in modern history as a result of improper analysis of the tactical lessons of previous conflicts. Specifically, I will discuss the implications of the tactical failures of the Adan armored division 6-8 October 1973. Finally, I will cite the changes to IDF armor doctrine and organizations as a result of those actions.

On 6 October 1973, the Israelis were defending in the Sinai well-forward. They planned to use the Suez Canal, a series of forts, and forward-deployed armored reserves to halt any attack until the arrival of the reserves that provided the bulk of their army. A reserve armored division was stationed in depth, with battalions situated several kilometers behind the canal and forts. Using its mobility and firepower, the armored division was to thwart Egyptian crossing efforts at the canal and, if necessary, counterattack the Egyptian forces that might penetrate Israeli static defenses.

MG Avraham Adan was commanding his reserve division (162nd) stationed in the north-central Negev at Beer'sheva and was in excellent position geographically to deploy into the Sinai.¹ The division consisted of three reserve armored brigades and was further reinforced during time of war under the "Ugdah" (division task force) concept.² The brigades were of varying strengths, but began the war in the triangular organization standard to most of the Israeli Army. One brigade began the war by detaching a tank battalion to the Northern Command. By the close of the war, Adan's division had collected remnants of units destroyed in the Sinai, the Uzzi Paratroop Brigade, and three separate paratroop/reconnaissance battalions.³

The 162nd Division was alerted between 0600-0900 hours on 6 October and, along with the balance of the Israeli Army, began mobilization.⁴ Already deployed forward as part of the Sinai reserve division of the Southern Command, the 460th "Gabi" Brigade of the 162nd "Adan" Division was already situated to deploy to the battle area from Bir Gifgafa.⁵

The other two brigades of Adan's division moved forward that evening, designated as the "131st Operational Group" for security. The 131st Operational Group closed to about half the distance to the battlefield by the next morning.⁶ The majority of the Nir (212th) and Aryeh (500th) brigades road marched from Beer'sheva to the front as soon as they were considered ready, despite the lack of tank transporters and the seriousness of the military situation.⁷

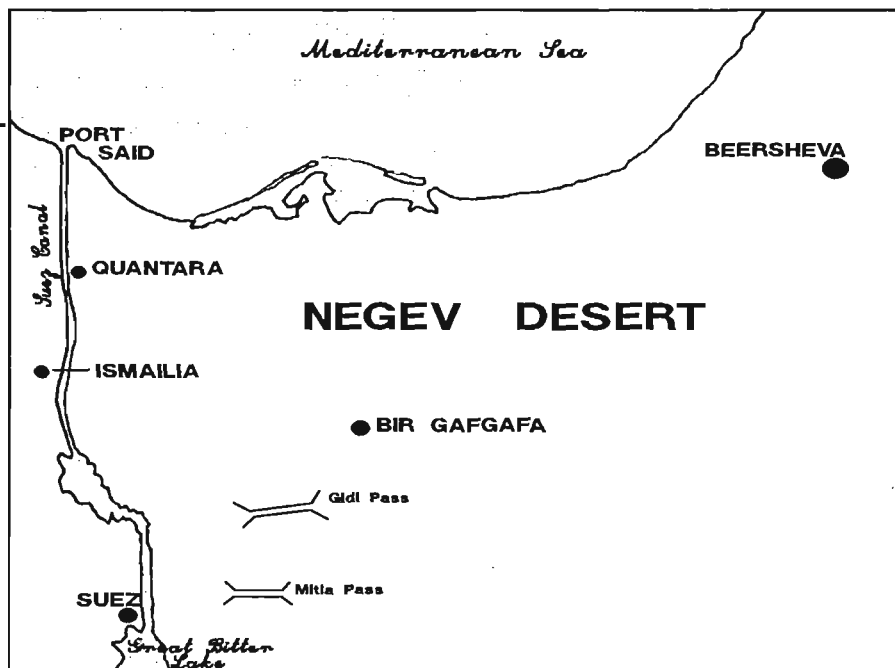
The 131st Operational Group (-) was strung along the Beer'sheva-Romani coastal road when it was ambushed early in the morning of 7 October. Lacking infantry to provide close-in security, the tank units were susceptible to attack by Egyptian antitank killer teams. The Nir Brigade suffered several losses, including a tank and several halftracks. Despite its setbacks, the Nir Brigade was able to reach the front shortly afterward.⁸ The Aryeh

Brigade did not arrive until late morning of 8 October.⁹

Already a serious problem had developed in the Sinai; which left the Israeli commanders with few alternatives. The Egyptians had crossed the Suez Canal in strength and were pressing the defenders' units back along a broad front with high losses. Adan's situation demanded one of two courses of action. Adan could either attack immediately with available forces, or wait, concentrate, then attack with massed forces.

MG Adan decided to attack immediately. At 0700, 1000, and 1500 hours on 7 October, Colonel "Gabi" Amir sent battalion-sized, tank-pure counterattacks forward beginning with Battalion 76.¹⁰ The attacks were conducted with no artillery support, virtually no CAS, and no accompanying infantry. The Israelis repeated this pattern of actions along the entire Sinai front. What resulted was a debacle of the first degree. Approximately 150-200 Israeli tanks (two brigade equivalents) were lost during the first 14-16 hours of these uncoordinated attacks along the entire Sinai front.¹¹

Losses attributed to the 131st Operational Group during the initial fights of 7 October are difficult to ascertain. However, of the two brigades available for battle on 8 October, Adan cites that 170 of the 192 tanks authorized were present for combat that morning.¹² This would indicate a loss of 22 tanks for whatever reasons, which might include combat losses. With the poor maintenance record of the reserve units and normal breakdowns, combat losses were, therefore, fairly light on 7 October. The battles on 8 October were very dif-



Key locales in the 1973 Sinai Campaign

ferent and heralded a disaster for General Adan's division and the Israeli armored corps.

The Israelis marshalled a sizable tank force to counterattack the Egyptians on the third day, 8 October. Remarkably, this large force was rushed into sector despite the numerous problems encountered by the Israelis — poor maintenance, missing equipment, mixed tank crews, understrength units, and a major two-front war. The Sinai was, and always has been, considered the most important front. The main ground effort has generally been devoted initially to operations there. In 1973, however, air operations were initially apportioned to support the front on the Golan and only later switched to the Sinai, a change from past wars.¹³

By 8 October, MG Sharon's division had arrived and was employed to the south of Adan's sector. Sharon's arrival allowed Southern Command to thicken the fight in all sectors by concentrating tanks. During the night of 7-8 October, Adan was directed in a confusing sequence to send the 131st

Operational Group into the attack parallel to, then toward, the Suez Canal to link up with the bypassed and surrounded forts in sector.¹⁴

At 0759 hours on 8 October, the 160th "Gabi" Brigade attacked toward the Suez Canal between Quantara and Ismailia into elements of the Egyptian 2nd Infantry Division. The Egyptians had been waiting for this rash act by the Israelis, who expected the Arab soldiers to quit and run at the sight of the Israeli tanks. The Israelis did not even try to close by maneuver, instead, they charged.¹⁵

Instead of assaulting by moving forward under the cover of overwatching tank fires, the Israelis arranged their brigade in column, battalions in-line and moved at speed toward the Egyptian infantry, which was dug in and armed with numerous antitank weapons.¹⁶ Very much unlike past wars, the Israelis had numerous vehicles hit. Six tanks of the lead battalion were left on the battlefield, with others hit and damaged. Undaunted, Gabi's brigade withdrew to reorganize and attempt a breakthrough again.

Adan planned for another attack by both Gabi's and Nir's brigades at 1430 hours in a coordinated push to the canal. Through poor communications, misunderstandings, and factors that might be characterized as the "fog of war," the brigades failed to attack jointly.¹⁷ Nir's brigade attacked with two battalions in line, brigade on line. Again, without any supporting artillery and without mutually supporting infantry, Nir's units deployed and "charged."¹⁸ The Israelis did not have the benefit of the sun to their backs this time, and the Egyptians took a massive toll of the attacking tanks. Eighteen of 22-25 tanks in one battalion were hit. The brigade ended the engagement with only ten operational tanks to fight the Egyptian counterattack that afternoon.¹⁹ What happened to the Israelis is an interesting lesson in arrogance.

By 1973, the Israeli Army had gone full circle from its organizations of 1948. Initially an infantry intensive army, the Israelis quickly grasped the concept and acquired the vehicles for maneuver warfare. By 1956, they were able to exercise the newfound power of armored units. The tank provided the firepower and shock to quickly destroy enemy armor in classic "tank versus tank" battles, which the Israelis eagerly sought.²⁰ In the open desert against an enemy poorly equipped with antitank weapons, superior gunnery and speed proved successful. In 1967, the Israelis validated their offensive armor doctrine in the Sinai by quickly defeating the Egyptians with deep penetrations and rapid envelopments. The Israelis incorrectly analyzed the cause of these successes and drew improper conclusions from their analyses.

The Israelis were quick to point to the successes they had gained with

armor in the Sinai in both 1956 and 1967. They generally dismissed the actions on the West Bank and in the Golan because they did not fit into the Israeli model of mobile warfare. Fighting in both of these other locations required larger numbers of infantry on more restrictive terrain. Tanks played a supporting role instead of a lead role in the advance through the Judean hills, up the slopes of the Golan and through cities like Jerusalem.²¹

Additionally, a number of the influential armor corps commanders had served in the Sinai in both 1956 and 1967 and were products of their experiences. From 1956 onward, the influence of the armored corps commander played a larger role in the promulgation of tanks in the IDF.²² During this time, the armor branch gained preeminence over the other branches and services.

The maneuver companion to the tank in 1956 and 1967 was armored infantry carried in surplus M2/M3 infantry halftracks of U.S. WWII vintage. During the Six-Day War, Israeli armored infantry in halftracks had great difficulty keeping up with newer tanks, such as the Centurions (vintage 1946) and M48 Pattons (vintage 1953). The infantry was allowed to suffer from neglect in equipment and training. The infantry, by its very nature as a more manpower intensive branch, made stabilization in units difficult and training haphazard. By and large, the infantry was supplied by the reserves and was intended for reduction of strongpoints and mopping-up operations, not spearheading assaults with the armor units.²³

The lackluster performance of the armored infantry in the Sinai during 1967 convinced a number of armor leaders that tanks alone could perform all the missions required of the ground gaining arms.²⁴ Tanks

had additional machine guns mounted on the turrets, and tankers were trained to assault infantry trenchlines with their own suppressive fires.²⁵ General Tal, an extremely successful and influential tank commander, was the major proponent of the "all tank" unit organizations. While not all Israeli leaders agreed with the concept, enough influential officers did, and it became the doctrine of the IDF between 1967 and 1973.²⁶ At the same time, infantry antitank weapons like the RPG-7 and wire-guided antitank missiles with increased lethality were increasing in numbers on the battlefield. Israeli tactical doctrine did not account for this major difference.

Misreading the reasons for their successes and elevating the dependence on the tank to the point of almost virtual exclusion of the other ground arms, the Israelis developed a doctrine of the "all tank" units.

The Israeli Army was already weak in infantry and this further "all tank" parochialization harmed what had been a fairly successful combined arms team. The problem caused by the poor quality infantry equipped in vehicles not able to keep pace with the newer tanks was simply solved in 1967-73 by elimination of the infantry from armored unit TOE. Infantry would still be available, but only as separate units to conduct traditional infantry-specific tasks.

The result of these organizations was the destruction of at least 400 of the 800 Israeli tanks committed in the Sinai during the opening battles of October 1973.²⁷ It didn't take very long, but the Israelis quickly determined the problem with their "all tank" organizations combined with the tactics of "charging." On 12 October, the Egyptians reported that the Israelis had changed their

tactics and were using artillery and infantry in concert with the tanks.²⁸ Additionally, the tankers began to return to the technique of "position improvement," using the terrain and moving by bounds under the cover of other tanks, instead of wildly "charging."²⁹

This resultant change, remarkably initiated in a period of just a few days, made the difference between success and failure in further armored operations. The changes capitalized on a major Israeli strength — the ability to improvise. Armor losses dramatically decreased in subsequent operations. The crossing of the Suez Canal was the epitome of combined arms action. The cost of relearning the combined arms lesson was staggering to the Israeli Army.³⁰

The Israelis appear to have relearned the major lessons of combined arms warfare well. As a result of the 1973 war, the number and quality of self-propelled artillery has increased, making it more available and responsive to armored corps units. More important, infantry is now organic to every tank battalion and brigade. Every tank battalion has one organic infantry company, and tank brigades may have one infantry battalion. While infantry still maintains a second place, the Israelis recognize the problem and are attempting to solve it.

