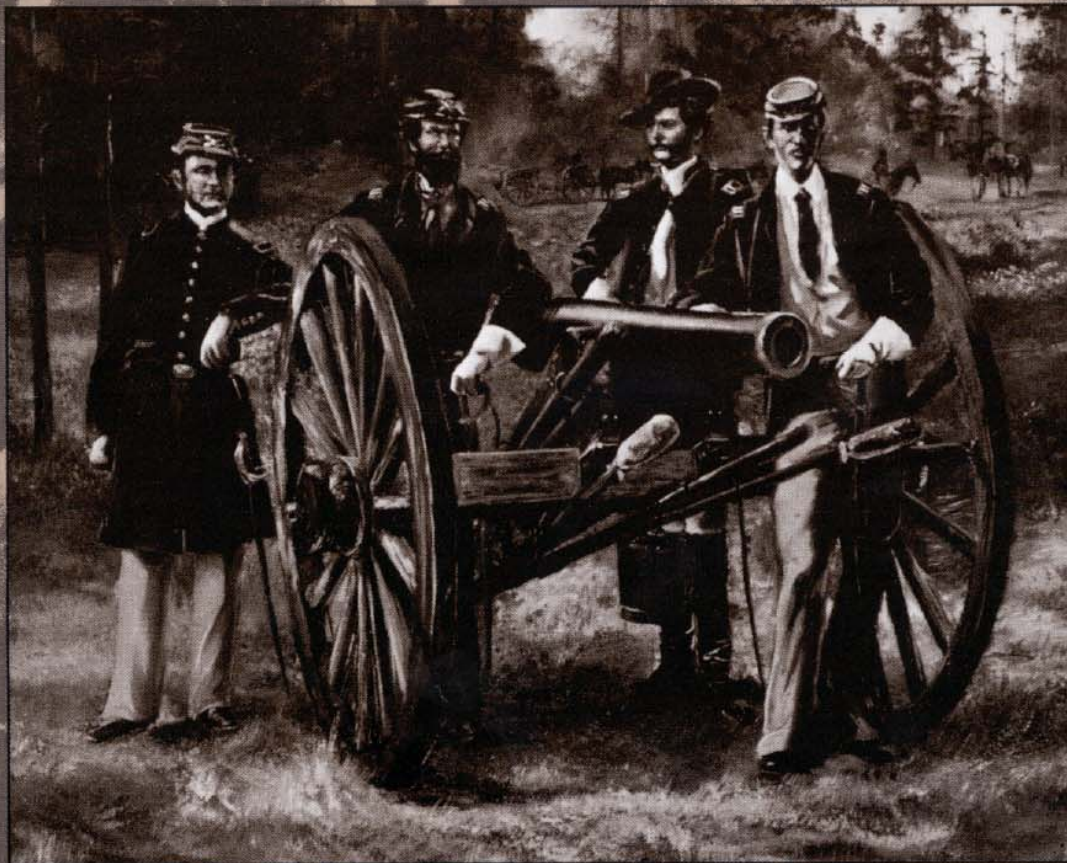




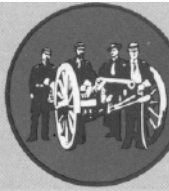
Field Artillery

A Professional Bulletin for Redlegs

August 1988



Change with Continuity



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1989 Field Artillery Themes

Publication Date	Theme	Article Deadline
February	3x8: The Transition in Tactics and Training	3 Oct
April	Counterfire	5 Dec
June	Artillery and Combat Service Support	6 Feb

NOTE: The themes for the rest of 1989 will appear in the 1988 December Red Book.

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"Field Artillerymen" is the title of the painting on the front cover by Ms. Joyce Kreadle of Shawnee, Oklahoma. Ms. Kreadle based her painting on an 1862 photo, which has become one of the most well-known images to come out of the Civil War and is part of *Field Artillery's* logo. Color prints of this classic painting are available through the **US Field Artillery Association, PO Box 33027, Fort Sill, OK 73503-0027.**

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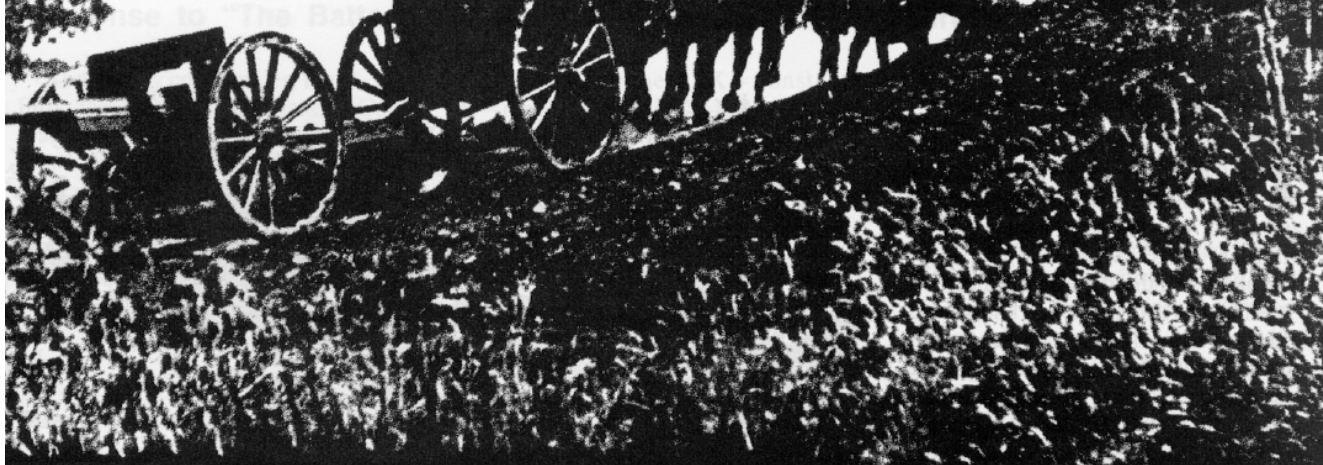
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Fellow citizens, we cannot escape history....No personal significance or insignificance can spare one or another of us. The fiery trail through which we pass will light us, in honor or dishonor, down to the last generation.

Abraham Lincoln



Looking Forward Through the Past

The need for a wide reading of history as an indispensable part of an Army officer's professional development is axiomatic. Only the foolish choose to learn these free lessons by trial and error. But what should the reader of history be looking for and analyzing? In a recent *Military Review* article, Colonel Henry G. Gole suggests an approach that focuses on context rather than technical detail. He says,

It is unlikely that we can know where we are or where we are going if we do not know where we have been. If we cannot get that right, we are aboard a ship smoothly steaming without purpose. Efficiency should not be confused with purpose. History provides reference points, but too often historians illuminate the roles, mechanics and laws of the power brokers with too little regard for what Alexander Pope called the proper study of mankind: man.

This examination of the human condition in the context of the times gives the modern soldier the depth of understanding required to outsmart the enemy. That understanding, coupled with the technical competence gained through rigorous training and the analysis of the technical detail of recent history, will

give the modern Field Artilleryman the balance to win—even against the odds.

Thanks to the US Field Artillery Association's sponsorship of the 1988 History Writing Contest, we can draw the lessons that will give us this balance from the best manuscripts submitted by excellent authors, the most submissions ever in the three years of the contest. Our panel of judges—all experts in the history of Field Artillery—made tough decisions using the following criteria:

- Relevance to Field Artillery in Combined-Arms Operations
- Usefulness to Today's Redlegs
- Historical Accuracy
- Writing Effectiveness
- Originality

The subjects our authors chose range from analyses of the use of Field Artillery fire bases in Vietnam back to the Franco-German War of 1870-71 and forward to a recent Israeli-Egyptian war. The times change, the weapons change, but authors with different backgrounds and points of view draw many of the same conclusions and lessons.

The History Writing Contest will continue to support a history issue of *Field Artillery* each year as a professional development tool for our soldiers in the field who are making the history. We hope this issue will help guide you down Lincoln's "fiery trail" with honor.

Editor

1988 History Writing Contest

First Place "Countering the Sappers" by Captain Gary J. Pieringer

Second Place "Combined-Arms Operations in the Franco-German War of 1870-1871" by Major Arthur T. Coumbe, MI, USAR

Third Place "The Dress Rehearsal: Lost Artillery Lessons of the 1912-1913 Balkan Wars" by Major David T. Zabecki, USAR

Honorable Mention "On Time—On Target" by Major Andrew G. Ellis

"The Ramadan War: Fire Support Egyptian Style" by Captain Robert D. Lewis, SF
 "Fortresses and Firepower in Vietnam" by Captain James J. Carafano
 "Fire Support in an Airmobile Environment: Some Lessons for Everyone" by Colonel (Retired) Griffin N. Dodge

"Lest We Forget" by Colonel (Retired) Robert M. Stegmaier

"The Strange Metamorphosis of One Division in World War II" by Lieutenant Colonel (Retired) Paul Cox Dillon
 "Kursk: The Application of Depth and Synchronization on the AirLand Battlefield" by Captain Robert D. Lewis

On the Move

MAJOR GENERAL RAPHAEL J. HALLADA

Truth in History

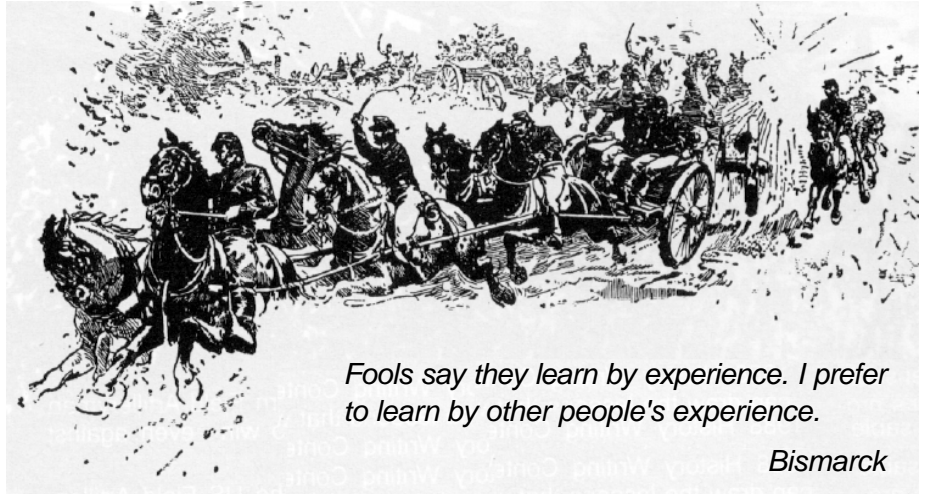
History lays the foundation for education by showing how mankind has triumphed . . . and erred. It is universal experience — infinitely longer, wider and more varied than any individual experience.

For Field Artillerymen, a knowledge of history is vital. For example, the US Army and its allies in 1944 forgot the lessons of 1940 in the Battle of the Bulge. In their drive to defeat Nazi Germany, they lightly defended the Ardennes Forest so they could concentrate on offensives in other areas. In doing so, they underestimated the resourcefulness of their opponent and, consequently, were surprised when the Germans struck through the Ardennes in December 1944. This doesn't imply that appreciation of May 1940 would have prevented the German successes of December 1944. It does suggest, however, that Eisenhower and others shouldn't have discounted a German offensive through the Forest. After all, the Germans had done it before.

Reflecting on the value of history to soldiers, General George S. Patton wrote to his son while a cadet at West Point, "To be a successful soldier you must know history . . . what you must know is how man reacts. Weapons change, but man who uses them changes not at all. To win battles you do not beat weapons — you beat the soul of the enemy."

Because the US Army is losing its combat veterans rapidly, historical examples and General Patton's advice are becoming even more important. Consequently, an essential ingredient of an effective officer professional development program involves studying history. Even though history will not solve every problem, it certainly will broaden perspectives for finding solutions and, perhaps, help artillerymen avoid needless planning. History reminds us life is fleeting and counsels us to be wary of naiveté, prejudices or shortsighted thinking.

Striving to increase an awareness of and appreciation for history is not easy.



Fools say they learn by experience. I prefer to learn by other people's experience.

Bismarck

However, here are several approaches you can take:

- Consider sponsoring unit-level discussions. Using battle analysis as taught by the Field Artillery School, discuss topics from suggested reading lists. However, I guarantee classes that use history in an uninspiring or unimaginative way will only defeat the goal of having history-minded officers.

- Before taking on a new project or field exercise, check the unit's archives for after-action reports. See how it was done before, and use those historical examples to improve procedures. The study of history doesn't mean it must be centuries old to be of value.

- Take a day out of the training schedule to conduct a staff ride to a nearby battlefield. Staff rides, like the one officers advanced course students take to Pea Ridge, Arkansas, have met with much enthusiasm and success. By walking the grounds where past battles took place, we gain a better appreciation for terrain, weather, fatigue, leadership, morale or other factors that influenced the fight. Units can use park rangers, museum curators or local historians who have the expertise to make the ride a meaningful and enjoyable experience.

- Consider appointing a battalion

historical officer to coordinate a unit history program. This program may include creating a regimental room like those at Snow Hall at Fort Sill, conducting reading or discussion groups, or providing short historical vignettes for bulletin boards. However, don't make this a one-man show since it quickly becomes another burdensome extra duty. It should be fun, challenging and, most importantly, rewarding for everyone.

Finally, professional development is as much an individual responsibility as it is a unit responsibility. Therefore, you must develop the habit of reading, talking and thinking about the lessons of history and making them a part of your daily routines the same way you run during physical training each morning. Keep a pencil close to underline or make notes to retain more of what you read and jot down ideas to reflect upon later or points to discuss with others.

I challenge all Redlegs to read and study as much history as you possibly can. Francis Bacon said more than 350 years ago that the study of history "makes men wise." I assure you, it will not only make you wise, but also a far more technically and tactically competent member of the combined-arms team.



Field Artillery

Incoming

LETTERS TO THE EDITOR

Response to "The Battery Commander's Method of Fire Direction"

As a battery commander, I read carefully the article "The Battery Commander's Method of Fire Direction" [October 1987]. I commend Captain [Frank A.] Hollingshead [USMC] for his research and submit the following improvement. In 1916, the French had a simple formula to compute the elevation: α (mils) =

$K \times R(R + 4)$, where K = constant, R = range (kms) and $!$ = elevation in mils. You get K from the tabular firing table.

With this formula, the forward observer (FO) can compute the elevation, if he knows the range. So the initial data is very easy to compute. Also, he can create an FO card with angles S

and D .