Notes

¹Martin Van Crevald, Command In War, (Cambridge, Mass.: Harvard University Press, 1985), p. 219.

²Avraham Adan, On the Banks of the Suez, (Novato, Calif.: Presidio Press, 1980), pp. 7-8.

³Ibid., Flyleaf inside cover. The Infantry formations were only attached before the crossing of the Suez Canal 16-17 October.

⁴Ibid., 9.

⁵Van Crevald, p. 205.

⁶Adan, p. 152.

⁷Van Crevald, p. 219. Based on the shortage of tank transporters in 1973, Israel invested a large sum to purchase transporters from European sources. I personally observed about 50 in a large motor park in the Negev which appeared to have been fairly new in 1981.

⁸RB 100-2, Vol. I, "Selected Readings in Tactics, The 1973 Middle East War," (Fort Leavenworth, Kan., USACGSC, 1980), p. 40.

⁹Adan, p. 135.

¹⁰Edgar O'Ballance, No Victor, No Vanquished, The Yom Kippur War, (San Rafael, Calif.: Presidio Press, 1978), p. 114 (Map 6).

¹¹Col. T.N. Dupuy, Elusive Victory: The Arab-Israeli Wars, 1947-1974, (Fairfax, Va.: Hero Books, 1984), p. 419.

¹²O'Ballance, p. 117; Adan, p. 112. Magan states there were 180 tanks in the division on the morning of 8 October, a minor difference.

¹³RB 100-2, Vol. I, p. 45.

¹⁴Van Crevald, p. 212.

¹⁵Dupuy, p. 419.

¹⁶RB 100-2, Vol. I, p. 63.

¹⁷O'Ballance, p. 116.

¹⁸Stan Morse, ed., Modern Military Powers, Israel, (New York: The Military Press, 1984), p. 42.

¹⁹Van Crevald, p. 224.

²⁰CPT Edwin L. Kennedy, Jr. Course Notes, Israeli Armored Corps Commanders Course. The Israelis firmly believe that the way to destroy enemy armored formations is with the tank. Tank versus tank engagements at extended ranges are stressed. Precision gunnery, though different from U.S. standards and procedures, is considered the foundation of the "tank versus tank" battle.

²¹David Eshel, Chariots of the Desert, (London: Brassey's Defense Publishers Ltd., 1989), p. 181.

²²Ibid.

²³Dr. George W. Gawrych, Key to the Sinai, The Battles for Abu Ageila in the 1956 and 1967 Arab-Israeli Wars, Research Survey No. 7, (Ft. Leavenworth, Kan.: USACGSC, 1990), p. 24.

²⁴Sam Katz, Israeli Defense Forces Since 1973, (London: Osprey Publishing Ltd., 1986), p. 6.

²⁵CPT Edwin L. Kennedy, "Israeli M113s," Infantry, (Fort Benning, Ga.: USAIS, 1984), pp. 6-7.

²⁶Eshel, pp. 26-30.

²⁷O'Ballance, p. 156.

²⁸Ibid.

²⁹Kennedy, Course Notes. The technique of "position improvement" used by the Israelis is essentially the same as bounding in U.S. tactical doctrine. The bounds are conducted, however, during the simultaneous engagement of the enemy at long range. Positions are "improved" while continuously keeping the enemy force under fire, and the range is closed on the enemy's location. The contrast between this and the "charge" is quite evident because the exposure time to enemy return fire is significantly lowered by use of the terrain, hull defilade positioning, and mutual support.

³⁰Dupuy, p. 609 (Table F). The Israelis lost in excess of 1200 tanks during the conduct of the Yom Kippur War. Some 400 were repaired immediately and returned to units. Some 840 tanks required more than one day's maintenance and may, or may not, have returned to their units. The Israeli predilection with security prevents accurate figures from being published in the open press.

Major Edwin L. Kennedy has served as commander, C Company, 1-18 Infantry (Mech), 1st ID; G3 operations officer, 3AD; S3, 1-36 Infantry (M2 Bradley), 3AD; a tactics instructor, CGSC; and in the Tactics/Doctrine Department, U.S. Army Infantry School. He attended the Israeli Armored Corps Commanders Course while assigned to the Infantry School in 1981. He is currently assigned to the Center for Army Tactics as an instructor at the CGSC. Major Kennedy has had articles published by *Armor*, *Army*, and *Infantry* magazines.

Chemical Reconnaissance

by Captain Dennis M. Verpoorten

The ability of units at the National Training Center to plan and conduct chemical reconnaissance has become a major concern. Too often, units have lost from 10 to 20 soldiers because of poor training and improper procedures established at their home unit.

NBC training is, without question, the most neglected area on most units' training schedules, especially in the area of chemical reconnaissance. In addition, little information is available to units on the proper procedures and equipment necessary to conduct these missions. The purpose of this article is to present the proper procedures for conducting a chemical reconnaissance and to emphasize the importance of NBC training and the establishment of NBC reconnaissance SOPs within units.

Definition

Chemical Reconnaissance. Chemical reconnaissance obtains information of chemical contamination in a known or suspected area and conducts detection, identification, reporting, and marking operations. It may be either hasty or deliberate, depending upon available equipment and METT-T.

Hasty Chemical Recon: A hasty chemical recon will usually occur during the execution of a route, zone, or area recon, or under the threat of enemy contact. Its purpose is to identify the presence of contaminants and their tentative boundaries during the conduct of the unit's presently assigned mission.

Deliberate chemical reconnaissance will be a thorough operation, involving more time, equipment, and manpower. Its components are:

- Confirm and identify the type of agent.
- Send an NBC-5 report.
- Identify and mark each contaminated area.
- Mark the entire area to prevent friendly elements from accidentally entering the area.
- Mark routes around a contaminated area.
- Mark routes through contaminated area. Note: Use routes through a contaminated area as a last resort. Personnel should avoid contaminated areas unless the mis-



sion dictates otherwise. In this case, the chemical recon team will have to complete one of the following tasks:

- Coordinate with engineers to blast paths through heavily vegetated areas.
- Direct earth moving equipment to scrape off top layers of contaminated soil.
- Spread STB over heavy liquid contamination.

Coordination

The task force commander or the S3 will usually give the chemical recon team its operation order. The operation order may read something like this:

TF 2-72 will conduct chemical reconnaissance of a possible CHEMSTRIKE SITE vic AC 443256 from 050900 May to 051200 May. Routes to recon site will be from SP AC 431251 to RP AC 451263, to include an area 300 meters each side of route. Route will be designated as "Firebreaker." Mark any contaminated area or areas and submit an NBC-5. Complete an overlay and submit it to TF TOC NLT 051400 May.

If there had been more than one contaminated area, the unit would need to establish priorities by considering:

- Key terrain.
- Movement routes.
- Location of planned battle positions.
- New unit locations.

Upon completion of the operation order, the recon team OIC or NCOIC should coordinate with the following personnel:

S2. The S2 will be able to give you a current update of enemy activities, location, capabilities, and the type of agents used in the past. He will be able to help select the shortest and safest route to and from the recon area. Remember to avoid using the same route when returning to prevent contact (ambush) with the enemy. Additionally, the S2 will process current weather and terrain data.

TF Chemical Officer/NCO. Make contact with either one to review reporting formats and TF SOPs. The chemical officer will be able to give additional intel on the contaminated area from an assessment of previous NBC-2 reports. It would be to the chemical recon team's ad-



vantage to have one of these individuals accompany it during the recon. By doing this, the chemical officer or NCO will be able to:

- Supervise the location and set up of the decon site.
- Supervise the team's rehearsals of recon technical procedures.
- Check each soldier for proper wear of MOPP suit.
- Collect data obtained from chemical reconnaissance party.
- Operate M-272 water test kit and M-34 sampling kit.

S4. The S4, in most cases, will be responsible for the unit's decontamination team or attached team. He should coordinate for a wheeled vehicle, preferably a 2-1/2- or 5-ton truck. The purpose of the truck is to carry contaminated personnel from the contaminated area to the decon site. Units sending their recon

teams to contaminated areas in M113s, M2s, M3s, or any other armored vehicles should avoid putting dismounted personnel back into the vehicle, which would contaminate the inside. Unit safety SOP may prevent personnel from riding on the outside of vehicles. It is far easier to decontaminate the back end of a truck than the inside of a Bradley.

Medical Support. Units should always coordinate medical support and evacuation plans before the mission in the event of NBC casualties. Medical personnel should be standing by at the decon site and prepared to evacuate personnel.

Preparation

The element that most often receives these missions is the task force scout platoon. In some cases, the task force may already have designated personnel who make up the unit's chemical reconnaissance team. Still, it is important that each

commander is capable of conducting the mission with his unit if called upon. In either case, the procedures and equipment will be the same, no matter who receives the mission.

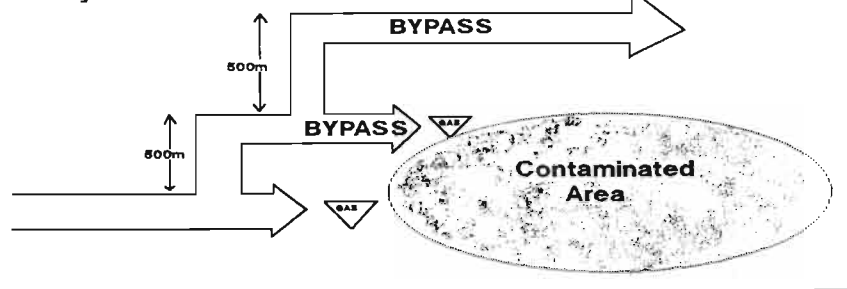
Before moving out, the team leader must give a complete operation order, followed by a brief-back from each recon member. After this, the team will conduct rehearsals. No less time, care, and effort should go into planning chemical reconnaissance than that which would go into any other tactical operation.

Be sure someone inspects completely all equipment, especially the MOPP gear that will be worn by the personnel entering the contaminated area. The equipment needed and items to be inspected include:

- Complete MOPP suit. Check to ensure that there are no holes or tears in the suit, boots, gloves, or the hood of the protective mask.
- Inspect mask for damage and proper fit.
- Ensure that each team member has M-256 kits.
- M-8 or M-9 paper.
- Complete marking kits.
- M-272 water test kit.
- M-34 sampling kit.
- Replacement MOPP suits and filters.
- Communications on the vehicles for mounted operations and a radio,

Figure 1

Chemical Reconnaissance
(Hasty Reconnaissance)



such as a PRC-77, for dismounted operations. Ensure that each soldier has call signs, primary and alternate radio frequencies, and a current map of the area with NBC reporting formats.

Decontamination equipment. For partial and self-decontaminating operations of vehicles and personnel, use the M-11, M-13 and M-258. But for large operations, keep equipment such as the M-12 or M-17 on standby.

Before the recon team moves toward the contaminated area, choose a decon site. The site must be upwind and well away from the chemical area, in a covered and concealed location. It should also be in an area that other friendly elements will not use.

Once decontamination is complete, the area itself may contain remnants of the chemicals brought back from the contaminated area. Stations should be able to handle both personnel and vehicle decontamination. Remember, medical personnel should also be here to handle chemical casualties.

Conduct of the Chemical Survey

Before the recon team moves forward, everyone will go into MOPP-4. The buddy system will ensure

that each soldier is wearing his MOPP suit correctly. If the team plans to enter the contaminated area with its vehicles, remove equipment (rucksacks, duffle bags, etc.) stored on the outside of the vehicle and leave it at the decon site. The less equipment exposed, the less will have to be decontaminated or considered a combat loss. Special consideration for vehicles entering the contaminated area:

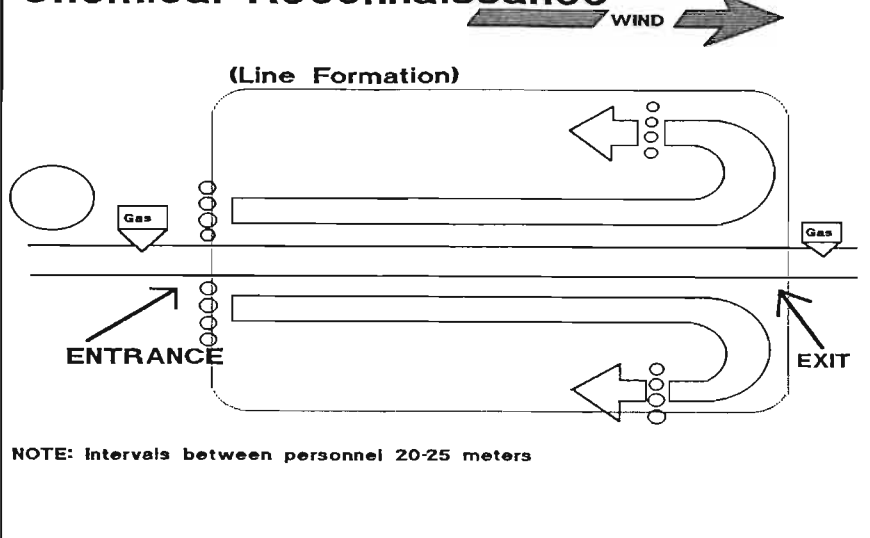
- Avoid low-hanging tree limbs.
- Avoid driving through puddles.
- Button up vehicles as much as possible.
- Move vehicles at extended intervals to prevent contamination from dust.

Again, avoid entering the contaminated area with vehicles if at all possible. If you must enter, ensure that anyone who dismounts does not re-enter the vehicle. DS-2 will play havoc with electrical wiring.

The area to be covered will determine the number of recon parties. When determining the number of teams, first take a look at the chart in *FM 3-3, NBC Contamination Avoidance*. By knowing the means of delivery, one can determine the area to be covered.

Figure 2

Chemical Reconnaissance



Hasty Reconnaissance. As stated earlier, a hasty recon is to identify the presence of agent and its tentative boundaries, and to find bypass routes. As an element moves forward, it makes contact with an agent. Once the contaminated spot is marked, the unit moves laterally 500 meters to either side of the original route before moving forward again. This is repeated until the unit passes the contaminated area (See figure 1).

Deliberate Reconnaissance. The following technique will prove not only to be the fastest, but also the most effective method to thoroughly inspect and survey a contaminated area. It is not a doctrinal procedure, but a method that has been proved. As shown in figure 2, recon personnel are formed in a line formation with intervals of 20 to 25 meters between personnel. Intervals will vary, depending on vegetation (the less vegetation, the greater the intervals).

As the team moves forward, it identifies and verifies contaminated areas with M-8 or M-9 paper. The team should employ an M-256 kit to identify the type of agent if using

M-9 paper. Once completed, the team marks the entrance to the area. As the recon team moves forward it should look for:

- Shell craters.
- Vegetation containing droplets of liquid.
- Low areas, such as depressions, ditches, ravines, stream beds, and abandoned fighting positions.
- Standing water or puddles of liquid.
- Areas where grids were given in NBC-2 reports.

If the team finds a source of liquid contamination during movement through the area, it should first test that liquid with M-8 and M-9 paper and then take a sample with the M-34 sampling kit. The team should then mark and label the area around the contaminated site.

As the team reaches the end of the contaminated area, it marks the exit. Once this is completed, the flanks of the area are the only things left to be identified and

marked. To do this, the team splits in half and returns toward the entrance, covers the area not already covered, and marks each contaminated spot (See figure 2).

When marking contaminated areas, use the NBC marking kits. But when marking routes into contaminated areas, it would be better to use equipment that following troops will see more easily, such as large poles or pickets and engineer tape.

Because white engineer tape is used for a variety of things, a unit may want to use colored engineer tape, such as yellow or green. This will avoid a mistake in identification.

Conclusion

Chemical agents are just as deadly as enemy direct and indirect fires. Chemical reconnaissance requires as much training, planning, coordination and rehearsal as any other assigned mission. To take this lightly will only result in unnecessary casualties and mission failure. Units need to ensure that their training schedules include all areas of NBC training.

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The Missing Link: Making the HMMWV Scoutworthy

First Lieutenant Kenneth L. Deal

Many lessons are learned at the National Training Center. Most are learned the hard way, and some are forgotten when soldiers go home. Despite the fact that so much is forgotten, it is always refreshing to see the number of lessons learned that are incorporated into subsequent rotations. We have recently seen more and more returning units with HMMWV-mounted scouts.

The HMMWV is one of the best investments the Army has made in recent years. The vehicle requires little maintenance, is quick, yet relatively quiet, is maneuverable on all terrain, and has a range of 300 miles on a tank of fuel.

It can be fitted any way the unit chooses — from TOWs and mortars to ground surveillance radars and ambulances — and is fully airmobile to boot. Some HMMWVs, employed at the NTC as scout vehicles, had mounted tank thermal sights taken right out of an M60A3. These scouts could see the battlefield clearly in all weather conditions without making a sound. What a concept!

It is evident that the armor community is now beginning to regard scouts as lookers, rather than fighters, a sound decision, because tank battalions already have 58 tanks trained exclusively to fight. Perhaps one of the factors driving conversion of scout platoons to HMMWVs is the consistent degree

of success exhibited by the OPFOR reconnaissance company when it uses the vehicles. While the HMMWV's outstanding performance is rewarding to the OPFOR, one must consider that the OPFOR HMMWVs are used to represent Soviet armored cars (BRDM1s or BRDM2s), only coincidentally taking advantage of the HMMWV's stealth and maneuverability. Many nations use armored cars for reconnaissance. For example, the Soviets have the BRDM, the British the Fox, and the French use the Panhard. Even the United States Marine Corps uses LAV25s in much the same manner as divisional cavalry.

With several modifications, the HMMWV would make an outstanding scout vehicle. However, of the existing HMMWV configurations, all are woefully inadequate.

First, the hard top (M966) configuration carries too little equipment inside, and the hatch permits only a single observer. Regardless of what type of weapon is mounted, in contact, only one weapon can be brought to bear. Additionally, with the windows up and the heater running, the scouts' hearing is limited. It has been observed that if one is able to hear the enemy, half of that battle is won. Finally, the Kevlar protection is limited to the roof. These major drawbacks dismiss the M966 for scouting use.

The next available choice is the open-top version of the HMMWV (M1038). Again, lack of armor is a significant drawback, but at least all weapons can be fired at the enemy, and all observers are up and looking. This is still not the best solution, but it is more suitable for scout use.

If these remain the only choices available to the task force, modifications can make them more effective. Windshields should be removed from all scout HMMWVs. Although in the bitter cold of a TEAM SPIRIT exercise, it's nice to have a warm vehicle, at sunrise and sunset the reflection from the windshield can travel 10 kilometers; a comfortable vehicle won't keep a crew alive! (Incidentally, all tactical HMMWVs at the NTC have no windshields.) A 1780 (AN/VRC1) intercom system, with at least three control box hookups for use with a CVC, is absolutely essential so that the crew can talk and monitor the radios without using speakers. The most silent vehicle on the battlefield is of little use on a still night when the commander screams, "Go left, dammit!" Although these problems are easily solved, their solutions alone will still not make the HMMWV scoutworthy.

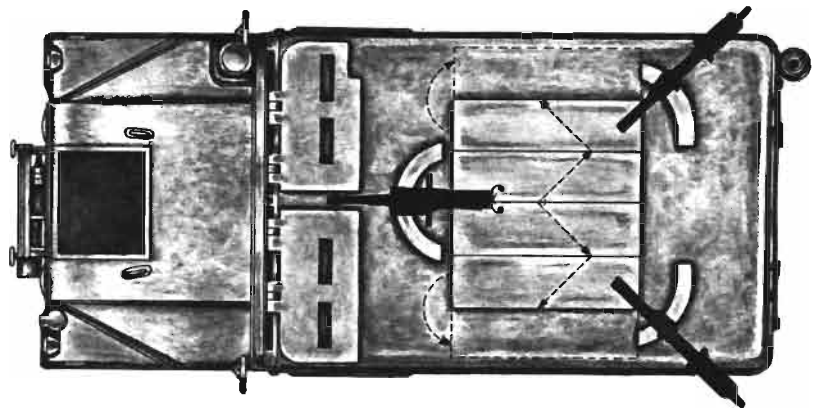
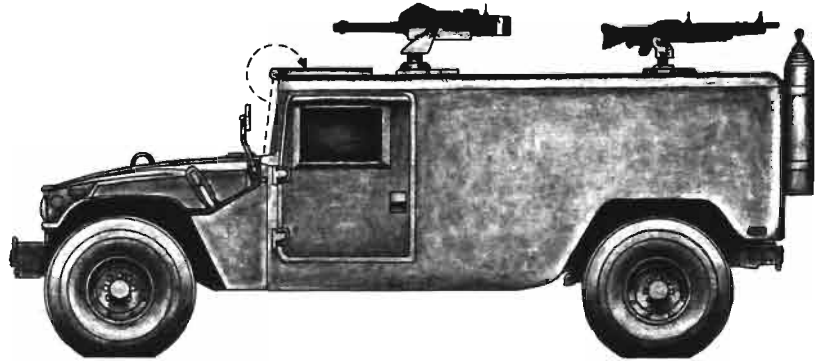
Armor officers always have opinions about MTOE changes for scout platoons, so I will not discuss these at length in this article. But just a few basic changes to the

HMMWV can make it as useful to a scout as a rifle is to an infantryman.

I suggest the M1038 basic chassis. I envision a two-door vehicle with the doors covered with Kevlar, each with one small window. A frame would be mounted from the windshield to the rear end, covering the roof and sides, and constructed of Kevlar. The windshield is removed; in its place I would mount Kevlar shutters that could drop into place during action or up during routine operations. These shutters would have several slits, much like glass vision blocks. The door windows would be secured in the same manner. (Another method to avoid windshield glare is to cover windows with louvers or clear window screen.) Kevlar protection for the engine would increase survivability of the vehicle but is not essential.

The crew compartment would be much the same as the M113. The top would remain open, with a hatch that could be closed for artillery protection. The crew compartment should be five feet by three feet, allowing room for two scouts and the vehicle commander. For additional protection, the crew would wear flak jackets.

The vehicle commander's weapon can be any weapon, but for the most effective firepower, an MK19 grenade launcher would be an out-



Outfitting

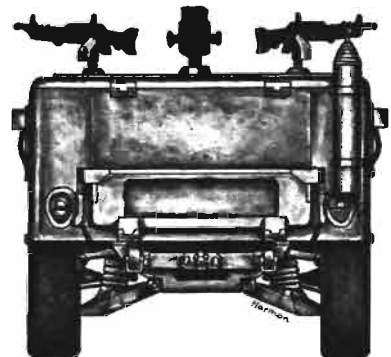
A Scout HMMWV

Author's concept for a dedicated scout HMMWV based on the M1038 basic chassis, with Kevlar body, doors, and shuttered Kevlar windshield panels.

Top hatch for all-around observation could be closed for overhead protection, when necessary. Top-mounted grenade launcher and machine guns are on swivel mounts for all-around coverage, dismountable for ground-mounting.

Skid plates, a winch, smoke grenade launchers, and a deep-water fording kit make the vehicle more versatile, while a land navigation system and thermal sight aid scouting.

A single C-130 could carry three of these and a 15-member scout section. A single vehicle could be sling-loaded for transport by helicopters.



Outfit a few scoutworthy HMMWVs with a section of M3 CFVs, for their thermal capabilities and tank-killing firepower, and the task force would have a formidable platoon for the recon/counterrecon battle.

standing choice. (An M2HB .50 cal. would also provide adequate firepower.) During a withdrawal, both machine guns can provide suppressive fire to the rear.

On a swing mount, much like the loader's M240 on the M1-series tank, the vehicle commander's weapon would give 180-degree coverage to the front of the vehicle, and with its 2000-m range, it can keep the most determined enemy at bay. Each observer's station would be equipped with an M60 machine gun, also on a 180-degree swing mount, adding 360-degree coverage.