Now, the FO has only one card with two tables. He can compute all initial data and has enough information for computing low-angle adjust fire.

Frederico Jose Rovisco Duarte
*Capitão, Escola Prática de Artilharia
 Vendas Novas, Portugal*

Response to "Survivable Hardware Coming? You Can Bet On It!"

The April 1988 edition of *Field Artillery* contains several errors in the article "Survivable Hardware Coming? You Can Bet On It!" [by Colonel Richard W. Wharton].

On page 11, some of the information in the chart "US Selected Artillery" needs revision as follows:

- The silhouettes of the M109A2/A3 and the M110A2 are reversed.
- The maximum ranges for the listed weapons should be as follows:

M109A2/A3 Maximum Range

(M)—23,500 with RAP*

M110A2 Maximum Range

(M)—30,000 with RAP*

M198 Maximum Range

(M)—30,000 with RAP*

*Rocket-Assisted Projectile

On page 13, some HIP information is incorrect:

- External Armor—The added armor is not "reactive" but just added, rolled homogenous armor (RHA).

- Ammunition Compartmentalization—There are no crew-cab bulkheads between the propellant stowage racks in the bustle and the crew compartment.

Douglas M. Converse
*Weapons Department
 Field Artillery School*

In the April 1988 issue...the silhouettes of the M109A2/A3 and the M110A2 are reversed in the chart [page 11]....This could be a very good April Fool's joke.

Richard L. Maglothin II
CPL, ARNG

3d Battalion, 115th Field Artillery

The author confirmed Mr. Converse's corrections to his article and added the following note:

The turret of the HIP howitzer will be "beefed up" with rolled homogeneous armor over the driver's compartment and the rear of the bustle. However, using reactive armor is a possibility for the follow-on to the HIP, an advanced Field Artillery system.

Field Artillery is responsible for reversing the two howitzer silhouettes. We strongly encourage our readers to continue to give us feedback. Only through such feedback can we ensure Field Artillery is most useful to the field.

Editor

	M109A2/A3	M110A2	M198
Towed/Self-Propelled	Self-Propelled	Self-Propelled	Towed
Caliber/Type	155-mm Howitzer	203-mm Howitzer	155-mm Howitzer
Maximum Range (M)	23,500	30,000	30,000
Nuclear-Capable	Yes	Yes	Yes

Corrected "US Selected Artillery" Chart from Page 11, April 1988 *Field Artillery*

Response to "The Flying Box": Supporting the Mobile Armored Corps" and "Fire Support in Mobile Armored Warfare"

Captain [Jorge M.] Fernandez ["The Flying Box": Supporting the Mobile Armored Corps," June 1988] is of the opinion the M110A2 should be used in "Storm Artillery." This should be the exception, not the rule! The M109A3 is the howitzer of choice due to its responsiveness, variety of shell and fuze combinations, crew protection and firepower.

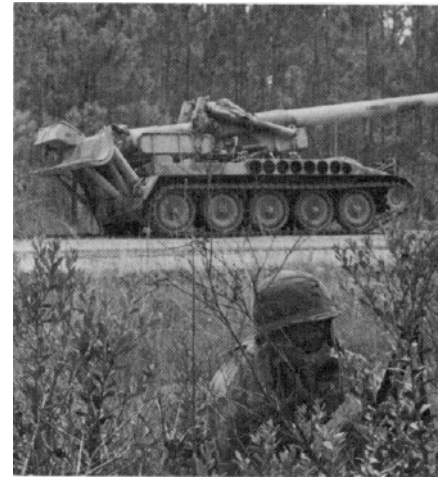
Captain Fernandez believes the M110A2 platoon (battery) should remain within 2,000 meters of the maneuver elements to assist the maneuver forces with direct fire. This is suicide for almost any Field Artillery asset against any Threat maneuver direct-fire asset. Field Artillery was designed primarily to provide accurate indirect fire—not engage targets with direct fire.

If you are leading the "Flying Box" formation with the M548 ammunition carrier because it has an M2, .50-caliber machine gun, you may be placing the wrong vehicle up front. The M548 is a front-heavy ammunition carrier with a less-experienced driver as a

vehicle commander, leading a formation over unknown terrain. If the M548 should hit a deep cut, it could tip or flip over very easily, unlike the M110A2. The M110A2 would be suited better to lead, with the more experienced driver and section chief. The M548 driver then would have time to react to a hazard area, if he were following his main cannon.

Counting on the "...high-mounted, .50-caliber machine guns..." on the M548 to engage the Threat would be fine if we were fighting a Third World country with no modern weapon system. But the threat facing the Mobile Armored Corps will be far better armed.

With regard to "Fire Support in Mobile Armored Warfare" [Lieutenant General Crosbie E. Saint, Colonel Tommy R. Franks and Major Alan B. Moon, June 1988], storm artillery leaders must be bold, audacious and dynamic if this type of fire support is to succeed. There can be no doubt fire support needs to remain close to maneuver, three to five kilometers being



the norm.

As fire support experts, we must ensure the maneuver commanders are kept informed of the risks involved in exposing their limited fire support resources to Threat direct-fire assets. Artillery does have direct-fire capability, but it's best to fight in the indirect-fire mode.

Jeffrey C. Meyer
CPT, FA

*Fire Support and Combined Arms
Operations Department
Field Artillery School*

Lieutenant Colonel [Christopher C.] Shoemaker's article ["Shakin' the Cities," April 1988] on the occupation of urban positions by Field Artillery units is long overdue. But he's correct when he states he hasn't discovered something new. My 8-inch battery in West Germany in 1984-85 practiced urban occupation as a matter of necessity.

With absolutely no ballistic protection for the crewmen, the M110A2 howitzer must be positioned to protect exposed artillerymen. We found the extra-sturdy construction of the typical German farmhouse (made completely of cinder blocks) provided this protection, so we habitually occupied positions next to those structures. Because of the limited traversing ability of the

M110A2, we could position howitzers right next to these buildings and not limit the firing capabilities of the guns.

Also, on our exercises into the German countryside, we found one other member of the advance party was necessary. This was an "interpreter" — one of our own soldiers who spoke German fluently. His task was to smooth relations with the German residents of the towns we occupied and to secure sleeping quarters in the nearest barn for the troops. By adding this "non-TOE" member to the advance party of each platoon, we provided for the welfare of the troops and maintained harmony with the local populace. All of our exercises in urban areas were extremely successful, and they

became our positions of choice.

Thomas A. Hardy
CPT, FA

*Department of Military Science
Fort Hays State University*

I enjoyed Lieutenant Colonel Shoemaker's article "Shakin' the Cities." I'd like to add some of the lessons I learned while developing some of the same techniques for mortars as part of the Berlin Brigade [East Germany] in the early 1980s.

While site to crest is less of a problem for mortars due to the high angle of the weapon, we found occasions where we actively sought a position with an extreme site-to-crest. For example, in

an environment with a high counterbattery threat, the mass of a building in front of the firing point provides significant protection to the firing battery. Additionally, engaging targets at ground level in city "canyons" requires high-angle fire anyway. (See "Indirect Fire in MOUT," March-April 1982, *Infantry Magazine*, for more details.)

Lieutenant Colonel Shoemaker mentions using multiple aiming circles to lay the battery. I agree this is the only way to proceed with limited lines of sight, but one must take into account additional problems. Studies I did in Berlin in 1981 showed that setting up an aiming circle within 200 meters of

an urban building caused an unacceptable level of error (in excess of 10 mils) because of the magnetic fields associated with electrical wiring, plumbing, etc. The solution we came up with was to use the end-of-orienting-line method of setting up the aiming circle.

Only in a very general way has the Signal community addressed Lieutenant Colonel Shoemaker's comments about remotely siting antennas to overcome communications problems. More in-depth studies could provide better guidance. Until that happens, units should consider using the civilian phone system as a back-up means of communications. These systems have a

good record of operating after sustained combat operations, especially in Germany where the phone cables are buried and the exchanges automated.

Military operations on urbanized terrain [MOUT] will be a reality in any future combat theater. Anyone who doubts this has only to look at the distribution of cities with more than one million inhabitants; most are not in the industrialized countries of the world. Continued work like Lieutenant Colonel Shoemaker's needs to be done and discussed.

Patrick J. Coyle
SFC, USAR
Columbus, GA

Response to "Redlegs in Acquisition"

Lieutenant General Bunyard's article "Redlegs in Acquisition" (April 1988) appropriately outlined the need for qualified Field Artillerymen in the research, development and acquisition area. Furthermore, it portrayed the path(s) and job assignments to follow to become materiel acquisition management (MAM) qualified.

However, the article was oriented heavily toward the Army Materiel Command or materiel development portion of the acquisition process. There is a need for qualified Field Artillerymen to fulfill the combat development requirements of both the Field Artillery School and the Training and Doctrine Command—to provide the doctrine, tactics, training, organizations and equipment necessary to modernize the total force. The Field Artillery

School also needs its core of experts, those young officers with practical field experience who can work to solve the known problems of today and the unknown challenges of the future.

There are assignments available at the School and at Fort Sill for those officers interested in pursuing a career in MAM. School assignments include combat developments (FA 99)—to determine and implement the concepts, doctrine, tactics and equipment needed to win the battle; operations research systems analysts (FA 49)—to conduct the combat development studies and analyses; and the research and development personnel (FA 51A)—to conduct the total system management of the new weapons, ammunition, survey, meteorological and target acquisition systems coming on line. The Field

Artillery Board has a need for test and evaluation officers (FA 51B) to conduct those tests and evaluations necessary to field new and improved systems.

Essential to the entire MAM process is a firm foundation in how we fight today in the Field Artillery coupled with a thorough understanding of the materiel and combat developments process. The former is learned in the field, the latter in the classroom. For those lieutenants and captains who are interested in a MAM career, I urge them to consider an assignment to Fort Sill as their first step.

Michael D. Blose
LTC, FA
TRADOC Systems Management TA/SS
Fort Sill, OK



"Hey — you back there.
This session is for infantry only!"

Countering the Sappers



by Captain Gary J. Pieringer

Artilletry units in Vietnam were not positioned far to the rear of maneuver forces, as was the case in previous conventional wars. The non-linear nature of the War often caused artillery batteries to be in direct contact with the enemy. While delivering devastating fire support, Field Artillery units demonstrated they were not simply rear-echelon forces incapable of defending themselves. They adapted to the elusive tactics of the enemy in Vietnam, developed several defense techniques and proved to be tenacious defenders of their positions.

Fire Support Bases

The fire base (or fire support base) was the primary position the artillery used in Vietnam. Artillery units moved to the bases by road or helicopter. But once positioned, they lacked mobility and were vulnerable to attack from any direction. A firing battery also lacked the personnel to defend against a determined enemy and still fulfill its primary mission of delivering timely and accurate fires.

To counteract these weaknesses, infantry was positioned at the fire base to provide perimeter defense. Usually one rifle company defended a single battery fire base. To meet this requirement, infantry

battalions in Vietnam were given four companies instead of three.

Several variables such as terrain, area available and the number of weapons prevented a standard organization among fire bases. However, several characteristics were common. Either an infantryman or artilleryman commanded the base, depending on seniority. The two commanders jointly selected the position of the fire base; the primary considerations were that it be centrally located to provide coverage for the maneuver forces and that it be within range of another artillery unit, which could provide indirect fire in defense of the base.

Fire bases varied in size because, depending on the task organization, more than one artillery battery might be positioned there. The 25th Infantry Division determined fire bases were constructed best in a circle small enough for one rifle company to defend.

Artillery pieces generally were arranged on a fire base in a star formation. For example, a six-gun battery was emplaced with five guns marking the points of the star and the sixth gun in the center. This configuration was excellent because it provided for an effective pattern of ground bursts and for a 360-degree defense. During a night attack, the center gun fired illumination and the other guns used direct fire.

The preparation of each gun emplacement provided all-around protection of the weapon and crew from

direct fire, overhead protection for the crew and protection for ammunition. Protective materials used included sandbags, ammunition boxes, powder canisters, heavy timbers and corrugated steel roofing. To protect the howitzers from enemy rockets, gun sections erected cyclone fencing 20 to 25 feet in front of their positions. An artillery unit might remain at a fire base for several weeks, so there was plenty of time to improve the fortification of the position.

The infantry defending the position used standard tactics to accomplish its mission. Perimeter defensive positions were dug in and included bunkers, where possible. Soldiers emplaced barbed wire, claymore mines and trip flares. The infantry also had 81-mm and 4.2-inch mortars, which were excellent for providing close-in illumination during night attacks. The infantry manned the perimeter and conducted patrols to find the enemy. They also incorporated the direct-fire capabilities of the artillery into their defensive plan as much as possible. And to defeat the enemy, the defenders studied the tactics of their attackers.

The devastating firepower of artillery made battery positions primary targets for attack. Although fire bases were heavily fortified, they afforded no mobility, so the Vietnamese could locate and attack them rather easily. Such attacks would range from unsupported attempts at sabotage through infiltration

to full-scale attacks in force supported by mortars, light artillery, recoilless rifles and other weapons. The most common and effective attacks on fire bases were the raids executed by the North Vietnamese Army's (NVA's) specialized sapper units.

NVA Sappers

The sapper was a tough, well-trained and highly motivated soldier. He was specially trained in techniques to penetrate US defensive positions. For example, he spent several weeks learning infiltration tactics—the technique of approaching an objective undetected. He also learned how to detect and disarm anti-intrusion devices such as trip flares and booby traps. After studying the tactics of how to attack outposts, fire support bases and built-up areas, he received final classes on the use of sophisticated and field-expedient explosives.

To be successful, sappers relied heavily on the conduct of a thorough reconnaissance. Upon receiving a mission, a sapper unit would have three to seven days to reconnoiter the objective and critically analyze the position's defenses. The sappers would find out the exact location of each bunker, crew-served



On 25 February 1970 in Vietnam, a 105-mm crew of A Battery, 2d Battalion, 319th Field Artillery, awaited word to begin a fire mission.

SP4 Jerry W. Hograve

weapon, command post, artillery piece, fire direction center and obstacle. By patiently observing the objective, the sappers would learn the defender's routine, to include where listening posts were and when patrols began. The sappers then would make a detailed plan and rehearse their courses of action.

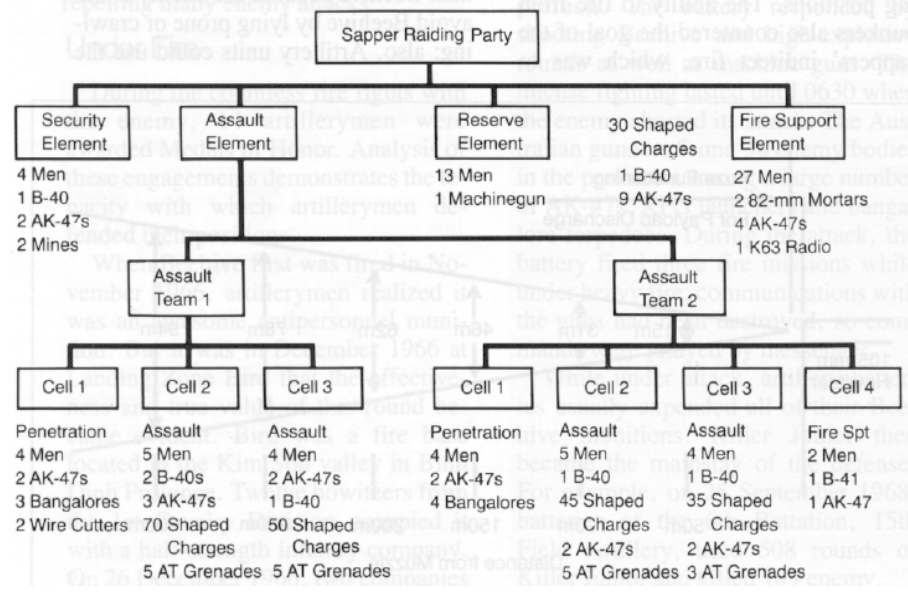
The success of a sapper attack also depended heavily upon two additional factors: surprise and initiative. Sappers gained surprise primarily through stealth and gained initiative by using

preparatory fires. In groups ranging in size from a squad of 10 to a platoon of 45, sappers would take an entire day to approach an objective. They then would take up to seven hours to creep the last 200 meters from the edge of the perimeter to positions just outside of the defensive wire. During an attack of a Marine fire support base in March 1969, sappers infiltrated past five listening posts and didn't set off any of the 300 trip flares or anti-intrusion devices. The sappers used camouflage and the noise of the fire base's artillery (in support of normal operations) to conceal their movement.

The sappers usually began their attack with preparatory mortar fires, causing the defenders to seek cover in their bunkers. Since most bunkers provide very limited fields of fire, the sappers could assault them and move quickly to their objectives relatively unopposed. And to keep the defenders in the bunkers after the mortar fires had been shifted, the sappers used rocket-propelled grenades (RPGs), satchel charges and bangalore torpedoes to create the illusion that mortars were still firing.

At this stage in the attack, the value of the sappers' detailed analysis became evident. Their indirect fire shocked the defenders with its accuracy. The defenders were stunned further by the speed with which the sappers moved to preselected targets and inflicted great damage. Targets generally were attacked with the following priority: command post bunkers, mortar positions, ammunition bunkers, the fire direction center and, last, the howitzers.

Sapper attack of November 1968 against US Installations in Tan Uyen District—Characteristic Organization for Medium- and Large-Scale Sapper Operations



Sapper Organization

August 1988

Using hand grenades, satchel charges and other explosives, the sappers would attempt to destroy these targets and then withdraw. Their attack was not designed to occupy a position or to seize a prominent terrain feature. Their primary objective was to penetrate defenses and inflict maximum casualties; they would destroy equipment, ordnance and installations and then withdraw.

The sappers were clearly a formidable enemy. In 1969, the average sapper raid inflicted more than \$1 million damage, and 43 percent of the targets were fire support bases. North Vietnam's Defense Minister, General Vo Nuyen Giap, was so confident in the ability of the sappers that he claimed, "regardless of how strongly the US or puppet troops are defended, they can easily be destroyed by our crack special combat troops with their special combat tactics."

Defending Against Sappers

Given both the probability that an artillery battery would be a lucrative target and the effectiveness of the sappers, Field Artillerymen developed several techniques to defend their positions. The only help the 1962 Field Manual 6-20-2 *Field Artillery Techniques* provided relative to position defense during jungle operations was: "Direct fire missions will frequently be required to defend positions against ground attack." So artillerymen had to be ingenious and learn from experience.

Unpredictability

One principle suggested by then Captain F.H. Hemphill, Jr. (US Marine Corps) was not to be consistent and predictable ("Defense of the Artillery Battery," *Artillery Trends*, January 1967). With the extensive intelligence preparation of the battlefield (IPB) conducted by the Vietnamese, any technique that provided a defensive strength could become a weakness if the enemy knew the defenders were using it. For example, the position of trip flares and wire obstacles needed to change frequently. The entire battery had to avoid a constant routine. Listening posts needed to move, and the infantry had to vary its patrol schedule. By being unpredictable, artillery units

could make Vietnamese reconnaissance less accurate and, thus, jeopardize the success of the enemy's attacks.

Early Detection

Early detection also was an important principle to thwart the sappers. Knowing they took several hours to crawl to the defensive positions, the defenders used patrols just outside their defensive perimeter. During patrols, soldiers would check trip flares for tampering. When infantrymen were assigned to defend a fire base perimeter, the commander could employ patrols liberally. However, when artillery batteries operated independently, the battery commander faced the dilemma of how he could have soldiers guard the perimeter and still maintain the capability to provide fire support 24 hours per day.

Multi-Directional Defense

Arthur L. Kelly, a Field Artillery battalion commander in Vietnam, stressed two additional techniques regarding position defense ("Defense of a Landing Zone," *Artillery Trends*, January 1968). First, each gun emplacement had to be prepared to defend itself from any direction; an adjacent position may not exist after the attack had started. Second, sleeping bunkers had to be fighting bunkers, and soldiers had to be able to fire in all directions. This technique was important because the enemy may be on all sides before soldiers could get to other regular fighting positions. The ability to fire from bunkers also countered the goal of the sappers' indirect fire, which was to

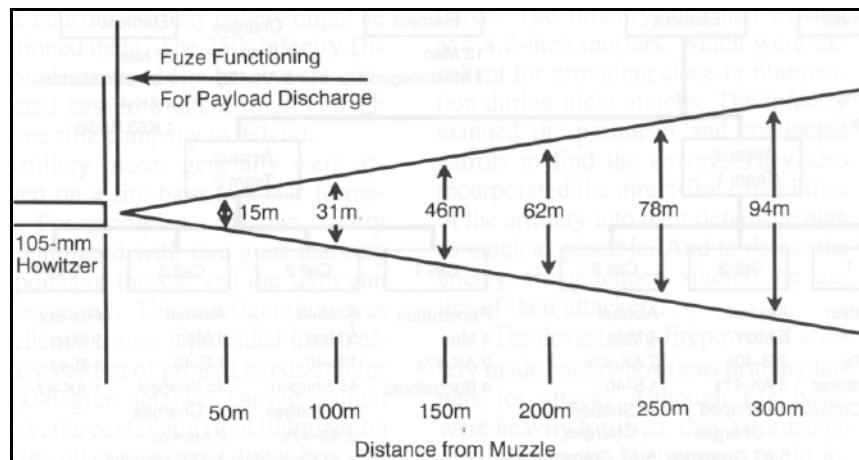
force the defenders into their bunkers and permit the sapper to move within the perimeter almost unopposed.

Firepower

To defend itself, Field Artillery also employed the very asset it was being attacked for: firepower. Artillery defensive fires included direct, countermortar and mutually supporting fire. Direct fire requires line of sight between the weapon and the target. A 105-mm special antipersonnel munition, commonly known as "Beehive," was developed and first used in November 1966. The round sprayed 8,000 steel flechettes in an 18-degree cone more than 300 meters from the bursting point of the round. (A flechette is similar to a small nail with the head stamped into four fins so it flies like an arrow.)

Because the 105-mm howitzer essentially was converted into a giant shotgun, the artillery unit took special precautions before it used Beehive. For example, it sounded a signal to warn friendly troops that it was about to fire a Beehive round. Additionally, infantry bunkers in front of artillery positions had their rear portions reinforced to provide protection from the Beehive.

Another direct-fire technique used was "Killer Junior." This technique employed the usual high-explosive munitions with time fuzes set to burst approximately 30 feet off the ground at ranges of 200 to 1,000 meters. Killer Junior was sometimes more effective than Beehive because the enemy could avoid Beehive by lying prone or crawling; also, Artillery units could use the



The Beehive round sprayed 8,000 steel flechettes, saturating everything in an 18-degree cone out to 300 meters.

This picture was taken shortly after the 1st Cavalry Division artillerymen repelled the enemy with Beehive rounds at LZ Bird in the Dinh Binh Province.

155-mm and 8-inch howitzers to fire Killer Junior.

When attacked at night, it was common procedure for firing batteries to shoot "self-illumination" missions; a designated gun would fire an illumination round at maximum elevation to light up the area surrounding the fire base.

Countermortar or counterbattery fires were the second type of artillery defensive fires. They were planned, unobserved fires that were fired at suspected enemy firing positions in the event of an attack. It may seem such fires required a great deal of luck, but an experienced Field Artilleryman, who knew the range of enemy weapons, could predict the position of enemy weapons accurately.

Mutually supporting fires, the third type of defensive fires, were indirect fires fired from one fire base in support of another. Thus whenever fire bases were established, being within the range of artillery at another fire base was a primary consideration. Mutually supporting fires were responsible for repelling many enemy attacks.

Under Fire

During the countless fire fights with the enemy, 14 artillerymen were awarded Medals of Honor. Analysis of these engagements demonstrates the tenacity with which artillerymen defended their positions.

When Beehive first was fired in November 1966, artillerymen realized it was an awesome antipersonnel munition. But it was in December 1966 at Landing Zone Bird that the effectiveness and true value of this round became evident. Bird was a fire base located in the Kim Son valley in Binh Dinh Province. Twelve howitzers from the 1st Cavalry Division occupied it with a half-strength infantry company. On 26 December 1966, two companies of the 22d NVA Regiment attacked the position. The defenders were driven to the south corner of the base near a 105-mm position. Almost in

desperation, the battery commander ordered the firing of Beehive. The battery executive officer loaded the round, yelled a warning and fired it at approximately 100 enemy soldiers. A second round was fired, and the attack quickly terminated. The US lost 30 men killed in action at Bird while 266 enemy were confirmed dead. For its actions, C Battery, 6th Battalion, 16th Field Artillery, received the Presidential Unit Citation. More importantly, the engagement convinced both the artillery and the infantry of the effectiveness of Beehive; the round played a vital role in position defense throughout the remainder of the War.

On 13 May 1968 at 0245 hours, a battery of the Royal Australian Artillery came under attack by an NVA battalion. This engagement is noteworthy because even though the battery was receiving heavy enemy fire, it still completed fire missions for needy maneuver units. The attack on the fire base began when the enemy fired RPG at the howitzers and assaulted a gun position. The battery responded by shooting Beehive and high-explosive rounds as well as machine guns. The intense fighting lasted until 0630 when the enemy aborted its attack. The Australian gunners found 38 enemy bodies in the perimeter among a large number of AK-47s, RPG launchers and bangalore torpedoes. During the attack, the battery fired three fire missions while under heavy fire; communications with the guns had been destroyed, so commands were relayed by messenger.


While under attack, artillery batteries usually expended all of their Beehive munitions. Killer Junior then became the mainstay of the defense. For example, on 25 September 1968, batteries of the 6th Battalion, 15th Field Artillery, used 508 rounds of Killer Junior and killed 189 enemy.

Lieutenant Colonel Charles Rogers won the Medal of Honor for his actions as commander of the 1st Battalion, 5th Field Artillery. On 1 November 1968 at

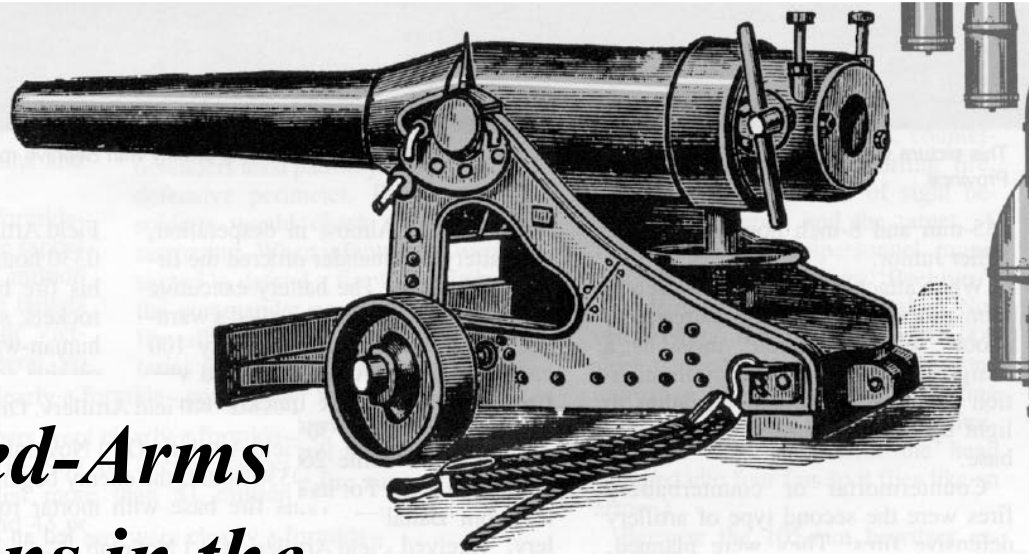
0330 hours, the enemy began to attack his fire base with mortar rounds and rockets; sappers then led an 800-man, human-wave assault. During three successive enemy attempts to overrun the base, Colonel Rogers personally led two counterattacks and was wounded twice. To thwart the third attempt, he directed the 105-mm howitzers to traverse and fire into the massed assaulting enemy. The artillery fought ferociously until 0645 when the enemy's assault ended unsuccessfully. During the intense battle, the artillery fired 1,300 rounds in direct fire and 800 in indirect fire.

Summary

Artillery units faced unique challenges in Vietnam. The non-linear battlefield brought artillery batteries in direct contact with the enemy. Artillery batteries met the challenge the sappers presented by employing unique defensive techniques on well-fortified fire bases. By repulsing the many attacks while always maintaining the ability to provide fire support, the artillery demonstrated it was still the "King of Battle."

Today's artillerymen should not forget the lessons learned in Vietnam. Some of the same defensive techniques employed during the non-linear Vietnam War will be applicable to the non-linear AirLand Battle. 