Both M60s must be capable of ground-mounting during dismounted operations or for local security. Additional weapons would be M16A2 rifles for the driver, a passenger, and the vehicle commander. The basic load would be set by local unit SOP, but most of the ammunition would go under the floor boards (the rear seats in the conventional HMMWV).

Personal equipment can be stored on the outside of the HMMWV, leaving room for essential equipment in the back of the truck. The extra room can also accommodate soldiers attached for specific tasks (medics, sappers, Stinger teams, or FISTs). A vehicle with a five-man crew is exceptionally dynamic; three men can dismount without degrading the combat efficiency of the vehicle, and if four scouts dismount, the vehicle can still be moved safely.

Other changes I feel are necessary and effective include:

- A five-ton winch mounted on the front of the HMMWV.

- Skid plates on the belly of the HMMWV for protection of the crossmembers, drive shaft, oil pan, transmission (The OPFOR scout vehicles have homemade skid plates and the OR rate has increased dramatically!) There is no protection for the plastic fuel tank, and it is desperately needed, especially for HMMWV use on rocky terrain.

- Smoke grenade launchers on the front and rear to cover movement under fire.

- A Dragon system will add to the versatility of the vehicle for use on lucrative targets (the use of TOW is actually overkill for the scouts; leave the killing to the tanks).

- A quick-erect antenna (AB903) with an RC292 or OE254 head assembly for extended range, for use in leaders' vehicles.

- A TOW VAS11 thermal sight mounted on a spindle on the right front of the crew compartment.

- A deep-water fording kit (Its use will not replace a real amphibious scout vehicle, but it would add a new dimension to a HMMWV scout.) (The BRDM and LAV25 are amphibious without preparation, unlike the M3 CFV.)

- A land navigation system, using a global positioning system receiver in conjunction with a laser range-finder that could provide accurate eight-digit grid coordinates to targets.

- A small arms shield can be added to crew-served weapons.

Current models of the HMMWV are not the answer to the scout

vehicle debate, but are a step in the right direction. Outfit a few scoutworthy HMMWVs with a section of M3 CFVs, for their thermal capabilities and tank-killing firepower, and the task force would have a formidable platoon for the recon/counterrecon battle.

Finally, with a rapidly deployable strategic Army, the scout HMMWV could be moved with minimum difficulty. Like other models, the scout HMMWVs could be sling-loaded and a three-vehicle, 15-member section could be transported in a single C-130.

The changes outlined in this article are by no means meant to be the final solution. We are a long way from developing the ultimate scout vehicle. It is well known that task force scouts are the eyes and ears of the battalion commander. We protect our own eyes and ears, why not our scouts? The HMMWV as a scout vehicle is a brilliant vision and its potential is limited only by our imagination.

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Eight M26 Pershing medium tanks await shipment from the Detroit Tank Arsenal in early 1945.

America's Improved World War II Tanks

by Konrad F. Schreier, Jr.

Before the American Stuarts, Lees, Grants, and Shermans had been combat proven, far-sighted people, particularly in the U.S. Army Ordnance Department, began planning a new generation of tank designs. They expected the Germans to introduce improved tanks, and America would need improved tanks to fight them. Time would prove them absolutely correct.

Development began before the first American tanks reached full production in 1941. Before America had entered the war, the Army's tank research and development program had been based on willing cooperation between the Army and industry. When the country entered the war, this cooperation became much more intense in what President Franklin D. Roosevelt called "the arsenal of democracy."

Although the major stress was to produce the arms and equipment required to fight the war, the

country's entire industrial research and development establishment supported the war effort. Before the end of the war, this cooperation helped the U.S. Army introduce three entirely new and improved tanks.

These were the 76-mm Gun Motor Carriage M18 "Hellcat," the 75-mm gun light tank M24 "Chaffee," and the 90-mm gun heavy (later medium) tank M26 "Pershing." Many of the basic improvements introduced with them will be found in today's tanks and other armored fighting vehicles.

The major improvements incorporated in these tanks stemmed from experimental work done by the U.S. Army Ordnance Department in the 1930s, particularly on tracks, suspensions, and power trains. At that time, several early model Stuart light tanks were built with experimental suspensions. One of these, the Combat Car T6, was

equipped with a new concept, "torsion bar suspension," invented by General Gladeon M. Barnes of the Ordnance Department.

At the same time, the Ordnance Department tested a new center guide rubber-bushed track to replace its successful edge-guided rubber-bushed track. This was an improvement on the center guide track design inventor Walter P. Christie had pioneered during and just after World War I.

Tests showed the torsion bar suspension was superior to the volute spring suspension already successfully in use because it gave the bogie wheels almost double the volute spring suspension's travel. The torsion bar suspension could also easily use a shock absorber, which was difficult, if not impossible, to use on the volute suspension. The center guide track was also superior to the edge-guided type because it was easier to modify

The M18 Hellcat:

While it could hit as much as 75 miles-per-hour on a good surface, it was governed to 55 miles-per-hour, a speed which was classified during the war.

and harder to throw off the suspension. However, while all this had been shown by the time America entered the war, the urgency of wartime requirements was too great to permit changes in existing production designs.

The torsion bars themselves also proved difficult to produce because of materials and surface finish problems. However, about the time America entered the war in 1941, development work on the latest thing in armored fighting vehicles, the tank destroyer, began with serious consideration of the torsion bar suspension and center-guided track. Wartime urgency kept its progress slow.

Buick Division of General Motors Corporation was selected to build the experimental new tank destroyer. The first prototype was the 37-mm Gun Motor Carriage T49. Before the project had gotten very far, designers changed the gun to the British 57-mm tank-antitank gun, which the U.S. Army had hastily adopted.

The T49 had torsion bar suspension, center-guided track, and another remarkable innovation contributed by General Motors: a rear track drive with a "Torquematic" automatic transmission. While this vehicle showed great promise in tests in the summer of 1942, the rapidly changing armored combat conditions required more changes.

The requirement for more powerful armament for tank destroyers led to a new Buick-built prototype: the 75-mm Gun Motor Carriage T67. It incorporated a host of detail improvements and the same 75-mm gun used in the Sherman tank, but

by the time it was tested in the late fall of 1942, an even more powerful gun was needed.

The Ordnance Department had developed a new lightweight version of the standard three-inch tank and antitank gun, including an ammunition change, which was designated the 76-mm tank and antitank gun. Six modified T67 prototypes mounting the new 76-mm gun were built, and after testing, it was recommended for production in February 1943. However, one major change was required: the track drive was to be in front instead of the rear.

Buick built this version very quickly as the 76-mm Gun Motor Carriage T70, and it was adopted for "limited production" in July 1943. It was standardized in February 1944 as the 76-mm Gun Motor Carriage

M18 "Hellcat," and it was a truly remarkable vehicle by any standards.

The 20-ton Hellcat was powered by the same 400-horsepower modified, air-cooled, radial aircraft engine used in the 32-ton Sherman, giving the Hellcat the highest power-to-weight ratio of any armored combat vehicle of its day. Its automatic transmission worked well, and it had as high an operating speed as any armored fighting vehicle ever built. It regularly operated at sustained road speeds of 45 miles-per-hour, and often terrified American car and truck drivers adhering to the 35-mile-per-hour wartime national speed limit.

While it could hit as much as 75 miles-per-hour on a good surface, it was governed to 55 miles-per-hour, a speed which was classified during the war.



M18 Hellcat tank destroyers being assembled at the GM Buick plant in Flint, Michigan. Like the M26 and M24, the M18 had torsion bar suspension. The M18 could do 75 MPH.



An M18 Hellcat supports infantry in the streets of Brest, France in September 1944.

As a tank destroyer, the Hellcat was more lightly armored than even a light tank. Its armor was about the same as the "splinter proof" protection of the U.S. Army World War II half-track.

The Hellcat first saw combat in Europe in the summer of 1944, and it proved to be an outstanding tank destroyer. Using its speed and "shoot and move" tactics, German tanks and antitank guns could not keep up with it. The record of the 609th Tank Destroyer Battalion is a good example. It went into action in northwestern Europe in October 1944. With the latest ammunition, its 76-mm guns could knock out anything the Germans had, up to Panther and Tiger family vehicles. In the Battle of the Bulge, the 609th knocked out more than 20 German tanks with a loss of two Hellcats.

Although a number of experimental vehicles were built on the Hellcat chassis, only one went into production. It was the U.S. Army's first production purpose-built, full-tracked armored personnel carrier: the Armored Utility Vehicle T41, later standardized in 1945 as the Armored Utility Carrier M39. It saw little combat use in World War II, but it is the first in the line leading to today's armored personnel carriers.

A New Light Tank

As soon as the Stuart light tank had gone into combat in 1941, the U.S. Army Ordnance Department recognized that it needed improvement, and eventual replacement. In 1942, it asked Cadillac Division of General Motors to borrow technology from Buick to develop a new light tank. The project moved slowly due to other wartime requirements, but in March 1943, limited production of a new 75-mm gun light tank

T24 was authorized. It was a massive improvement over the Stuart.

One key improvement was a new lightweight 75-mm gun, the first mounted in a light tank. While it fired the same ammunition as the Sherman's 75, it only weighed half as much: 406 pounds. This 75 was a modification of the lightweight 75 used to arm U.S. Army Air Force North American B25 Mitchell ground attack aircraft. The 20-ton T24 had well designed light tank



The forerunner of later armored personnel carriers, the M39 - seen here in a postwar exercise - was based on the M18 Hellcat chassis. It saw little action in WWII.



M24 Chaffee light tanks patrol a forest road near Haulthausen, Germany in March 1945.

armor. It was driven by a pair of Cadillac V8 passenger car engines geared to a common output, and used a hydramatic automatic transmission with a front track drive. Its top speed was more than 35 miles-per-hour, and it could sustain speeds of 25 miles-per-hour, excellent for the time. "Limited production" of the T24 began in September 1943, and it was standardized as the 75-mm Gun Light Tank M24 "Chaffee" in July 1945. By that time, it had been in combat for several months. The Chaffee proved very successful in action, and by the end of 1944, the U.S. Army was committed to replace all its older model light tanks with Chaffees.

A great deal of the Chaffee's success was due to its superior chassis, which was used for a number of

other vehicles. The first was the Twin 40-mm Gun Motor Carriage M19 (T65). It mounted an air-cooled modification of the U.S. Navy's water-cooled shipboard twin 40-mm Bofors automatic anti-aircraft gun. The M19 was developed in anticipation of a much stronger German Air Force than existed, and it was hardly committed in World War II because it was not required. Like all Chaffee vehicles, it proved very successful in Korea.

The Chaffee chassis was the basis for two very successful self-propelled artillery pieces. One was the 105-mm Howitzer Motor Carriage M37 (T76), a replacement for the Sherman-chassis-based 105-mm self-propelled M7 "Priest." The M37 used a 105-mm howitzer, originally

developed for the infantry support 105-mm-armed Sherman tank.

The other Chaffee self-propelled gun was the 155-mm Howitzer Motor Carriage M41 (T64). Although both this and the 105-mm howitzer M37 were both in production before the end of the war, there was no urgent need for them and they did not see any combat. Both were used in Korea with good success, and remained in use for many years.

All the Chaffee family vehicles not only served with distinction in Korea, but they remained U.S. Army "Standard B" well into the 1960s. They will still be found in service in some military establishments, and many elements of the chassis are practically identical to those of tracked vehicles in current service.

M26 Pershing Medium Tank

Unlike the Hellcat and Chaffee, the development of the 90-mm gun M26 Pershing tank was a long, complicated program. It began when the U.S. Army adopted the M4 Sherman, and the Ordnance Department looked at ways to improve it. It began in 1942 with two major considerations: to improve the Sherman's silhouette, and to arm it with a more powerful gun. This led to a series of experimental tanks known as the T20s.