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Combined-Arms Operations in the Franco-German War of 1870-1871

by Major Arthur T. Coumbe, MI, USAR

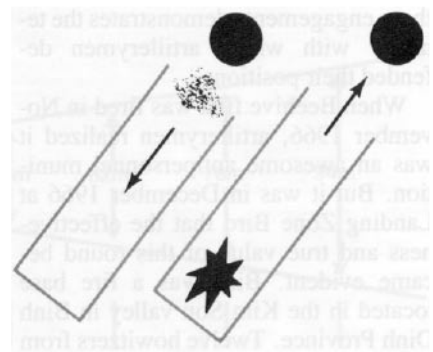


The decade of the 1860s was an era of revolutionary change in warfare. In the American Civil War, the widespread use of the railroad, telegraph and rifled musket transformed tactics and strategy. The wars of German unification brought equally dramatic alterations. The further elaboration of the railway and telegraph as instruments of war, coupled with the application of modern managerial techniques to the mobilization process, allowed the Prussians in 1866 and 1870 to put massive armies in the field with unprecedented quickness and efficiency.

A technological superiority in weaponry made a great contribution to Prussian victory in both these wars. The campaign of 1866 saw the coming of age of the Dreyse "needle-gun," a breech-loading, rifled shoulder arm that could be fired from the prone position. The Dreyse afforded the Prussians an immense tactical advantage over the Austrians who carried the muzzle-loading Lorenz rifle. In the Franco-German War of 1870, the German field artillery, for the first time, was equipped entirely with Krupp-manufactured steel, rifled, breech-loading guns. They were superior in range, accuracy and rate of fire to the old-fashioned, bronze muzzle-loaders of the French. Just as importantly, the German field artillery was organized, trained and employed so its full weight could be brought to bear in combined-arms operations on the battlefield.

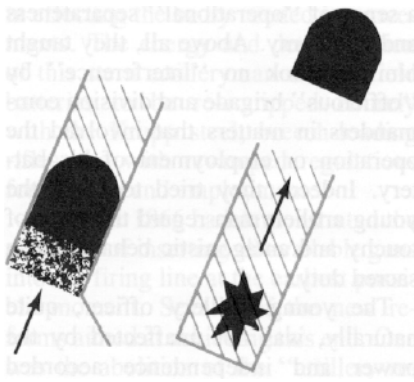
Recent historians have tended to minimize the importance of the technological component in Prussia's wars against Austria and France. Instead, they emphasize its improved mobilization procedures, command and staff system and theoretical excellence as the prime causes of German victory. This article balances the discussion by

highlighting the crucial role played by the Krupp breech-loader in the latter of these conflicts. The Krupp gun was an invaluable tactical asset that exercised an influence far out of proportion to the number of casualties it inflicted. The capabilities of the Krupp gun plus the correction of the German artillery's ineffective practices and parochial orientation led to its technical and tactical success in combined-arms operations and the German's winning the Franco-German War of 1870-1871.



Muzzle Loading: A powder charge is pushed from the bottom of the barrel, followed sometimes by a wad and then by the projectile; a narrow vent leading to the powder is lit, which explodes and propels the shot out of the barrel.

Field Artillery



Breech loading has several advantages: the shell can fit tightly in a rifled bore, adding power and accuracy; loading is generally faster and easier in turret and casemate mountings.

Krupp's Breech-loader

Alfred Krupp's rifled, breech-loading, cast-steel cannon were introduced into the Prussian Army in 1860. Their adoption aroused bitter opposition. Traditionalists preferred the old bronze smoothbores, considering them to be indispensable for close-in fighting. Rifled breech-loaders could not deliver case and shrapnel effectively, they argued. Others deprecated Krupp's steel guns because the method of cooling the barrel during the casting process sometimes produced flaws that caused the gun to shatter when fired. Nevertheless, the proponents of the new field piece triumphed, and the percentage of rifled, breech-loading cannon in the artillery inventory gradually but steadily increased.

The first test of the Krupp cannon in combat came in 1864 when Prussia and Austria went to war with Denmark over Schleswig-Holstein. At this juncture, not quite half of the Prussian artillery had been converted to the new piece. The guns showed definite promise, rendering particularly valuable service at Duppel. But the limited nature of the war coupled with the fact that much of it consisted of sieges convinced many that its lessons were only marginally instructive for operations on a larger scale.

When King William I sent the Prussian Army to war against the Austrians in 1866, 10 out of every 16 batteries

had the new guns. The 1866 campaign was the first time the Krupp cannon saw action against a major adversary in the open field. Despite the high hopes entertained before the war, the Prussians, to include the monarch himself, came away extremely disappointed with the performance of their artillery.

Glaring technical defects came to light. Due to gas and flame leakages through the seams of the breeches, Krupp guns had demonstrated a disturbing propensity to explode in the faces of their crews. Their manufacturer, Alfred Krupp, fled to Switzerland after the war to avoid shame and embarrassment. He did not return to his factory in the Ruhr for more than a year.

Even more dismaying to the Prussians than the technical problems were the organizational and tactical deficiencies that surfaced. Throughout the campaign, Prussian artillery repeatedly arrived too late with too few guns and with what appeared to be an excessive willingness to withdraw to the rear to "refit." Its performance contrasted sharply with that of the Austrian artillery, which came on the scene quickly and in great numbers and withdrew only reluctantly.

It often appeared artillery officers would rather lose a battle than one of their precious cannon.

Prussian Artillery Practices

A host of factors accounts for Prussia's artillery troubles. One involved Prussian adherence to the concept of an "artillery reserve." Artillery doctrine in 1866 rested on lessons gained in the Wars of Liberation (1813-1815), when muzzle-loading smoothbores comprised the artillery. During this era, commanders held back their guns for use in the decisive phase of the battle. This worked well enough in 1814 but was singularly inappropriate for the conditions of a half century later. Nevertheless, since doctrine called for inserting the artillery only after the battle had begun, Prussian cannon, along with their attendant supply train, were relegated to the rear of the march column. Thus, it was all but impossible, even if the desire were present, to bring the guns into action in a timely fashion.



Fort Sill Museum Archives

The Prussian Artillery in Trenches in 1870. Protective gabions — wickerwork cylinders filled with earth — flank the gun positions.

Other practices worked more directly to impede cooperation between artillerists and their colleagues in the other arms. Gun crews had been taught to withdraw when subjected to infantry fire. Artillery, it was believed, could not withstand such an ordeal. Reinforcing this teaching was the ancient tradition that it was the ultimate disgrace to lose a gun. It often appeared artillery officers would rather lose a battle than one of their precious cannons. Moreover, when an artillery piece became damaged even slightly, it was taken immediately to the rear to "refit," in most cases, never to be seen again. Such customs resulted in a large portion of available firepower's being withdrawn from the fight prematurely and caused infantrymen to quip, "Who has ever seen a dead artilleryman?"

When Prussian artillerymen did get their pieces into action quickly and in enough strength, they had trouble hitting their target. Gunnery instruction had received little emphasis before 1866. In the era of the smoothbore, marksmanship did not count for much because of the inaccuracy of the guns. Crews pointed their pieces at the target and hoped for the best. A direct hit reflected more luck than skill. When the Austro-Prussian War broke out, training methods and philosophy had not caught up with the new technology yet; old ideas about gunnery still prevailed. The massive influx of new four-pounders into the artillery on the eve of the War exacerbated the problem. Many gunners did not have the opportunity to familiarize themselves adequately with the new cannon, let alone consider ways to integrate them with the other arms.

Artillerists were concerned more with advancing the narrow interests of their arm than with supporting the rest of the army.

Prussian Parochial Orientation

Even more baneful in its effects than the factors discussed thus far was the parochialism that pervaded the

artillery. Gunners had long had the reputation of being a caste apart. For centuries after its appearance on the battlefield, Prussia's professional soldiers had considered the artillery to be more of a technical specialty than a combat arm, more suited to the outlook and skills of a mechanic than a warrior. For this reason, the aristocracy that predominated within the Prussian officer corps as a whole through the first two-thirds of the nineteenth century shunned this "ignoble" arm. The branch became a preserve of the despised middle class and acquired a distinct bourgeois flavor.

This state of affairs was not due entirely to aristocratic prejudice. The artillerists, for their part, did much to foster their isolation. They donned a facade of great erudition to impress their fellows in the infantry and cavalry. Textbooks on geography, history and higher mathematics adorned the limber of every field gun. Gunners took great delight in posing as a member of a scientific arm and went to great lengths to shroud the supposed "secrets" of their craft in the deepest mystery. Every new Prussian artillery officer had to take an oath by which he swore not to reveal the "secrets" of his profession to anyone outside the regiment. This had an unfortunate effect. Prince Kraft zu Hohenlohe-Ingelfingen, the eminent Prussian artillerist, tells us that although the young officer was sworn to secrecy, in reality—

...he learnt no secrets at all, and...as he was not told that what he learnt was not a secret, he never knew whether he was not divulging secrets whenever he spoke about his arm, and he gladly stopped all conversation on the subject by saying that these were technical things about which he was not at liberty to speak.

The mind-set thus engendered, of course, did nothing to enhance cooperation, communication and mutual respect among the artillery and the other arms. Artillerists, it seemed clear, were concerned more with advancing the narrow interests of their arm than with supporting the rest of the army. To make matters worse, senior

gunners sought to instill in every new lieutenant a sense of "operational" separateness and autonomy. Above all, they taught him to brook no "interference" by "officious" brigade and division commanders in matters that involved the operation or employment of his battery. Indeed, they tried to make the young artilleryman regard this type of touchy and antagonistic behavior as a sacred duty.

The young artillery officer, quite naturally, was not unaffected by the power and independence accorded him. His ability to contradict and thwart the designs of his superiors understandably flattered his sense of self-importance. An infantry or cavalry officer more often than not let the young gunner attached to his unit go his own way. Many of them reasoned he must understand the "technicalities" of his craft better than they. Besides, officers in the more "established" branches were not exactly fond of interacting with "recalcitrant and cavilling" artillerymen. They wanted to get the upstart out of their hair, even if it meant giving in to his objections. The disdain, or at least suspicion, with which present-day combat-arms officers in the US Army sometimes regard their combat-support and combat-service-support colleagues is a modern parallel.

The artillery officer found himself giving up some of his independence and authority, but he also saw himself becoming a more valued member of the commander's staff.

Correcting the Weaknesses

The bitter experiences and lackluster performance of the Prussian artillery in 1866 provided the jolt that set the wheels of reform in motion. Prussian authorities moved quickly to eliminate the technical flaws in the Krupp cannon. Moreover, Prussian gunners zealously sought out the reasons behind tactical shortcomings and then set about correcting them. General von Hindersin, the Prussian Inspector-General

of Artillery, played a big part in effecting the badly needed improvements. The energy and determination of this stern artilleryman caused field batteries to be re-equipped entirely with the Krupp steel, breech-loading rifles and with revamped regulations for training and employment.

The year 1866 had demonstrated the necessity of inserting all available guns into the firing line at the earliest possible moment. Several of the new reforms aimed at achieving this end. One was the abolition of the "artillery reserve"; even the term itself was dropped. Prussian authorities finally recognized that the increased range of rifled guns permitted batteries to cooperate on a distant point of attack; thus, it no longer made sense to "save" one's artillery for the climax of the battle. It was determined also that the rear of the march column was an inappropriate place for artillery. Gunners now were to travel as far to the front of the formation as was compatible with their security.

Other reforms sought to avoid a premature abandonment of firing positions. There was to be no more withdrawing to the rear to "refit." If possible, repairs were to be made on the firing line. Moreover, artillery authorities instructed gunners to remain at their pieces when subjected to enemy rifle fire. Only if the guns were in position close enough to support the infantry effectively would they serve any useful purpose. And just as importantly, senior artillery officers emphasized that it was not a disgrace to lose a gun. In fact, under certain circumstances, it was an honorable and commendable act.

One of General Hindersin's signal accomplishments was establishing the School of Gunnery in 1867. With the founding of this institution, Prussian authorities officially and at long last recognized that it was of paramount importance for gunners to be able to hit the target. On his inspection visits, Hindersin reinforced the work of the School of Gunnery by evaluating units on how well they shot, not on how well they executed intricate parade-ground maneuvers.

Finally and most significantly for the future development of the German artillery,

a broadened perspective and a new sense of professionalism entered into the corps of Prussian artillery officers after 1866. One sign of this new spirit was an increased willingness to question accepted doctrine and method. Another was a readiness to seize the initiative and take action without awaiting orders.

Especially indicative of the new attitude, however, was the desire on the part of gunners to "mesh" with their comrades in the other arms. Instead of jealously guarding their own interests and prerogatives, artillerymen tried to open channels of communication with the cavalry and infantry and explored ways to help these other arms accomplish the common mission. Their participation in *Kriegsspiels* (war games) was a particularly useful tool in achieving these ends. It served to overcome their parochial orientation, familiarize them with the doctrine, problems and concerns of the other branches and make them an integral part of the army. If the artillery officer found himself giving up some of his former independence and authority, he also saw himself becoming a more valued member of the commander's staff—an advisor a senior infantry officer could rely on rather than a pedant he took pains to avoid.

French Faults

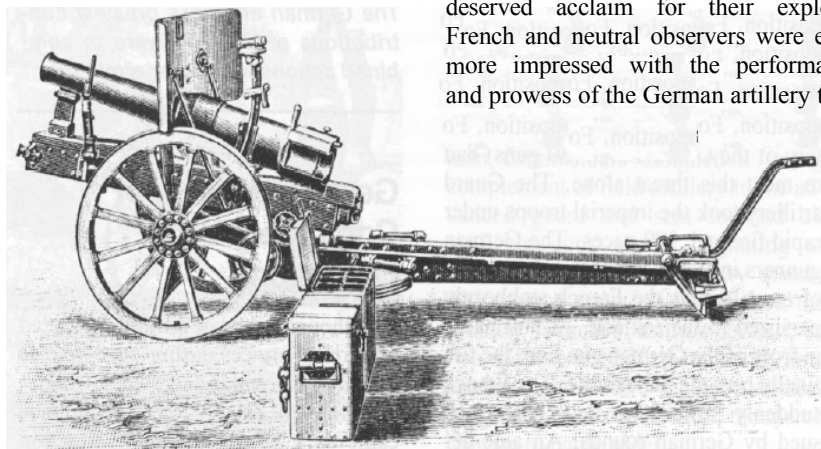
As a result of the reforms instituted after 1866, the Prussian artillery stood ready for action when war broke out in July 1870. Things were far different with the French.

In a sense, the French were victims of their own success. Napoleon III's bronze, muzzle-loading, rifled cannon had performed admirably in the War of 1859 and had played an important role in the Franco-Sardinian victory over the Austrians. Unlike Prussia, France had received no shock that stimulated the reform and modernization of its artillery. Thus in 1870, the French Army went to war with the bronze rifles that had proved so effective a decade before but which were now, in the words of William Manchester, the author of *The Arms of Krupp, 1587-1968*, "hopelessly obsolete."

French artillery was inferior to German in several respects. For one thing, the French Imperial Army had 30 percent fewer pieces than its enemies. Moreover, the Krupp rifles had twice the range of French cannon and were superior in accuracy, concentration and rate of fire. French inferiority in the last category was by design. French ordnance experts deprecated rapid fire because they believed it encouraged gunners to waste ammunition.

The French labored under a further disadvantage in that they used time instead of percussion fuzes. Time after time in the War of 1870, French shells burrowed deep in the ground before exploding and caused minimal damage to the Germans.

German artillerymen did not take long to make their presence felt on the battlefield. From the outset, Prussian gunners, along with their colleagues in the south German contingents, brought their pieces into action with speed, efficiency and devastating effect. German cannoneers received wide and deserved acclaim for their exploits. French and neutral observers were even more impressed with the performance and prowess of the German artillery than



The Krupp 7.5 Centimeter Long-Range Cannon used in the Early 1870s.

were the Germans themselves. In their reports and recollections of the campaign, they almost unanimously attested to its great effectiveness and destructive power.

However, the success of German artillerymen can't be measured quantitatively. In the Franco-German War, infantry shoulder arms inflicted most battlefield casualties. To understand the real significance of the artillery contribution, one must look at the vital roles it played in and the critical services it provided to the German army.

German Sieges, Independence and Offensive Actions

The artillery furthered the German war effort in three fundamental ways. First, it provided invaluable assistance during the many siege operations of the campaign. Field artillery units helped reduce the French fortresses that lay astride German lines of communications (Toul, Bitsche, Strassburg and Phalsburg, to name only a few). They also played a key role in penning up the enormous French garrisons at Metz and Paris during the investment of those two cities. The usefulness of artillery in this capacity is so obvious and had been a part of the European military experience for so long that no further elaboration is necessary.

Second, German artillery frequently acted more or less independently to decide a battle or a certain episode within a battle. During the battle of Gravelotte-Saint-Privat, for example, the French launched a two-regiment-strong counterattack from the village of Amanvillers against the central portion of the German line. Because its infantry was occupied elsewhere, the artillery of the Guard Corps (30 guns) had to meet this threat alone. The Guard artillery took the imperial troops under rapid fire at 1,900 paces. The German gunners inflicted a devastating number of casualties as the French stubbornly persisted in their attack. At 900 paces in front of the German gun line, the fire finally became unbearable. The French suddenly turned and fled, hotly pursued by German rounds. An aide-de-camp to

General de Ladmirault, the French officer who ordered the counterattack, told a German participant in the battle after the War, "It was impossible to succeed. You have no idea what it is to advance under the fire of your artillery." This engagement represented a German defensive victory secured solely by the artillery.

Third, German artillerymen won several offensive actions almost single-handedly. The most celebrated "artillery" victory of this type, however, occurred during the Battle of Sedan (1 September 1870) at the Bois de la Garenne. Hohenlohe-Ingelfingen, the artillery commander of the elite Prussian Guard Corps, had this forest to the north of Sedan systematically bombarded when retreating French units took refuge in it. He positioned his cannon on the crest of a hill overlooking the woods and had his crews dig gun pits to protect themselves and their pieces. The Prince assigned to each of his 10 batteries a particular section of the Bois de la Garenne and to each gun a different elevation, so no part of the forest could escape the devastating fire of his artillery. Whenever a French unit would attempt to escape from this inferno, every gun would turn on it and force it back into the killing zone. When the infantry of the Guard advanced in the late afternoon to take possession of the wood, they met little opposition. For the most part, all they encountered were demoralized and shell-shocked enemy soldiers incapable of coherent and coordinated resistance.

The German artillery's greatest contributions of the War were in combined actions with other arms.

German Artillery in Combined-Arms Operations

Although German artillery rendered important services during sieges and as a semi-autonomous agent on the battlefield, clearly its greatest contributions came as a result of combined action with the other arms, especially the infantry.

The support it provided to infantry line regiments in both the attack and defense proved invaluable. In virtually every major engagement of the War, it was the close cooperation between the gunners and their infantry colleagues that was largely responsible for overcoming enemy opposition and winning the day for the Germans.

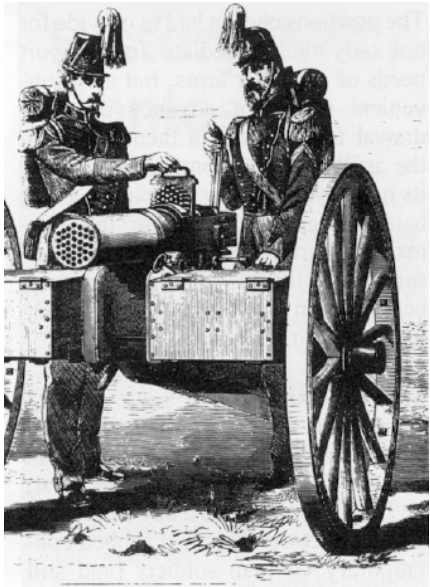
The French mitrailleuse gun's introduction was shrouded in so much secrecy that a full discussion of its employment was suppressed, making it less effective during the War.

Suppressing Enemy Artillery

As a member of the combined-arms team, the field artillery performed several very essential duties. One, of course, was the suppression of enemy artillery fire. In the main, German artillerists quickly got the upper hand in their exchanges with enemy gunners, destroying their field pieces or forcing their withdrawal. Even on the relatively few occasions when the Germans were unable to put enemy cannon out of action, their fire at least diverted French attention away from the infantry.

A distinctive feature of this war was the range at which the Germans began their "preliminary cannonade" against opposing artillery. When the terrain permitted it, King William's artillerymen opened fire when they were from one and a half to two miles from the enemy—an unprecedented distance in 1870.

At the Battle of Spichern (6 August 1870), this role of the German artillery clearly was illustrated. In this encounter, the French artillery initially set up on the Rotheberg, a prominence to the north of the village of Spichern that dominated the approaches to the French positions. To dislodge the French field pieces, Prussian gunners employed a favorite tactic. They used their numerical superiority to great advantage by forming a huge semi-circle of artillery and outflanking the enemy gun line. After they had forced the French artillery to withdraw from the Rotheberg by their enfilading fire, the



Fort Sill Museum Archives

arsenal shortly before the War—the mitrailleuse. This weapon was similar to the American Gatling gun. It had 25 barrels, each fired sequentially by turning a handle. The mitrailleuse could fire 150 rounds per minute and had a range of almost 2,000 yards.

Its performance in 1870, however, never lived up to the high expectations of the French Emperor. This was due in part to its introduction's being shrouded in so much secrecy that a full discussion of its employment had been suppressed. The relative ineffectiveness of these weapons is also attributable to the German steel cannon, with its greater accuracy and longer range, that was more than a match for the mitrailleuse in a head-to-head duel.

Repelling Enemy Attacks

In addition to silencing enemy cannon and mitrailleuses, the German artillery acted to pin down, rattle and ravage the ranks of French infantrymen. When on the tactical defensive, Krupp guns provided powerful support to the infantry in repelling enemy attacks. They also were useful in suppressing French rifle fire to cover the withdrawal or retreat of German infantrymen.

A small-scale but striking illustration

Prussians kept up pressure on the enemy by advancing their guns and by feeding more pieces into the gun line as they arrived on the battlefield. In this way, the Germans succeeded in neutralizing French artillery support at a relatively early stage of the battle and paved the way for the eventual infantry assault.

Krupp's cannon also were instrumental in counteracting a weapon of tremendous destructive potential that the French had introduced into their

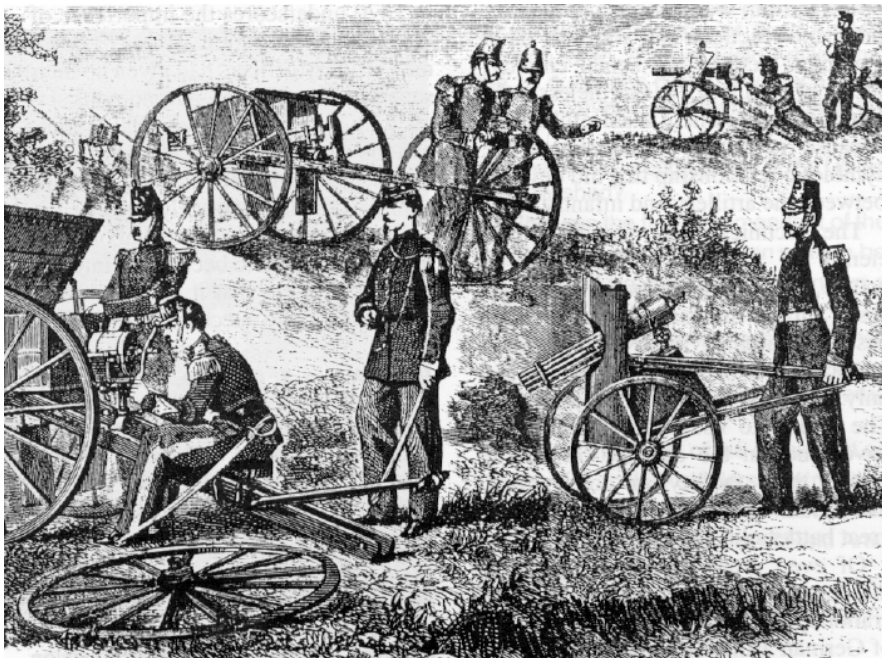
of artillery's fulfilling this latter role occurred during the Battle of Le Bourget (30 October 1870). From their positions along a railroad embankment, two companies from the Alexander Regiment of the Prussian Guard Corps had held at bay five French regiments in the village of Drancy. When the Prussian companies received an order to withdraw, however, they realized to their dismay that the French could pour an annihilating fire onto their escape route. Two batteries (12 guns) of field artillery came to their rescue. The infantry retreated by executing three rushes, each of about 300 paces, while the guns delivered a hot "quick fire" (*Schnellfeuer*) against the enemy; their fire was so hot, in fact, the French dared not raise their heads to draw a bead on the retreating Germans. The Guardsmen made it to the protecting cover of a potato field without losing a single man.

Supporting the Infantry

Although the role of the Krupp cannon in the defense was important, it was not unique. Field artillery, especially of the smoothbore variety, had performed similar services in earlier wars. The part played by German gunners in the attack, however, was unique and represented the epitome of combined-arms action during this era. In no other army and in no other war before 1870 had infantry-artillery cooperation and mutual support during the offensive reached such a high stage of development.

The first major battles of the campaign along the Franco-German frontier at Wissembourg (4 August 1870), Worth (6 August 1870) and Spichern (6 August 1870) set the pattern for the entire War. In these encounters, German commanders assigned a strong complement of field artillery to the advanced guard and sent forward all available guns at the beginning of action to support the infantry attack. The cannon came on line before the infantry launched its first assault; in two of these clashes, the cannon came on line even before the foot soldiers had a chance to deploy from the march column to battle order.

Not only did the artillery arrive early



The Montigny mitrailleuse in action during the Franco-Prussian War.

and in great numbers, but it also took up forward and, in many cases, even exposed positions. Many artillerymen, in fact, found themselves fighting in the foremost line of skirmishers.

German gunners had ceased to concern themselves with the old "bugaboo" about losing one's field piece to the enemy and concentrated instead on rendering close and effective support to line regiments. This attitude, coupled with a determination to stay on the firing line even if repairs had to be made

The technical and tactical proficiency of the German gun crews was a big factor in their success.

or ammunition ran short, meant that, unlike 1866, German infantrymen would not be left to their own devices.

German foot soldiers learned early in the campaign that their salvation lay in close cooperation with the artillery. The Germans, it is important to note, were equipped with a shoulder arm that had less than half the range and much less accuracy than the French Chassepot rifle. (The French had introduced the breech-loading Chassepot after the Prussian needle-gun had proved its worth in 1866.) Because of the inferiority of their infantry rifle, the Germans by necessity had to rely on their artillery to accomplish many of the

tasks performed by the French infantry (and which in 1866 had been performed by the Prussian infantry). Without the artillery, it would have been extremely difficult and costly for the Germans to get close enough to the French to use their Dreyse needle-guns effectively.

Ideally, an offensive action would commence with an artillery exchange at long range. As soon as the artillerists established their superiority, the infantry went forward in formation, halting before it came within effective range of French rifle fire. The artillery then would move forward in two echelons, take up a supporting position and resume its cannonade. Then, it was again the turn of the foot soldiers. Under the protective fire of the gunners, they would advance to within 450 yards of the enemy positions (about the maximum effective range of the Dreyse needle-gun). Covered by infantry fire, the artillery would be brought forward in stages until all guns were on line 400 to 500 yards to the rear of the infantry. Artillery and infantry together would then rake the French positions. The final assault came when the commander believed the enemy had been "softened up" enough.

In practice, of course, things did not always proceed this smoothly or regularly. Terrain, weather, enemy dispositions and reactions and a host of other variables dictated the actual employment of artillery. Nevertheless, the scheme sketched here is a useful model because it clearly demonstrates the symbiotic relationship that did develop between the artillery and infantry.


The technical and tactical proficiency of German gun crews, of course, was a big factor in their success. Superb marksmanship and deftness in handling their pieces were important but were by no means the only skills that made them so effective. The ability to use terrain to provide cover and, in the absence of natural cover, their facility in constructing hasty field works gave the Germans a great battlefield advantage.

Of even greater significance from the perspective of combined-arms operations was the extraordinary ability of German artillerists to select suitable gun positions. This was no easy task.

The positions chosen had to provide for not only the immediate fire support needs of the other arms, but also convenient routes of advance or withdrawal for the cannon themselves, so the artillery could continue to support its infantry or cavalry colleagues as the battle progressed. Because the Germans performed these tasks with consummate skill, they derived maximum benefit from the technological superiority of their cannon.