The first of the T20s mounting the new high-velocity 76-mm gun were built in 1942. There were several prototypes using as much of the Sherman as possible but with a new flatter hull and modified turret. Several had automatic transmissions, and some had rear track drive. Some used Sherman suspensions, some a new torsion bar type. They all weighed about the same as



Photos of the M26A3 Pershing at war were rare because the tank only saw action in the later stages. Seen here with its 90-mm gun tube over the rear deck, this 9th Armored Division M26 is near Vettweiss, Germany in March 1945.

the Sherman, 33 tons, and were deemed "promising," but none of them went into even limited production.

But, 1942 was not the year for the introduction of new tank designs. The requirements of the U.S. Army and its allies, equipped under Lend-Lease agreements, was too urgent. The U.S. Army Ground Forces Command and the Armored Force Board observed the success of the existing tanks in combat, and were convinced that they needed improved versions of existing tanks, and not new ones.

However, improvements in German tanks were coming very quickly. When the Armored Force Board considered the T20s in late 1942, it requested a large number of changes and improvements, and the T20

series went back to the designers for more work.

In October 1942, the Chrysler-operated Detroit Tank Arsenal was ordered to produce two experimental T22 tanks with the requested changes and improvements. They had an improved Sherman-type volute spring suspension and track, and they mounted the 76-mm gun. They also had a number of power train changes. They were not particularly successful, but they indicated what was needed. An experimental automatic loading 75-mm gun was temporarily mounted on one T22, but it was not satisfactory.

Following right behind the T22s were the T23s, authorized in early 1943. These had improved armor and the 76-mm gun. T23s included versions built with both the Sher-

man-type suspension and a torsion-bar type, and an experimental gasoline-electric drive. This last was a system similar to that used in diesel-electric locomotives, and it was, at best, marginally satisfactory. The T23s all weighed about 36 tons.

Although the T23s had some superior features, which looked very promising, they were only built in limited numbers for experimental work. However, improvements in German tanks and other considerations again sent the T20 series back to the drawing board.

One of the new considerations was to arm a new tank with a 90-mm gun. A 90-mm gun, adapted from the 90-mm antiaircraft gun, had already been fielded on the M36 tank destroyer. Until mid-1943, the Army Ground Forces Command and the

Armored Force Board had questioned the need for a 90-mm gun, but the need for it was now recognized. One was satisfactorily mounted in a T23 prototype, but by then, another redesign was underway.

The next version was the 90-mm gun T25, built with the new, much improved HVSS suspension with its new wider center guide track (M4A3E8). This model was superior to any other tank in service.

Another version, the T25E1 was built with a torsion bar suspension with a center guided track, and it was also successful. Both the T25s used a new "hydramatic" automatic transmission with a new Ford GAF V8 water-cooled gasoline engine, which was very satisfactory. Fifty T25 prototypes, 25 of each suspension type, were completed in January 1944, and they went under "field testing" by the Armored Force.

The T25s weighed some 38 tons and were well armored, but by 1944, Army Ground Forces Command and Armored Force Board observations of the latest German tanks led them to request improved protection. At this point, the needs and urgent requirements for the Normandy invasion of Europe in June 1944 delayed the program.

To further complicate things, Army Ground Forces Command and the Armor Force Board were unable to decide which suspension they wanted for the new tank. The Ordnance Department recommended the torsion-bar type, the ultimate choice, because of its success on the Hellcat and Chaffee.

A new 46-ton T26 up-armored version of the T25E1 was built with a 90-mm gun and torsion bar suspension. It was authorized for limited production in October 1944. A number of changes made it the T26E3.

The T26E3 was standardized as the 90-mm gun heavy tank M26 "Pershing" in May 1945, but it had seen combat six months before.

About the time the war ended in August 1945, the M26 heavy Pershing was redesignated the 90-mm gun medium tank M26 "Pershing" because even heavier tanks were in the experimental stage.

The Pershing was a superior tank for its day, and its basic design still influences main battle tank designs. The Pershing's torsion bar suspension gave it an easy ride and made it a superior moving gun platform. Its heavy armor and powerful 90-mm gun allowed it to fight the vaunted German Panthers and Tigers on equal terms. Its power train had problems, but these were corrected after the war.

The first 20 Pershings were shipped to Europe on an "emergency" basis in January 1945, and immediately issued to the 3rd and 4th Armored Divisions. Although their numbers were very small, they went into action before the U.S. Army crossed the Rhine River. Six of them were used in the Rhine crossing at Wesel, and several were in the famous Remagen Bridge fight. Although the Pershing proved its superiority, the rapid collapse of the German armed forces kept many from catching up with the action.

A handful of Pershings, and a few of the infantry support 105-mm howitzer heavy tank M45 version, were committed on Okinawa in late 1945. The Japanese had nothing but massive land mines and heavy field artillery that could bother them.

Although a number of experimental models were built, the Pershing did not become the basic chassis for any other vehicles. The Pershing, however, is the basis of the U.S. Army tank designs from the M46

The Pershing's torsion bar suspension gave it an easy ride and made it a superior moving gun platform. Its heavy armor and powerful 90-mm gun allowed it to fight the vaunted German Panthers and Tigers on equal terms.

used in Korea up to today's M1. The improved American World War II tanks, the Hellcat, Chaffee, and Pershing, introduced many tank design features still in use.

Note

This analysis was based on official reports, manuals, and other documents pertaining to U.S. Army tanks and their development in World War II, Army Ordnance magazine, and other military journals. Other sources include the published and unpublished writings of General Gladeon M. Barnes, U.S. Army Chief of Development and Engineering for the Ordnance Department during World War II. The author has also consulted several other credible unauthorized U.S. Army tank histories, and a number of unit histories.

Konrad F. Schreier, Jr. is a professional technological and military historian who served in the China-Burma-India Theater in World War II and later graduated from the U.S. Army Ordnance School at Aberdeen Proving Ground, Md. He was a civilian engineer from 1950 to 1967, when he became a full-time historian, specializing in U.S. Armed Forces history. He is a Fellow of the Company of Military Historians and a member of the U.S. Commission on Military History.

Employing a Brigade Scout Platoon

by Major Kent D. Thomas

"Time spent in recce is never wasted."

British Army Adage

Just as reconnaissance was key for leaders in the past, it is critical for leaders today. The commander who loses the recon-counterrecon battle begins the fight at a disadvantage. To see the battlefield is critical to the fight.

Commanders at various levels view the battlefield differently. Army and corps commanders use overhead platforms, airborne platforms, cavalry regiments, special forces, and long range surveillance units (LRSU). Division commanders have divisional cavalry squadrons, OH-58Ds, and LRSU. Battalion commanders have scouts, and company commanders have observation posts. The brigade commander, however, has no clearly identified asset to see the battlefield. He can glean second-hand information through battalion scouts or division assets, but that information is often skewed by the needs of the commander who owns the asset, may not be timely, and may not address the brigade commander's needs.

One solution to the problem is the brigade scout platoon. Mounted in highly mobile vehicles capable of rapid movement across a brigade front, such an organization offers great promise to fill the brigade commander's void in recon-counterrecon capabilities.

First Brigade, 3d Armored Division had the opportunity to test the brigade scout platoon concept during exercise CENTURION SHIELD (REFORGER 90). The division provided an existing scout platoon of one officer and 18 soldiers from 4th Battalion, 8th Cavalry, outfitted with six HMMWVs in place of their TO&E M3 Cavalry Fighting Vehicles. Two of the HMMWVs had dual-net secure capability, while the other four had single-net secure radios.

Before the exercise, the platoon was told to prepare to conduct a series of critical tasks taken from its MTP. Tasks were divided into those key to the exercise, possible during the exercise, and unlikely during the exercise, to allow the platoon's leadership the opportunity to prioritize training.

A scrub of missions immediately before CENTURION SHIELD resulted in a final critical task and mission list (see table 1).

Brigade Scout Platoon

Critical Tasks (ARTEP 17-57-10-MTP)

- Passage of Lines
 - Perform a passage of lines (17-3-1014)
 - Assist a passage of lines (17-3-1015)
- Perform a Route Reconnaissance (17-3-1017)
- Conduct a Screen (17-3-1023)
- Perform an Area Reconnaissance (17-3-1019)
- Execute Actions on Contact (17-3-1021)
(In order to disengage and continue reconnaissance and surveillance operations)

Missions

- Maintain contact with the forward covering force. Coordinate and assist passage of lines. Provide link between the forward covering force and the brigade, allowing more decisive and flexible employment of maneuver battalions.
- Maintain contact and conduct screen between battalions attacking on separate axes.
 - Provide route and zone reconnaissance before and during brigade movement and attack.
 - Provide flank screen during brigade movement to contact.
 - Cover avenues of approach into the brigade area, both in the defense and on the offense. Responsible for coverage of specific NAls critical to the brigade scheme of maneuver.
 - Reinforce a battalion reconnaissance and surveillance effort.

Table 1

Actual missions the platoon conducted during CENTURION SHIELD included:

- Maintenance of contact with the forward covering force, while reporting progress by phase line, and coordinating forward movement of the brigade under radio listening silence.

- Maintenance of contact between battalions attacking on separate axes, while also screening key named areas of interest (NAI) for possible enemy activity.

- Screens to both the front and flank of the moving brigade.

- Reinforcement of battalions to supplement screens over extended distances, to thicken an economy of force sector, and to replace scout elements lost in combat.

- Security for the command group/brigade tactical command post when light infantry threat warranted (never more than two vehicles required).

- Route reconnaissance, bridge classification, obstacle identification, and route clearing. The platoon was also instrumental in keeping MSR's open at night when enemy forces sought to disrupt resupply.

The scout platoon was effective in all missions and was a major factor in the brigade's agility and ability to synchronize and focus combat power in a timely manner. Before the battle, the platoon identified the location of key leadership within the brigade and served as a courier/messenger element to ensure rapid dissemination of information and orders, as well as to provide subordinate commanders a timely method of relaying information to

the brigade while radio listening silence was in effect.

Early in the fight, the platoon maintained contact between the brigade and elements of the forward covering force. Not only did the platoon relay important information from the covering force to the brigade, but it also tracked forward movement and positioning of subordinate elements, allowing the brigade to maintain radio listening silence without sacrificing command and control.

During forward and rearward passage of lines by the brigade, the platoon manned passage points. As a separate force available to coordinate this critical task, the platoon freed battalions from the requirement to look two ways at once, and allowed the battalion commander and his staff to focus on the battle. Battalions were thus able to transition more rapidly into the fight as they moved forward, and later continue the fight as long as possible before quickly withdrawing through passage points coordinated and manned by the scout platoon and brigade headquarters.

As an economy of force element during the attack, the scout platoon effectively monitored a critical NAI, while screening between battalions attacking on separate axes. Had the platoon not been available, combat power would have been diverted for this task. Later in the fight, the platoon used its superior mobility to screen a battalion-sized frontage, allowing the brigade to mass additional combat power for the penetration of the enemy defense. The brigade's ability to add an additional battalion to the fight made the difference between success and failure. The scout platoon's mobility and effectiveness made that addition pos-

sible. In the defense, the platoon was in position to observe critical NAI/TAIs, again allowing greater combat power to be massed for the fight.

In the counterattack, the scout platoon first served as an advance screen, then as a deep reconnaissance force. Its success in finding seams in the enemy defense allowed rapid penetration by the maneuver battalions. Operating deep in the enemy rear, the platoon identified enemy positions. This allowed the brigade to bring indirect fires, air, and attack helicopters to bear in support of the scheme of maneuver. The platoon's identification of obstacles and engagement areas further allowed the brigade to influence the enemy rather than to be influenced by it.

The platoon proved to be very versatile. At one point in the offensive phase, it conducted an area reconnaissance based on reports of light infantry forces and performed security for the command group and brigade TAC, also in response to the light infantry threat. Its ability to perform multiple missions simultaneously increased its value to the command.

As configured for CENTURION SHIELD, the platoon had some noticeable shortcomings. It could not subdivide itself into enough self-supporting sections to cover assigned tasks. It was not armed adequately to disengage from tanks or enemy attack helicopters, and did not have sufficient secure communications capability to operate in more than two sections. Finally, it lacked adequate mounted and dismounted day-night vision capability.