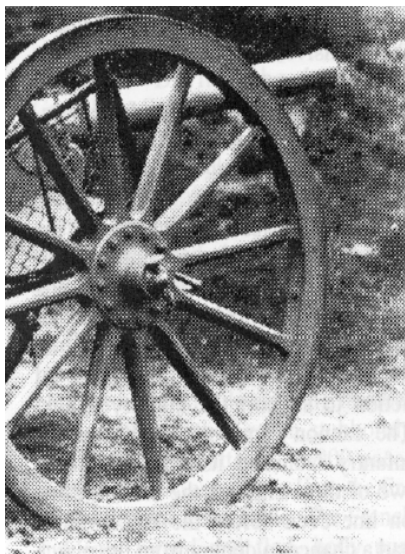
Conclusion

From this brief look at the role of the German artillery in the Franco-German War of 1870, two points emerge. First, the Krupp cannon was a key element in German victory. This fact rubbed contemporary German soldiers (and still rubs many Germanophile historians) the wrong way; for in their minds at least, it detracted from the German military achievement. They would have much preferred that German success be attributed to German intelligence, bravery, resolve, audacity and tactical skill than to something as mundane and unheroic as a superior artillery piece. The point clearly was not in accord with the German military myth.

Second, and more importantly from the vantage point of a modern soldier, the experience of the German artillery in 1870 underscores the importance of combined-arms action. By 1870, German artillery officers had given up their separateness and semi-autonomous status within corps and divisional organizations and willingly subordinated themselves and their guns to the unit commander. It was largely because the artillery laid aside its parochial orientation and resolved to become an integral part of the army that it contributed so much to German success in 1870. 

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Field Artillery



Fort Sill Museum Archives

A Krupp 2.95-Inch Field Gun used in the Early 1870s

1989 History Writing Contest



The United States Field Artillery Association is having its fourth annual History Writing Contest with the winners' articles published in the History issue (October 1989) of *Field Artillery*.

Send us your original, unpublished historical manuscript on **Field Artillery Tactics**. The Association will award three cash prizes for the best manuscripts: First Place—\$300, Second—\$150 and Third—\$50. At the discretion of the judges, a manuscript may receive Honorable Mention and be published in *Field Artillery* or the Association's "Forward Observer" newsletter.

Military or civilian, Association member or not—anyone with an interest

in the history of the King of Battle may compete. Just send the Field Artillery Association a manuscript not longer than 2,500 words, about 16 double-spaced, typed pages, by **15 March 1989**. You can write on any aspect of the history of Field Artillery Tactics you want; however, your thesis should include lessons learned that apply today.

A panel of three, expert historians—an officer, noncommissioned officer and a civilian—will judge the manuscripts. The panel will use the following criteria:

- Relevance to Field Artillery Tactics

- Usefulness to today's Redlegs
- Historical accuracy
- Writing effectiveness — organization, construction and style
- Originality

Include your **biography** and **supporting graphics** (photographs, art, charts, graphs, maps, crests, etc.) with your manuscript and mail them to:

**The United States
Field Artillery Association
ATTN: History Writing Contest
PO Box 33027
Fort Sill, Oklahoma 73503-0027**

Level 1—Redleg History Quiz



Test your knowledge of Field Artillery history! On this page and pages 25 and 30 of this History issue of *Field Artillery* are three history quizzes—levels one through three. A "true" Field Artilleryman should be able to answer eight out of the 10 questions correctly in each level to qualify for the three titles: Level 1—**Redleg**, Level 2—**Artillerist** and Level 3—**King of Battle**.

1. What was the original title of the US Army Field Artillery School, and when was it established?
2. Who was the first Commandant of the Artillery School at Fort Sill?
3. What new artillery weapon system became operational at Fort Sill in 1983?
4. Mary Ludwig Hays is better known as whom? What did she do to earn the nickname?
5. What is an ammunition wagon for horse-drawn artillery called?
6. What Continental Army artillery commander moved 55 cannon, howitzers and mortars 300 miles from Fort Ticonderoga to Boston in March 1776 to drive the British from the city?
7. What is the name of the oldest test agency in the Army?
8. Why are artillery soldiers referred to as "Redlegs"?
9. Who was the "Father of American Artillery"?
10. Who is the patron saint of Field Artillery and why?

For the answers to Level 1—**Redleg**, turn to page 31.

The Dress Rehearsal: Lost Artillery Lessons of the 1912-1913 Balkan Wars



by Major David T. Zabecki, USAR

At the end of the era of the great European empires, the years just before World War I, the Balkan Peninsula was the powder keg of the world. Much like the Middle East today, it was an area of seething ethnic and nationalistic passions; it was the stage for a bewildering array of radical and splinter groups, each pursuing its own agenda; and it was the primary arena in which the world's major powers vied for economic and political dominance.

In June 1914, an assassin's bullet fired in a Balkan city struck the spark that touched off World War I. But just a few years before that, there had been a series of pre-eruptions that flashed a clear image of the nature of the worldwide conflict to come. The First and Second Balkan Wars of 1912 and 1913 were, moreover, particularly significant for artillery. Here were fought the first battles in which both sides were equipped with modern, rapid-firing field pieces (as opposed to the transitional guns used in the Russo-Japanese War). The first battle in history in which

modern artillery equipment played a clearly decisive role took place just outside the gates of Constantinople at the end of 1912. And finally, the evidence showed that the old relationship between fire and maneuver had been changed forever.

As in the Middle East today, the belligerents in the Balkan Wars were essentially client states of the major powers. This too was particularly true of artillery. On the one side, the Turkish Army was equipped with German guns; its officers were German-trained; and in some cases, German advisors actually commanded Turkish batteries. On the other side, the Balkan Allies were equipped with French guns, and many of their artillery officers had been trained in France.

In every sense, it was a dress rehearsal for the main event. Yet the main event followed too quickly. There was not enough time to analyze the very clear lessons that were there to be learned. In the heat of the fire storm that followed the general mobilizations of August 1914, the memory of the Balkan

fighting was overshadowed quickly, and the lessons that could have been learned were not understood fully until almost the beginning of 1918.

The Flashpoint of Europe

For centuries, the Balkan Peninsula had belonged to Turkey. But the Ottoman Empire had been in slow decline for many years, and by the turn of the 20th century, it was being called the "Sick Man of Europe." Military and economic competition in the Balkans was a three-way contest among Germany, Britain and France. Russia and Austro-Hungary also had ambitions there, but these empires too were in a state of decline and internal disarray.

The newly emerging Balkan states were generally hostile to one another most of the time, but there was one thing they could all agree upon—ejecting Turkey from Europe. In 1912, Greece, Bulgaria and Serbia (covertly

prodded on by Russia) formed the Balkan League. They hoped to take advantage of Turkey, which was just then concluding an unsuccessful war with Italy. In September 1912, the Allies began to mobilize on the pretext of Turkey's mistreatment of the various Balkan ethnic groups in its two remaining European provinces: Macedonia and Thrace.

Turkey's field army in Macedonia had about 140,000 troops and 506 guns. Its field army in Thrace had about 100,000 troops and 450 guns. Turkey also had field armies outside of Europe: one in Kurdistan and another in Mesopotamia. Once the fighting started, Turkey was prevented from reinforcing its troops in the Balkans because Greece, which alone among the

belligerents had the only large, modern warship, controlled the Aegean Sea.

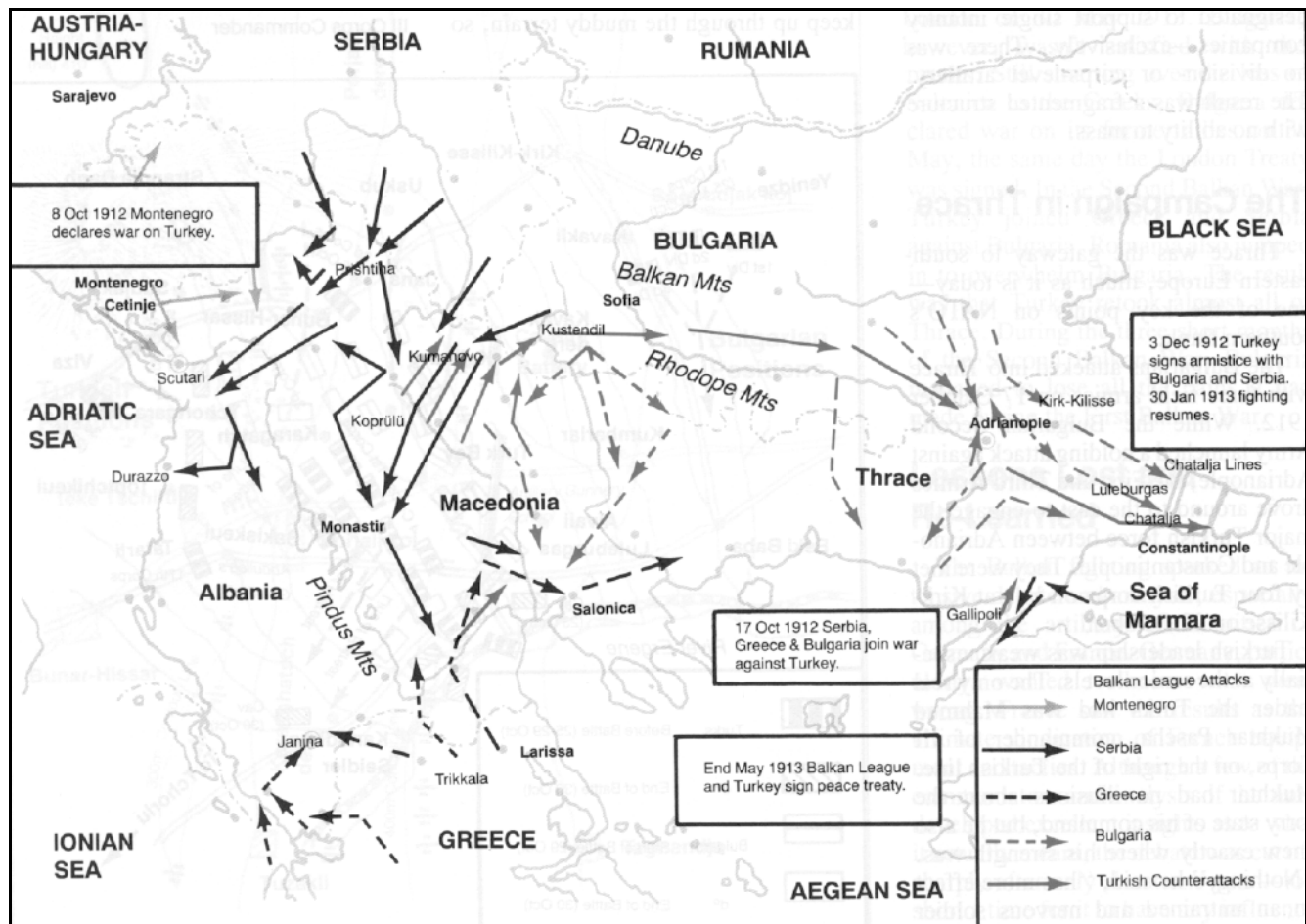
The Turkish Army, in general, was poorly equipped and organized. Moreover, it was very poorly trained and even more poorly led. Despite a recent influx of German advisors, years of corruption and incompetence could not be turned around over night. The Turkish Army also depended heavily on reservists during mobilization. The typical Turkish corps had one reserve and three regular divisions.

Artillery was the exception in the Turkish Army. All artillery was formed into regular units, even those belonging to the reserve divisions. Artillery units, with a higher concentration of German advisors, were better-trained and better-led than the infantry, although Turkish artillery was still not generally proficient in indirect fire techniques. The standard Turkish fire support weapon was the German Krupp 75-mm field gun, with a range of 8,700 yards.

In Macedonia, the Turks faced about 110,000 Serbians from the north and about 70,000 Greek troops from the



A Turkish Gun Crew with a Krupp 75-mm Field Gun



The Ottoman Empire: The First Balkan War

south. Together the Serbians and the Greeks fielded about 750 guns. The Bulgarians, who wanted the city of Salonica, also sent a division into eastern Macedonia to grab that Aegean port. (To their chagrin, they entered Salonica the day after the Greeks.) The main Bulgarian force of about 200,000 was poised against Thrace.

The Allies all were equipped with the French Schneider 75-mm field gun, with a range of 7,700 yards. The Serbians probably had the best artillery. They were well-trained in indirect fire techniques, and their battery commanders were innovative and aggressive. Greek artillery, on the other hand, was not so well-trained and could not handle indirect fire.

Going into the conflict, the Bulgarian artillery had a good reputation but failed to live up to it during the fighting. It had almost 1,000 guns in Thrace, but the effect of the fire was often poor, and it generally failed to support the infantry adequately. Its biggest problem was in its organization. Artillery was tasked downwards as far as possible. Single guns often were designated to support single infantry companies—exclusively. There was no division- or corps-level artillery. The result was a fragmented structure with no ability to mass.

The Campaign in Thrace

Thrace was the gateway to southeastern Europe, much as it is today—one of the key points on NATO's southern flank.

The Bulgarians attacked into Thrace with three field armies on 17 October 1912. While the Bulgarian Second Army launched a holding attack against Adrianople, the First and Third Armies drove around to the east to engage the major Turkish force between Adrianople and Constantinople. They were met by four Turkish corps on line at Kirk-Kilisse on 22 October.

Turkish leadership was weak, especially at the senior levels. The only real leader the Turks had was Mahmud Mukhtar Pascha, commander of III Corps, on the right of the Turkish line. Mukhtar had no illusions about the sorry state of his command, but he also knew exactly where his strength was. "Nothing," he said, "has more effect on an untrained and nervous soldier than the fire of his own artillery."

By midday of the 22nd, the Turkish

line was beginning to collapse. III Corps was holding, however, and Mukhtar was even intending to counterattack, but he too was forced eventually to withdraw when the Turkish I Corps on his left broke and fled in panic.

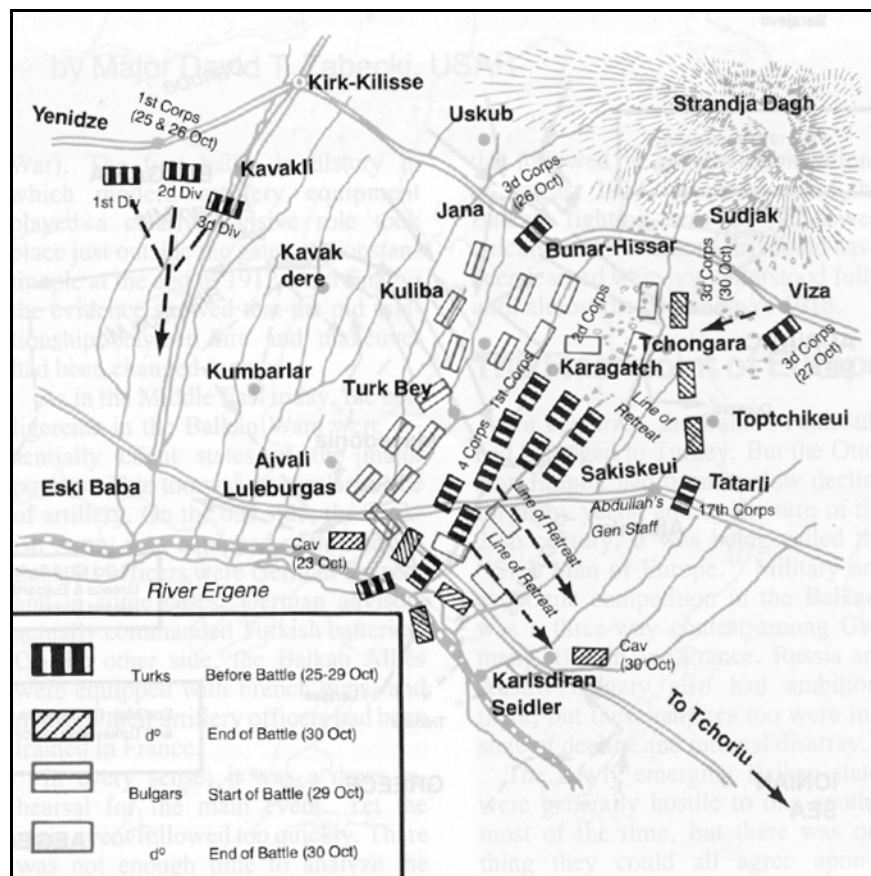
The Turks were beaten severely at Kirk-Kilisse and withdrew to the east. By the 28th they had managed to reestablish a line across a 35-mile-long front running from Luleburgas to Bunar-Hissar. III Corps, still on the right at Bunar-Hissar, was in far better shape than the other three corps, but Mukhtar's effective combat force consisted of only eight infantry battalions and nine batteries of artillery. Early on the morning of the 29th, he received much-needed reinforcements of three batteries from the Turkish Artillery School. He positioned the fresh firing units in his center.

The Bulgarians attacked across a 20-mile front on the 29th. They expected to roll right over the Turks as they had just four days before at Kirk-Kilisse. But the Bulgarian infantry had moved too far, too fast. The artillery couldn't keep up through the muddy terrain, so

the Bulgarian infantry attacked with much of its artillery still strung out along the route of advance. The Turkish line wavered, but III Corps held



General Mahmud Mukhtar Pascha. Turkish III Corps Commander



Plan of the Battle of Luleburgas

firm. Mukhtar's guns ignored the sparse Bulgarian artillery and relentlessly tore into the infantry. By 1700 hours, the dazed Bulgarians broke off their attack only to have to beat back an immediate counterattack from Mukhtar's III Corps.

The next day, the Turks reorganized their forces into two armies. Mukhtar was given the command of the Second Army on the right. The entire Turkish force attacked the Bulgarians, driving them farther back. The Turkish attack petered out, however, when the First Army ran out of artillery ammunition.

With the pressure off, the Turkish Army made an orderly withdrawal to the east on 3 November and took up defensive positions at Chatalja, just in front of Constantinople. It carefully

prepared its defensive positions and dug deep trenches. With its lines of communications now very short, it brought up large amounts of artillery ammunition. It also brought up a large number of heavier guns and howitzers, although these were mostly older and obsolete models.

The Bulgarians attacked the Chatalja line from 17 to 19 November. They had most of their artillery in place this time, but their inflexible organization prevented them from ever massing it. Turkish artillery again tore into the Bulgarian infantry, driving back wave after wave. On the 18th, Turkish artillery fire was so effective it broke up the Bulgarian attack before they could even jump off.

Commenting later on the battle,

General Fredrich Georges Herr, Inspector General of French Artillery, noted, "The ground was covered by successive waves of infantry, but suddenly, all were brought to a standstill, suffering great losses from the Turkish batteries." The modern rapid-firing gun had made its first decisive impact on the battlefield.

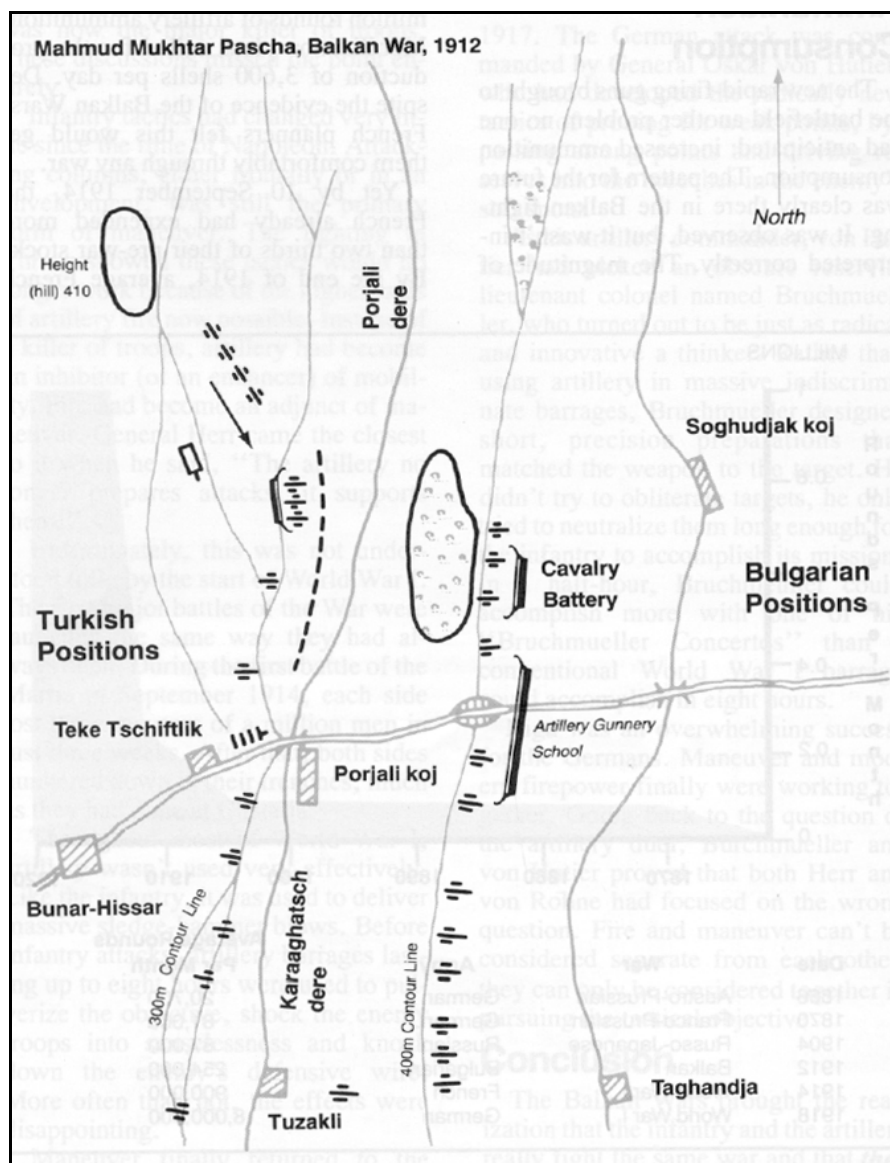
By 3 December, the front had stabilized. The Turkish infantry was in no condition to attack, but the Turkish artillery effectively could prevent the Bulgarian infantry from moving out of its trenches. According to General Herr, "The Bulgarians tried to rise from the trenches but were hurled back by a combined fire of infantry and artillery." An uneasy calm settled in, and both sides waited for the major powers to make the next move.

Elsewhere in the Balkans, the Turks were routed by the Serbs and Greeks and pushed out of Macedonia forever. Sporadic fighting continued in Thrace for several more months. Adrianople fell on 26 March 1913. The end of the First Balkan War finally was imposed by the major powers with the Treaty of London on 30 May 1913. Bulgaria, however, wasn't satisfied with the results. Still smarting over the loss of Salonica to the Greeks, Bulgaria declared war on its former allies on 30 May, the same day the London Treaty was signed. In the Second Balkan War, Turkey joined Greece and Serbia against Bulgaria. Romania also jumped in to overwhelm Bulgaria. The result was that Turkey retook almost all of Thrace. During the three short months of the Second Balkan War, Bulgaria managed to lose all the gains it had made during the First Balkan War.

Lessons Lost and Re-Learned

The Balkan fighting sparked an intensive debate and analysis, especially among the artillery communities of Germany and France. Germany, particularly, wanted to know what went wrong. France saw the results as the ultimate vindication of French equipment and tactics. Although a few of the commentators and analysts of the time developed excellent insights as to what it actually meant, the debate was cut off sharply after only about one year—too short a time for it to have any influence on current doctrine and practice.

The role of the artillery duel in modern



Artillery Positions and Targets on 30 October 1912, at Karaaghatsch dere

warfare was a central point debated in the military journals of 1913 and early 1914. On the one side, French General Herr concluded that the Balkan fighting proved the artillery duel was an absolute necessity. The enemy's artillery must first be eliminated, then one's own artillery would be free to deal with the enemy infantry. German General Heinrich von Rohne disagreed. Pointing to the Turkish experience at Luleburgas and Chatalja, he concluded that the enemy's infantry should be the only interest of the artillery. World War I would soon show that Herr and von Rohne were debating the wrong question.

The Need for Heavy Artillery

The general impression of the First Balkan War in Thrace was of a sound defeat for the Turks and a stunning victory for the Bulgarians. This overall result tended to obscure the dismal failure of the Bulgarian artillery at Luleburgas and Chatalja and the corresponding successes of the Turkish artillery. By not analyzing the last two actions very closely, the French jumped to the conclusion that their belief in the universal power of their 75-mm gun had been justified.

The French believed the answer to any firepower problem was to add more 75-mm guns. But it was the over reliance on this weapon that made the Bulgarian fire at Chatalja so ineffective. The Turkish positions at Chatalja were well-prepared and heavily fortified. The trenches were deep. Against positions of this type, the 75-mm shell was too light and its trajectory too flat to have much effect. The Turks, meanwhile, had brought up howitzers and heavier artillery. Although these were mostly slower-firing, obsolete models, the effects of their fire, with their heavier shells and higher trajectories, wreaked havoc on the Bulgarian lines. Used in combination with the rapid-firing 75-mm Krupp, the Turks had stopped the Bulgarians cold.

The howitzer and heavy artillery lesson was not lost on the Germans. They realized immediately that no single artillery weapon system would work in every situation. Both the Krupp and Skoda Works had long traditions of researching and developing heavier artillery, and after the Balkan Wars, these programs were accelerated.

Ironically, General Herr drew the correct conclusions on this issue. He began calling for longer range and heavier artillery for the French Army, but his was a lone voice. The prevailing French view was summarized by a Captain G. Bellenger, writing in a 1913 issue of *Revue d'Artillerie*: "In operations which develop rapidly, and especially if there is much maneuvering, the heavy artillery will rarely find employment."

By August 1914, a standard French corps had 120, 75-mm guns and only six 155-mm howitzers. A standard German corps, on the other hand, had 108, 77-mm guns; 36, 105-mm howitzers and 16, 155-mm howitzers. The lack of heavier artillery plagued France throughout World War I.

Ammunition Consumption

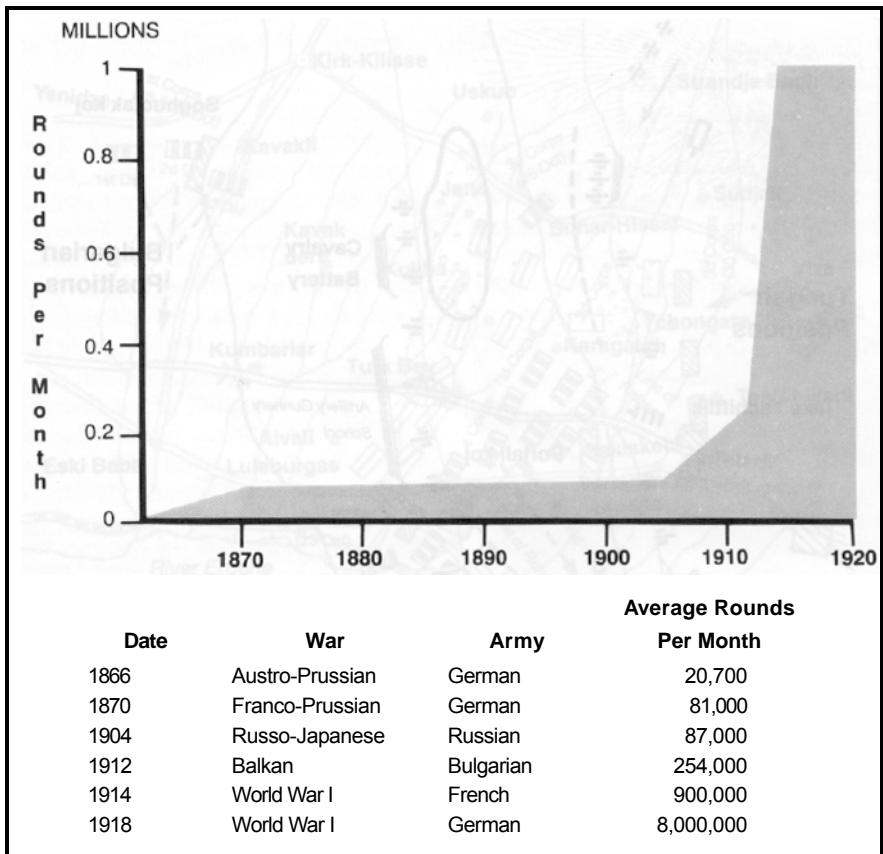
The new rapid-firing guns brought to the battlefield another problem no one had anticipated: increased ammunition consumption. The pattern for the future was clearly there in the Balkan fighting. It was observed, but it wasn't interpreted correctly. The magnitude of

the increase was far beyond what anyone thought possible.

During the Franco-Prussian War, Germany's average monthly expenditure of artillery ammunition was 81,000 rounds. During the Russo-Japanese War, Russia's average monthly expenditure was 87,000 rounds. But during the Balkan Wars, Bulgaria's average monthly expenditure of artillery ammunition was 254,000 rounds. This fact did provoke some mild interest in the world's military journals. One journal reported that Bulgaria had decided to increase its war reserve stock of artillery ammunition by 50 percent. For some reason though, the armies of the major powers didn't react to this at all. The result was disastrous, especially for France.