Based on the 1st Brigade's experience, the desired organization

Forcing the scouts to concentrate on finding rather than fighting the enemy worked well. Aware of their vulnerability, scouts were careful to remain well camouflaged.

and equipment for a brigade scout platoon would include:

- Ten HMMWVs, one officer, 29 soldiers. With the multiplicity of missions the platoon does well, more vehicles are required than were available on CENTURION SHIELD. Each vehicle needs a minimum of three personnel to sustain 24-hour-a-day operations.

- Secure and long-range communications capability. Ideally, each vehicle would have two secure nets. It was not uncommon to send two vehicles on a mission that needed a two-net capability during CENTURION SHIELD, yet only two of the platoon's HMMWVs had that capability. In light of the importance of normally assigned missions, a two-net capability and long-range antennas are highly desirable.

- Armament consisting of personal weapons for each soldier (at least one M-203 per vehicle) and a vehicular weapon system capable of providing the crew the capability to disengage quickly. The Mark 19 40-mm grenade launcher appears appropriate. Coupled with one or two AT-4 systems per vehicle, the platoon would have the capability to defeat an enemy force when confronted, yet retain the capability to disengage when outgunned. The lack of an armor-defeating primary weapon system would encourage the platoon to avoid contact when at all possible, thus preventing decisive engagement.

- High power, day-night vision devices; something capable of giving the platoon a distinct advantage in reconnaissance.

- For dismounted operations, the platoon needs night vision goggles and dismounted, secure radios.

- Internal indirect fire support capability. On CENTURION SHIELD, fire support for the platoon was provided through the brigade command net with the brigade FSCoord responding to calls for fire. While acceptable, the addition of a platoon forward observer with digital message device (DMD) would increase the responsiveness of needed fires.

- Air defense is also a recognized need. Addition of a Stinger section would add too much mass to the unit. It may well be better to cross-train one or two scout crews in the use of the weapon, allowing the platoon to disengage quickly and avoid decisive engagement.

- Although not tested on CENTURION SHIELD, motorcycles as an additional platoon asset seem to make sense intuitively, if the HMMWV can carry one.

The change from CFV to HMMWV should not, however, be delayed by motorcycle testing. The HMMWV proved far more versatile than the CFV, and its lack of armor kept the scouts from engaging in direct fire engagements with enemy forces. Forcing the scouts to concentrate on finding rather than fighting the enemy worked well. Aware of their vulnerability, scouts were careful to remain well camouflaged. As a result, they were discovered less often, and were killed less frequently, than CFV-mounted scouts. The HMMWV's increased survivability was achieved through mobility rather than protective armor. Addition of the armament

listed above would make up for the loss of the TOW and 25-mm gun.

The brigade scout platoon proved itself an invaluable asset during CENTURION SHIELD. It provided the brigade commander the ability to focus on the bigger fight or the next fight. In mobile armored warfare, many tasks have to be accomplished simultaneously. The brigade scouts allow the brigade commander and staff to focus on those tasks without disrupting the battalion fight and battalion commander's focus. Under radio listening silence, the platoon ties the command and control structure together, allowing rapid dissemination of information. During passage of lines, it provides a single coordinating entity for the brigade, while allowing battalions to focus on the fight. In the defense and offense, it can trigger brigade targets, assist in the movement of the brigade as a whole, or supplement key task forces without weakening others. Because it is mobile, a HMMWV platoon can often accomplish several of these missions concurrently. It is an idea whose time has come.

Major Kent Thomas is the XO, 2d Battalion, 32d Armor, Kirchgoens, Germany. He is a 1974 graduate of Georgetown University and holds an M.S. degree from Purdue University and an M.M.A.S. degree from the U.S. Army Command and General Staff College. His armor assignments have been with the 9th Infantry Division and the 3d Armored Division. During REFORGER '90, he was the S3 of the 1st Brigade, 3d Armored Division.

Letters (Continued from Page 4)

that this radical new tank initially encountered have been discussed in detail. The similar American T-95 tank program, that included many of the features of the then new T-64, was cancelled due to similar problems with its innovative design. As already stated in the pages of *ARMOR*, a comparison between the T-64 (or the T-72) and more modern American and NATO main battle tanks is one of apples and oranges. A more "realistic" assessment would compare the T-64 with the tanks it would have faced if a war had been fought in the '60s or '70s. This "piece of junk," as Mr. Goldfarb calls it, was deemed capable enough by the Soviets to keep in production for more than 20 years.

Second, Mr. Goldfarb claims that problems with the T-64 were so severe that "no one wanted it," and that it was kept in Russia because "it couldn't go very far anyway." Not only is the deployment of the T-64 to both the Western Group of Forces (WGF) in East Germany and the Southern Group of Forces (SGF) in Hungary well known, it has been confirmed by the withdrawal of the T-64s from both countries as detailed by the world press and the Soviets themselves. Perhaps Mr. Goldfarb is confusing the T-64 with the T-62, which was not adopted by the Warsaw Pact due to its limited capabilities. The T-64, like all first-line Soviet weapons, was not for sale.

The well-known T-72, on the other hand, was offered for export and is currently employed by 16 different countries. It appears that Mr. Goldfarb has made the incorrect assumption that one T-72 is like any other T-72. It is certainly a mistake to base the evaluation of the entire T-72 series (which includes 13 different variants) on the performance of an early export model in 1982. Some of the different T-72s clearly are more advanced and more capable than some others; and like the T-64, these "high priority" T-72s have not been offered for sale.

Finally, any examination of the T-64 cannot be truly conclusive. The T-64 first appeared as a surprise to the West, was very closely held by the Soviets, and has not been used in combat. As of now, the T-64 has not been exported to any Soviet client states. The hypothetical deployment of some export version of the T-64 in place of the T-72B, T-72G, and T-72M1s used by the Iraqi Army could have changed the current situation in the Persian Gulf dramatically. The potential

deployment of the T-64 (or any other Soviet Premium tank) by a Soviet ally, could pose as serious a threat for rapidly deploying American forces as that faced by the German Army in July 1941 with the appearance of the Russian T-34/76. The T-64, like the T-34 of the past and the FST-2 of the near future, was truly the tank that could have won the next war.

JAMES M. WARFORD
CPT, Armor
Ft. Knox, Ky.

LAV 8x8, A Better Choice

Dear Sir:

Captain Nobles' article in the May-June issue concerning the procurement of wheeled armor for RDF and LIDs was very timely. Our lack of air-deployable light armor is quite obvious in the current deployment to Iraq. He makes a strong point about solving the problem quickly and at low cost without repeating previous research and suggests the V300 Commando 6x6 family of AFVs.

I believe the captain's reasoning is sound, but his choice is incorrect. The Canadian military and the U.S. Marine Corps performed numerous tests and found the LAV 8x8 chassis superior to the 6x6 for overland mobility. By page 4 of his article, Captain Nobles had already done what he said we should not do — ignored previous research and taken the Army down a separate path. Budget restraints no longer allow us this kind of ineffective latitude.

The USMC has not fully exploited the LAV chassis up to this point in time. For example, Royal Ordnance makes a turret-mounted, breech-loaded, 120-mm mortar that handles both ballistic and laser-guided ammunition. This is the direction in which the future lies, not firing an 81-mm mortar through a hole in the roof. With creative solutions of this kind, the Army could put its own stamp on a readily available and very serviceable chassis.

Captain Nobles is to be commended for an excellent dissection of this problem, but the Army can no longer go its own way every time.

LARRY CHASE
Springfield, Ore.

Tactical and Logistical Problems of CRD

Dear Sir:

In response to "the combat meeting engagement and defense," I'd like to respond from both the tactical and logistical aspects of the "Combat Reconnaissance Detachment," (July-August 1990 issue).

My first major comment is that taking one tank from each company headquarters tank section means that either the CO or XO of that tank company is tankless. So what does he fight/command from? The TO&E for a tank company does not add any extra vehicles for the CO or XO to ride or fight from. To add to that, the mech infantry battalion that gets the cross-attached tank companies loses two tanks. That infantry task force commander will probably not appreciate that very much.

He'll also have to form his own counter-recon/combat reconnaissance detachment out of his own "hide" thereby depreciating his combat power in his main task force.

On the logistical side of the house lies the problem of casualty evacuation/reconstitution. While it is not hard to fix the responsibility, to evac casualties and refit the CRD is hard to actually do. The mortar platoon sergeant has a big enough job with his own element; the same goes for the scout platoon sergeant. A "Field First" comes from where? There is no provision for evac vehicles for that element, or for that matter, any Class III or V. The mortar platoon's vehicles would be split between the two sections, one in the CRD and one in the main body, and would be hard pressed to carry tank main gun and small arms ammunition in enough quantity to refit four to six tanks.

While I'm not being very optimistic about the CRD, I'm trying to be realistic, and at the same time, play the "devil's advocate."

I'm not talking about something of which I don't know. I was with A Co., 2-77 Armor attached to TF 1-10 Inf during the 1988 NTC rotation of which Major Oliver wrote. While I don't have the personal experience of trying to support the CRD, I do know that TF 2-77 Armor did use only four tanks in its CRD, and that its concept

of the CRD did not survive any of the engagements it fought in.

Also, Major Oliver did not expound one iota on the use of the CRD in the defense. Is it possible that he was writing about the counterrecon effort?

ROBERT G. TREVORROW
1SG, A Co., 2-77 Armor
Ft. Carson, Colo.

CRD Idea Interesting, But Raises Questions

Dear Sir:

Major Bryan L. Oliver provides an interesting new perspective on the meeting engagement in his article, "The Combat Reconnaissance Detachment in the Meeting Engagement and Defense," in the July-August 1990 issue of *ARMOR*. But his article raises questions that I hope he or another writer will address in the future.

First of all, what happens to the company XO when his tank is taken? Does he fight from a thin-skinned vehicle? How does he keep up with his M1-equipped company? Does his role change?

Secondly, does Major Oliver's proposed force have enough experience to carry out the mission? The XO's tanks that make up the bulk of the combat reconnaissance detachment's punch have the least experienced crews in the battalion. All have sergeant tank commanders and specialist gunners. Perhaps a better choice would be to pull a platoon wing tank with a staff sergeant tank commander and a sergeant gunner from each company for the CRD and replace that crew with the XO's crew in the platoon.

Finally, where are the Soviet scouts? In his sample engagement, Major Oliver neglects to mention the Soviet divisional and, more important, regimental reconnaissance assets that doctrinally precede the regiment's advance guard battalion and its own forward elements. Aren't these recon patrols providing their headquarters (and thus, indirectly, the advance guard battalion) with the same information about our task force main body that our scouts are providing about the Soviet main body to our task force commander?

The presence of Soviet scouts does nothing to invalidate Major Oliver's ideas. In fact, it increases the need for the force he

proposes. I mention the point simply because the Soviet's recon forces are so critical to their success that they should not be left out of the scenario.

I hope someone will address these concerns and spark further discussion on what sounds like an excellent tactical idea.

JOHN M. DUEZABOU
SFC, MT ARNG
A Co., 1-163d Cav
Dillon, Mont.

The Author Responds

Dear Sir:

Good questions! Taking the headquarters tank was my first option for the following reasons. In my experience, company commanders or XOs command and control their elements a lot, and actually fight their tanks very little. Commanders (and XOs) can command and control just as easily from an M113 or Bradley. We could discuss the survivability risk for a long time. It's NOT my intent to force them into a wheeled vehicle, or change their role on the battlefield. Additionally, their tank crews tended to be above average. They were expected to train, maintain, and fight their tank with little supervision by their "tank commander." Detaching a platoon wing tank rather than a headquarters tank is a viable option and, in fact, happened on one occasion — for the same concerns you have stated.

Division and regimental reconnaissance is indeed a concern, but not to the lead task force commander, unless his mission requires him to conduct counterreconnaissance against those elements. In that case, it's a whole new ball game, and somebody else should be taking on the advance guard battalion. Division and regimental recon are moving up to 50 km ahead of their main bodies. They will avoid contact in order to look deeper for intelligence of consequence to their echelon of

command, and will waste little time maintaining contact with an enemy lead battalion. Regimental recon might be more interested. Still, it seeks a bigger picture of the enemy brigade dispositions. Its spot reports concerning the lead task force may be up to an hour old — not so relevant to an advance guard battalion at the point of attack. I don't mean to say we can ignore the division and regimental recon. That counterreconnaissance mission might be given to the divisional cavalry, aviation brigade, or follow-on task forces.

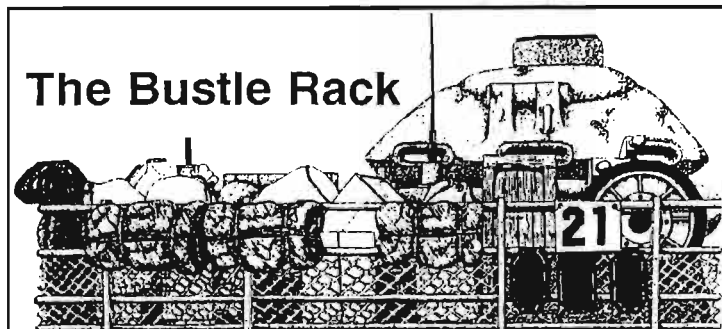
BRYAN L. OLIVER
MAJ, Armor
Ft. McCoy, Wis.

Correction

We incorrectly identified SHAPE as Supreme Headquarters Allied Forces Europe on page 25 of the article, "Task Force RAMSEY at Hardheim," in the September-October 1990 issue. The correct title is Supreme Headquarters Allied Powers Europe. - Ed.

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1989 Military History Writing Contest Winners



Recently, Colonel (P) Harold W. Nelson, U.S. Army Chief of Military History, announced the winners of the Army's 1989 Military History Writing Contest.

CPT Stephen C. Danckert, Ordnance Officers Advanced Course, won first prize and a cash award of \$500. CPT Danckert's winning essay was titled, "A Genius for Training: Baron von Steuben and the Training of the Continental Army." He is presently assigned to the 611th Ordnance Co., Maint. Spt. (GM), U.S. Army, Europe and Seventh Army.

Second place (\$400) was awarded to CPT Robert P. Feliu, Infantry Officers Advanced Course, for "The Battle of Landing Zone X-Ray: An American Victory in Vietnam." CPT Feliu is currently assigned to the General J. Lawton Collins Training Center, Fort Benning, Ga.

LT Anthony Cook, also Ordnance Officers Advanced Course, won third place and \$300 for "The Afro-American Experience during the Civil War." He is currently the commander of the 523d Maintenance Company (TMDE), U.S. Army, Europe and Seventh Army.

CPT Douglas S. Dankworth, Armor Officers Advanced Course, was awarded fourth place and \$200. Fifth Place was not awarded.

1990 Military History Writing Contest

The 1990 contest will consist of three prizes and be held in accordance with the following rules:

- **Eligibility:** Participation is limited to students attending officer advanced courses and the Sergeants Major Academy at any time during calendar year 1990.

- **Entries:** Submit two copies of previously unpublished manuscripts, 2,000-3,000 words (7-12 pages), typed, double-spaced. Documentation is required, but footnotes and endnotes do not count in length. Photographs, illustrations, or other graphics should be included as part of the submission. Essays should develop a limited historical theme related to the U.S. Army. Suggested topic areas are:

- WWII or Korean War battles and campaigns. (Note that this is the beginning year of the 40th and 50th anniversaries of these conflicts.)

- The black experience during the Civil War, WWII, Korea, or Vietnam
- Leadership and training
- Mexican border operations, Indian campaigns
- Unit cohesion and stress in combat
- Fighting outnumbered and winning
- Logistics

Entries for the 1990 contest must be postmarked to the Center of Military History, ATTN: DAMH-FI (Writing Contest), by midnight, 31 December.

Papers will be judged by a panel of military historians using the following criteria: usefulness to today's Army leaders, originality, historical accuracy, sources-documentation, style, and rhetoric. For more information contact: Mr. Arthur, AV 335-2905 or commercial (202)475-2905.

TCCT/SCCT-II

Congratulations to the following units for having five or more of their Excellence in Armor (EIA) sergeants and sergeants (P) take and pass the Tank/Scout Commander's Competency Test - Level II (TCCT/SCCT-II). Through their active EIA

program, these units have helped their sergeants earn 50 promotion points.

3-8 Cav (14)	3-69 Ar (6)
2-64 Ar (14)	4-8 Cav (5)
3-66 Ar (11)	3-64 Ar (5)
1-67 Ar (8)	2-66 Ar (5)
4-67 Ar (6)	4-69 Ar (5)
4-64 Ar (6)	1/11 ACR (5)
2-68 Ar (6)	5-12 Cav (5)

The TCCT/SCCT-II and notices dated February 1988 are no longer in effect. Beginning with the fall test window, 1 Sep - 31 Oct, Testing Standards Offices (TSOs) began testing the TCCT/SCCT-II from the revised TCCT/SCCT-II and notice, dated June 1990. Please ensure that your EIA sergeants (E5) and promotable sergeants (E5) study tasks from the new notice and not the Feb 88 version. The revised TCCT/SCCT-II and notice have a green cover.

We are currently distributing a Memorandum of Instruction (MOI) - Excellence in Armor program. The MOI is a stand-alone document that gives detailed information on EIA and will make running unit-level EIA programs easier. If you need more information on EIA or TCCT-SCCT-II, contact the Directorate of Total Armor Force Readiness - Personnel Proponency Division, Fort Knox, Kentucky 40121-5000, AV 464-5155/3188 or commercial (502)624-5155/3188. The Excellence in Armor Program is a Total Armor Force Program.

HCOR/HSGMOR

The roles of the Honorary Colonel of the Regiment (HCOR) and Honorary Sergeant Major of the Regiment (HSGMOR) are critical to preserving the brilliant history and esprit of Armor and Cavalry. They are credible sources who have lived that history and can relay their personal feelings

and experience. Army Regulation 600-82 describes the duties of the HCOR and HSGMOR, stating they can assist in fostering regimental esprit, traditions, and perpetuation of the history of the regiment.

The relationship between the HCOR, HSGMOR, and the regimental units is determined by the personality of the people, the unit's desire to involve their HCOR or HSGMOR, and the HCOR or HSGMOR's desire to play an active part. A good mix of unit and HCOR/HSGMOR involvement contributes to our soldiers' knowledge and experience. There are several ways in which an HCOR and HSGMOR can benefit the unit:

- Serve as guest speaker or honorary guest at regimental dedications, ceremonies, dining outs, and related functions.
- Assist units in overseeing the regiment's honorary program.
- Visit units and speak at OPD or NCOPD classes.
- Produce literature on the regiment's history.
- Compare ideas with other HCORs and HSGMORs.
- Assist in sending invitations for regimental functions to other distinguished and former members of the regiment.
- Develop morale items.
- Play a key role in naming a successor.
- Help to develop or maintain a regimental history SOP.
- Attend officer and NCO school graduations.
- Establish regimental funds that could be used for scholarships, awards, or other regimental items.
- Institute a Regimental Week that honors past and present members of the regiment and promotes unit cohesion and teamwork.
- Contribute to the establishment of regimental rooms or hallways featuring pictures, photos, news articles about honorary members, and special announcements.
- Speak to ROTC cadets at local colleges about the importance of Armor and Cavalry and its glorious history.
- Maintain contact between CONUS and OCONUS units of the regiment.

If you have any questions concerning the Regimental System or the honorary program, please contact the Directorate of Total Armor Force Readiness - Personnel Propensity Division, Fort Knox, Kentucky

40121-5000, AV 464-5155/3188 or commercial (502) 624-5155/3188.

19E Transition to 19K

This is an updated transmission of Message, ATZK-TFP, 221600Z May 90, Subject: 19E Transition to 19K.

Force reductions have significantly complicated the transition of our 19Es to 19K. You must be aware of several ongoing actions that will affect the transition program and your units:

- We have coordinated three additional transition programs for 19Es. Although none of the programs provide complete transition training, our aim is to limit the impact on M1-equipped units that receive completely untrained 19Ks.

Supplemental NET at Fort Carson. This program provided transition training to 320 soldiers between Jan-Mar 90. Skill level 10 soldiers who completed the training transitioned to 19K10. Skill level 20-40 soldiers must either complete UCOFT training to Reticle Aim Level 24 or complete a unit Level 1 gunnery before receiving MOS 19K at the appropriate skill level.

Mini-NET at Fort Knox. From Apr-Oct 90, Mini-NET trained the majority of 19Es returning from Korea, and some from Fort Lewis, on the individual tasks they need to safely operate the M1 tank. Due to budget constraints, some soldiers did not drive the M1. These soldiers received PMOS 19K00 (no skill level recognition) at the completion of training. You can award skill level 10 soldiers PMOS 19K10, upon successful completion of a unit-level driver's training program. NCOs must complete your unit-level driver's training program and a UCOFT program to Reticle Aim Level 24 or a unit gunnery through Table VIII before you can award them MOS 19K20/30/40. All SL1 soldiers who drive the M1 during transition training will receive 19K10; NCOs will receive 19K00. The NCOs must complete a UCOFT program to Reticle Aim Level 24, or a unit gunnery through Table VIII, before you can award them MOS 19K20/30/40. All soldiers completing mini-NET will receive a memorandum that outlines the specific training and administrative requirements which they must complete before being awarded the appropriate skill level identifier.

Gowen Field Transition Training. A group of 166 soldiers from 1-33d Armor at

Fort Lewis transitioned from 19E to 19K at the National Guard's Combat Vehicle Transition Training Team (CVT³) facility at Gowen Field, Idaho. These soldiers received individual training, to include driver's training, a day and night TCPC, and some UCOFT time. All SL1 soldiers received 19K10; NCOs received 19K00. You can award your NCOs the appropriate skill level after they complete a UCOFT program to Reticle Aim Level 24 or a unit gunnery through Table VIII.

We are training solely on M1 or M11P tanks. Even though the soldier reports with MOS 19K, you must conduct appropriate safety classes before he is qualified to operate the M1A1. In particular, your unit training must focus on ammunition handling, loading and misfire procedures, 120-mm gun system maintenance, and crew evacuation drills.

Due to sheer numbers and limited time, there will be some 19Es who will be assigned to M1-equipped units without 19K training. To transition the soldier to 19K, you must use the supervised on-the-job training (SOJT) package available from the M1 NET Team at Fort Knox (AV 464-1661/5504). Message, ATZK-AR, 111830Z Dec 89, Subject: 19Es Being Assigned to M1 Equipped Units, outlines the training and administrative procedures. It is imperative to Total Armor Force readiness that you train these soldiers and complete the administrative paperwork.

The Tank Commander Certification Course (TC³) remains an option for transitioning an NCO from 19E to 19K. You can request TC³ seats through G3 channels to Specialized Training Branch at DA PERSCOM. If you have any 19E NCOs who are preparing to PCS, it is imperative they contact Armor Enlisted Branch to request a TC³ seat (AV 221-9080).

Effective 1 October 1991, 19E will no longer be an MOS in the active component. At that time, soldiers who have not transitioned will receive ASI Y2 indicating they still require transition training. 19Ks who have previous M60 experience will receive ASI B8, indicating they are qualified to operate the M60A3 tank.

We are working hard to transition the 19E inventory and minimize the impact on soldiers and unit readiness. For additional information or clarification, the POC within the Directorate of Total Armor Force Readiness is CPT Chris Lucier, AV 464-5155/3188.

Personnel Qualification Record

Armor Branch has recently received bulk boxes of DA Form 2 and 2-1 from the 1990 Sergeant First Class Promotion selection board for filing in the Career Management Information File (CMIF).

Just as it was when you went before the sergeant or the staff sergeant promotion board, the president of the board probably said something like, "Sergeant, you are here to sell yourself to this promotion board." Then you advised all the members collectively that you are prepared to take on the responsibilities of the next higher grade.

In this manner, Department of the Army selection boards are somewhat the same. You are forwarding all of your historical data to a group of very professional, senior noncommissioned officers and officers. As they go through the selection process, you are in fact trying to show that you should be promoted "on paper" i.e.: Noncommissioned Officer Evaluation Reports (NCOER), DA Photo, DA Forms 2A and 2-1. If they aren't in a good state of repair, the board members will notice that many of you did not take the time to ensure your file was as neat and correct as it could have been.

Armor Branch encourages all NCOs to refer to the Armor Enlisted Professional Development Guide, Chapter 3, Section II. This guide will show you how to prepare your PQR for DA Centralized Selection Boards. Any questions concerning these boards may be directed to your career advisor at AV 221-9080 or commercial (703) 325-9080.

Battle Staff Noncommissioned Officer Course

The Battle Staff Noncommissioned Officer Course (BSNCOC) objective is to train battalion, brigade, division, and corps staff NCOs to serve as integral members of a battle staff and manage the day-to-day operations of command posts. NCOs will learn their specific staff duties and become familiar with the duties of other staff sections.

The BSNCOC is a six-week course conducted at Fort Bliss, Texas. Prerequisites for attendance to this course are that candidates be in the grade of staff sergeant and above, serve in a G1/S1, G2/S2,

G3/S3, or G4/S4 position, and have a secret security clearance.

Upon successful completion of BSNCOC, soldiers will be awarded the additional skill identifier (ASI) 2S (tentatively).

Approving authority for attendance to BSNCOC will be Headquarters, Department of the Army. Direct questions concerning BSNCOC to Armor Branch at commercial (202)325-9080 or AV 221-9080/Infantry Branch at commercial (202)325-8056 or AV 221-8056.

Congratulations, 4-34 Armor

From 12 June through 3 July 1990, the 4th Battalion, 34th Armor, qualified all assigned tank crews first run on Tank Table VII, Range 117, Grafenwoehr. With a battalion average score of 862 points, 4-34 claims the highest average in USAREUR. The battalion also leads USAREUR with 14 Distinguished Tanks and two crews shooting a perfect 1000 points. To date, only five USAREUR crews have earned 1000 points. The perfect score of C-24 (TC SFC Rynearson, Gnr. SGT Fuller, Dvr. SPC Boykin, Ldr. PFC Williamson) and C-34 (TC SFC Nimmons, Gnr. SGT Diaz, Dvr. SPC Fulinara, Ldr. SPC Robinson) give 4-34 40 percent of USAREUR's 1000-point crews.

The Centurion Battalion did not stop on Tank Table VII, but went on to set the standard on Tank Table XII by qualifying all 12 platoons with a battalion average of 89.9 percent target hits. Each platoon consisted of three, not four, tanks, due to reductions in assigned personnel strength. Again, the 89.9 percent average on target hits is the highest in USAREUR. Overall, four platoons earned distinguished ratings, while the remaining eight were superior.

The battalion attributes its great success to the hard work, clearly defined objectives established well ahead of deployment, and a focus on individual responsibilities.

ROTC Alumni Association

The Army ROTC Department at Worcester Polytechnic Institute is establishing an Alumni Association. The association seeks to support the cadets of WPI and affiliated schools, as well as help alumni maintain contact with the battalion and classmates.

Alumni of WPI's ROTC program are invited to call SGM Plant or MAJ Sayre at (508) 752-7209 or FAX (508) 831-5483 or send their names, addresses, and telephone numbers to: Army ROTC, Worcester Polytechnic Institute, 100 Institute Road, Worcester, Mass. 01609.

Draper Award Winners

On 13 July 1990, Company B, 4th Battalion, 70th Armor received the annual Draper Award for tank/cavalry leadership for 1st Armored Division. CPT Tyrone K. Brown, company commander, and 1SG Jeffrey D. Hampton accepted the award. The award is intended to promote, sustain, and recognize effective leadership in armor/cavalry units. "The Draper Award means that we are the best tank company in this division. This award reflects our company motto, 'through training we will succeed'," 1SG Hampton said.

Armor Saber Awards

On 23 May 1990, LTG Dave Palmer, USMA's superintendent and senior armor officer, presented the U.S. Armor Association cavalry sabers to two cadets.

This year's Armor Saber Award winners are Cadet Don Minton, who was the highest ranking Armor Branch cadet, and Cadet Eric Peltz, the Armor Branch cadet with the highest academic average.

Volunteers Wanted for Ranger School

The United States Total Army Personnel Command is seeking 19D Cavalry scouts to volunteer for Ranger School. Volunteers must meet the medical, physical, and mental requirements as stated in AR 614-200, Chapter 6, paragraph 6-11c, Selection of Enlisted Soldiers for Training and Assignment. Soldiers in overseas commands need to submit their application five to eight months before date eligible to return from overseas. All volunteers must meet the service obligation prescribed in AR 601-280, Total Army Retention Program. Volunteers must possess the rank of sergeant and above.

Further information can be obtained by contacting Infantry/Armor Branch at commercial (202)325-9080/5494 or AV 221-9080/5494.

Victor Six, by David Christian and William Hoffer, McGraw-Hill Publishing Company, 1990. \$19.95.

Victor Six describes the experience of a young infantry lieutenant in Vietnam, and with equal emphasis, his post-war activities in support of veterans. Christian organized the book as a series of vignettes, each centering around a specific incident. To provide a setting, he gives the date and location of an incident as the title of each subsection.

The book has many favorable aspects. The descriptions of war at platoon, squad, and even man-to-man level are the most graphic I've ever read. What made these passages so valuable is the "human" or psychological element of combat that he includes. His absolute honesty in recounting battle in the jungle is, in some cases, shocking — but if you are interested in learning about the "face of battle," as popularized by John Keegan, read the first half of this book.

The author also brings to light a lot of information on how the U.S. Government has dealt (or not dealt) with Vietnam veterans. His experiences working in the Veterans Administration during the Carter administration, and as a two-time congressional candidate, are very illuminating. This is what sets this book apart from the stereotype Vietnam veteran book. Because of this, most veterans will avidly read the last half of the book.

There are a few areas that detract from the overall value of the book. At some points, the book appears to be overdone in generalizations of field grade officers and support personnel. Although, no doubt, Vietnam did taint the image of the senior officer corps, it also produced many superior fighters — such as Patton, Bahnsen, etc. Some references to units were erroneous (26th Infantry Division? 11th Armored Cavalry Division?), which may have slipped in during the editing process. And, the continuing reference to Agent Orange in the combat sections appeared out of place and a bit repetitive.

For me, the best characteristic of the book is that it is a success story. David Christian did suffer setbacks in post-war life, but here is a Vietnam veteran who is young, vibrant, well dressed, and well

groomed making a tremendous impact on society. It certainly is not the average media portrayal of a Vietnam veteran. Perhaps this book reflects a contemporary trend. This trend is evidenced by groups like the Atlanta Vietnam Veterans Business Association, a group of real estate moguls, bank presidents, securities brokers, and the like. It seems that what used to be the silent majority of veterans — those who are highly successful in civilian life — have come forward, lent their voices (and, perhaps more important, their money), and are contributing to the cause of veterans...but in their own way.

If you're interested in tactics or tanks, this book probably isn't for you. If you're intrigued with the mental side of combat, you may want to purchase this book. If you are studying the societal side of warfare or the situation of Vietnam veterans — this book is a must.

KRIS THOMPSON
CPT, Armor
Ft. Knox, Ky.

Survivor: Memoir of Defeat and Captivity, Bataan 1942 by Thomas R. Harrison. Western Epics, Inc., Salt Lake City, 1989. 223 pages. \$15.95.

Duty in the Philippines in the summer of 1941 was a dream-like paradise for a young U.S. Army lieutenant. Then the dream turned bad and became a nightmare, which lasted more than three and a half years. Thomas R. Harrison's book, *Survivor*, is his personal memoir of the fall of the Philippines to the Japanese early in World War II, the Bataan death march, and his years as a prisoner of war.

Survivor is a poignant story, told with unbelievable clarity and stark realism. Thomas Harrison was a naive, inexperienced young man when he joined the Army in 1941. Trained as an artilleryman, he was sent to the Philippines as a second lieutenant, to train Filipinos in the newly formed Philippine Army. Life was good for a bachelor lieutenant who enjoyed his work and the company of his comrades and soldiers.

Harrison first takes you through those idyllic months in the summer of 1941, up

to December 8, when the war began for him. His perspective of the war is remarkably simple and tragic. Fighting against the Japanese invaders with his half-trained, unseasoned troops, poor equipment, and outdated weapons, with little ammunition and even less food, Harrison saw first-hand the courage and cowardice of a losing struggle. He designed his own self-propelled artillery — old British 75-mm cannons bolted to flat-bed trucks — but even those could not keep pace with the quick-marching Japanese infantry.

The disbelief of inevitable surrender struck hard at the Americans and Filipinos backed into the Bataan Peninsula in early 1942. Then the nightmare really began. The long road to captivity started with the Bataan Death March, an event so brutal it is a wonder anyone survived. But Thomas Harrison did, and he tells of it with graphic candor: no food, no water, no rest, no medicine — just marching and violent death at the hands of the victors.

The remainder of the book is devoted to Harrison's life as a POW, first at various camps in the Philippines, then later at other camps in Japan. Harrison vividly describes the POW living and working conditions, but more important, he conveys the utter hopelessness and despair of their situation most convincingly. While apparently trying to maintain their human dignity and establish a sense of normalcy, it is quite clear that everyone's driving motivation was to obtain food — to survive. Little else really mattered. Perhaps that is why Harrison never mentions anything about escape attempts.

Mr. Harrison is not a professional writer, he is a retired mining engineer. His writing, however, is smooth and colorful, filled with insight and imagery. Forty-five years after the war, it is amazing that he recalls so much detail, but he has included excellent maps, drawings, and vintage photographs to support his memories. *Survivor* is an excellent tale of innocent courage and it serves as a superb example of man's final victory over defeat and despair.

W.D. BUSHNELL
LTC, U.S. Marine Corps
Ft. Knox, Ky.



IRAQI ARMOR



T-54/55

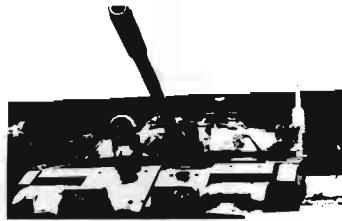


T-72



T-62

The export variant T-72M1 shows a thicker upper glacis (evidenced by three, rather than four, transverse ribs in front of the driver's hatch), increased framed turret armor and applique armor on the turret roof.

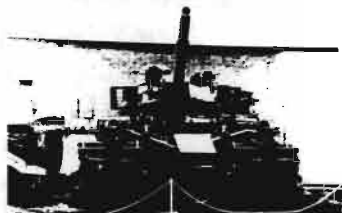


T-55 WITH SMOKE GRENADE LAUNCHERS, ENHANCED ARMOR AND FIRE CONTROL SYSTEMS.

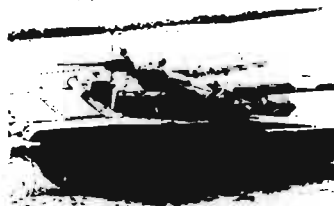
The modified T-55 may include multi-layered, applique armor protection to hull and turret, side skirts, smoke grenade launchers, improved fire control, and a 125mm main gun with auto loader.



PT-76



T-55 WITH 125MM MAIN GUN, AUTO LOADER, SMOKE GRENADE LAUNCHERS, ENHANCED ARMOR AND FIRE CONTROL SYSTEMS.



T-72M1



TYPE 69

CHARACTERISTICS

	PT-76	T-54/55	T-55(mod)*	T-62	T-72/72M1	Type 69
MAIN ARMAMENT	76mm	100mm	100/125mm	115mm	125mm	100mm
MAX EFF RANGE	650m	1500m	1500/2100m	1600m	2100m	1500m
AMMUNITION TYPES	FRAG-HE, AP, HEAT, HVAP	FRAG-HE, HEAT, HVAP, AP, APDS	FRAG-HE(FS), HEAT-FS, HVAPFSDS	FRAG-HE(FS), HEAT-FS, HVAPFSDS	FRAG-HE(FS), HEAT-FS, HVAPFSDS	HEAT, HE, APDS, APPSDS
BASIC LOAD	40 rds	34 rds	40 rds	40 rds	40 rds	44 rds
CREW SIZE	3	4	4/3	4	3	4

This 24-by-27-inch poster of Iraqi Armor is the latest in a series on Threat tanks, armored vehicles, helicopters, and ATGMs to be produced by Threat Division, Directorate of Combat Developments, Fort Knox. Units may request copies by phoning AV-464-AWTS or 502-624-AWTS.

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