In August 1914, France had about 7 million rounds of artillery ammunition. Mobilization plans called for the production of 3,600 shells per day. Despite the evidence of the Balkan Wars, French planners felt this would get them comfortably through any war.

Yet by 10 September 1914, the French already had expended more than two thirds of their pre-war stock. By the end of 1914, average French



Artillery Ammunition Consumption in Combat Operations

consumption was 900,000 rounds per month. By the end of the war in 1918, Germany was shooting 8 million rounds per month. Entire industries on both sides were re-tooled for artillery ammunition production, and by the end of the war, the supply finally had caught up to the level of the demand. But throughout most of the War, both sides constantly were plagued with ammunition shortages.

Fire as an Adjunct of Maneuver

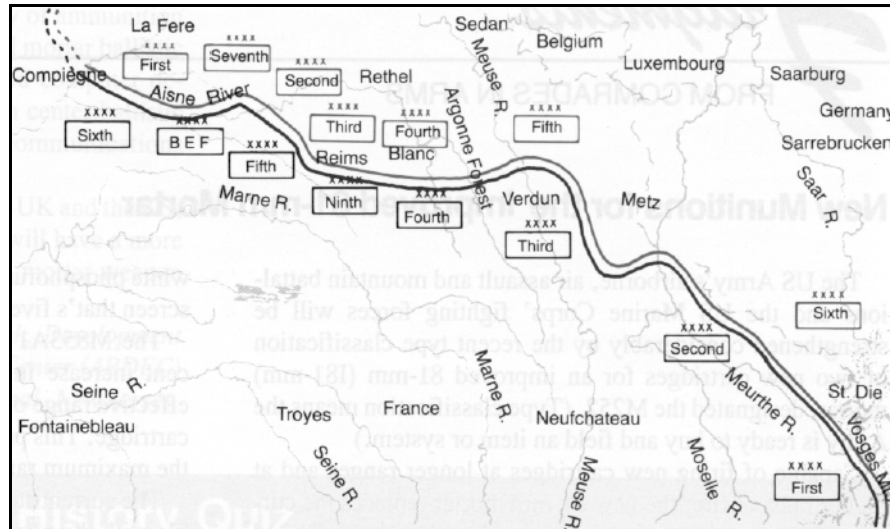
Perhaps the greatest significance of the Balkan Wars was the clear demonstration that the old relationships between fire and maneuver had changed forever. Much of the debate in 1913 centered on whether the infantry rifle or the new quick-firing artillery gun was now the major killer of troops. These discussions missed the point entirely.

Infantry tactics had changed very little since the time of Napoleon. Attacking columns, either frontally or in an envelopment, was still the primary form of maneuver. The fighting in Thrace showed these tactics would no longer work because of the higher rates of artillery fire now possible. Instead of a killer of troops, artillery had become an inhibitor (or an enhancer) of mobility. Fire had become an adjunct of maneuver. General Herr came the closest to it when he said, "The artillery no longer prepares attacks, it supports them."

Unfortunately, this was not understood fully by the start of World War I. The first major battles of the War were launched the same way they had always been. During the first battle of the Marne in September 1914, each side lost three-quarters of a million men in just three weeks. After that, both sides hunkered down in their trenches, much as they had done at Chatalja.

Throughout most of World War I, artillery wasn't used very effectively. Like the infantry, it was used to deliver massive sledge-hammer blows. Before infantry attacks, artillery barrages lasting up to eight hours were used to pulverize the objective, shock the enemy troops into senselessness and knock down the enemy's defensive wire. More often than not, the effects were disappointing.

Maneuver finally returned to the modern battlefield at the battle of Riga on the Eastern Front in September



After the first battle of the Marne in September 1914, both sides hunkered down in trenches much as they had done at Chatalja.

1917. The German attack was commanded by General Oskar von Hutier, who had developed the radically new tactics of probing for weak points, bypassing strong points and driving reserves into the breaches in the enemy's soft spots.

As his artillery commander, von Hutier had picked an obscure reservist lieutenant colonel named Bruchmueller, who turned out to be just as radical and innovative a thinker. Rather than using artillery in massive indiscriminate barrages, Bruchmueller designed short, precision preparations that matched the weapon to the target. He didn't try to obliterate targets, he only tried to neutralize them long enough for the infantry to accomplish its mission. In a half-hour, Bruchmueller could accomplish more with one of his "Bruchmueller Concertos" than a conventional World War I barrage could accomplish in eight hours.

Riga was an overwhelming success for the Germans. Maneuver and modern firepower finally were working together. Going back to the question of the artillery duel, Burchmueller and von Hutier proved that both Herr and von Rohne had focused on the wrong question. Fire and maneuver can't be considered separate from each other; they can only be considered together in pursuing the tactical objective.

Conclusion

The Balkan Wars brought the realization that the infantry and the artillery really fight the same war and that *they had better learn how to fight it together*. Writing in early 1914, Lieutenant

Colonel Nikoloff of the Bulgarian Army said of the relationship between the two, "Without closer cooperation and more intimate knowledge of each other's powers and limitations, there can be no success on the battlefield." Although many may have understood this point, no one was able to make it work until von Hutier and Burchmueller came along almost four years later.

Facing the violence of future conflicts and using constantly evolving technologies, today's Army leaders will have to display independent initiative to win on the battlefield. The artillery's challenge will be not to concentrate just on the capabilities of its new, high-tech weapons, but to use those systems innovatively to support the maneuver forces. The artillery must not lose the lessons learned from the Balkan Wars—lessons that apply today. We must know the powers and limitations of our maneuver brothers and adjust our technical and tactical skills to meet our objective: to support maneuver forces.



Major David T. Zabecki, United States Army Reserve (USAR), is a frequent contributor of historical articles to *Field Artillery*. He won the 1987 History Writing contest with his article "The Guns of Manchuria" (April 1988) and is a Contributing Editor of *Military History* magazine. Major Zabecki is the Targeting Intelligence Officer for the USAR Military Intelligence Group supporting the NATO Central Army Group in Europe. He gratefully acknowledges the Bundeswehr's Militaergeschichtliches Forschungsamt (Military History Research Office), West Germany, for making its library available to him.

Fragments

FROM COMRADES IN ARMS

New Munitions for the Improved 81-mm Mortar

The US Army's airborne, air assault and mountain battalions and the US Marine Corps' fighting forces will be strengthened considerably by the recent type classification of two new cartridges for an improved 81-mm (181-mm) mortar, designated the M252. (Type classification means the Army is ready to buy and field an item or system.)

Capable of firing new cartridges at longer ranges and at higher rates of fire, the new 81-mm mortar replaces the current M29A1 mortar system. Co-developed with the United Kingdom's Ministry of Defence, the M252 system is the result of improvements on the British 81-mm smoothbore, muzzle-loaded mortar and high-explosive (HE) cartridge.

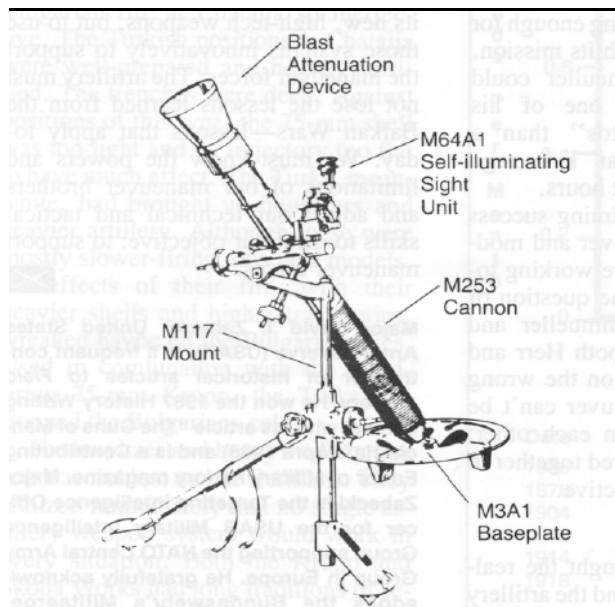
According to John Feneck, a system engineer for the fire support armaments center (FSAC) mortar systems office, "this new weapon has a stronger tube than the old mortar and also uses a blast attenuation device...designed to improve crew safety...by diverting the muzzle blast and noise up and away from the gun crew."

The two new type-classified cartridges are the M819 red phosphorus smoke and the M853A1 illumination. The M819 smoke-screening cartridge is the only one in the world that uses red phosphorus wedges. These wedges are ignited, ejected from the cartridge over the target by using a mechanical time fuze and dispersed on the target to produce an obscuring smoke screen quickly. The cartridge provides an increase in range of 400 meters over the standard bulk-filled

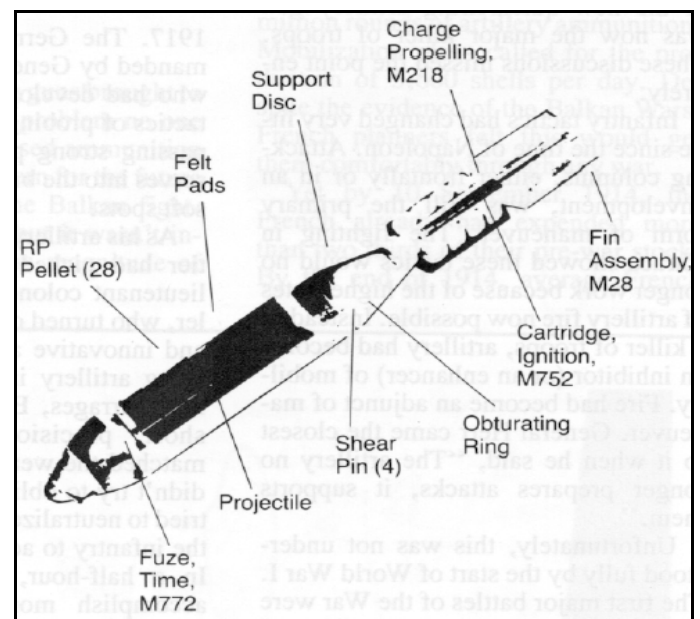
white phosphorus cartridge it replaces and produces a smoke screen that's five times more effective.

The M853A1 illumination cartridge provides a 200 percent increase in the illumination area and an increase in effective range of 2,300 meters over the current illumination cartridge. This provides enough illumination to adjust fire to the maximum range of the HE cartridges (5,700 meters).

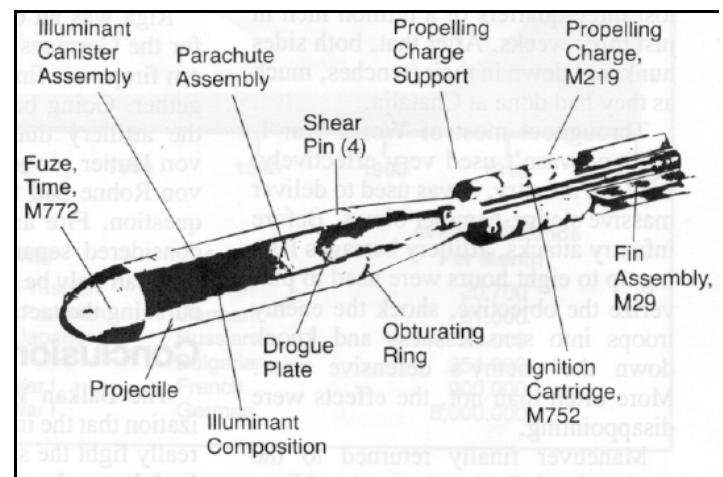
The current stockpile of 81-mm ammunition is interoperable with the new system. The improved ammunition is also interoperable with the old system but at reduced ranges. All



The M252 181-mm mortar fires cartridges at longer ranges and higher rates of fire.



The New M819 Red Phosphorus Smoke Cartridge for the 181-mm Mortar



The New M853A1 Illumination Cartridge for the 181-mm Mortar

the fire control data for the improved family of ammunition will be incorporated into the recently fielded mortar ballistic computer (MBC). The MBC is a hand-held computer designed to automate the mortar fire direction center ballistic computation, data management and communications functions.

Thus, through the combined efforts of the UK and the US, American and other NATO infantry forces will have a more sophisticated, reliable and effective 81-mm mortar weapon system.

*US Army Armament, Research, Development
and Engineering Center (ARDEC)
Picatinny Arsenal, New Jersey.*

Level 2—Artillerist History Quiz



This is the second level of history quizzes in this issue. You must answer eight out of the 10 questions correctly to qualify as an "Artillerist." For the Level 1—**Redleg** and Level 3—**King of Battle** History quizzes, see pages 17 and 30, respectively.

1. In World War II, the Red Army used a truck-mounted rocket launcher that fired 16, 132-mm rockets to a range of 9,800 yards. What is this system called, and where were most of the trucks the rockets were mounted on made?
2. What German rocket engineer, famous for developing the V-2, supervised the development of the Pershing rocket?
3. What World War I US Redleg commander became Chief of Staff of the Army in November 1926?
4. When and where was the first documented substantial use of cannon against troops in the field?
5. What munition first used by King Gustavus Adolphus of Sweden in the early 1600s combined the powder charge and projectile into one package?
6. What Continental Army Redleg commander fired a couple of cannon balls into Nassau Hall of the College of New Jersey (now Princeton University) to dislodge British soldiers hiding there?
7. When and where were the first cast-iron cannon manufactured?
8. Major Samuel Ringgold used light Horse Artillery with great effectiveness against General Mariano Arista's Mexican troops at the Battle of Palo Alto, 8 May 1846. What was this type of artillery nicknamed?
9. What Redleg Confederate general had been brevetted lieutenant colonel in the US Army for his battlefield performance at Buena Vista in 1847 during the Mexican War?
10. Who was the Chief of Artillery for the Army of the Potomac during the Civil War?

*For the answers to Level 2—**Artillerist**, turn to page 31.*

On Time— On Target

The Birth of Modern American Artillery

by Major Andrew G. Ellis



St. Mihiel, France, 12 September 1918—*"A veritable ring of artillery was positioned around three sides of the salient—3,010 guns in all. Right on schedule at 1:00 a.m., the artillery preparation began to eat its way into the German defenses. By the time the American infantry began the attack at 5:00 a.m., the supporting artillery already had fired more than a million rounds into the salient . . ."* (Major Phillip H. Stevens in his book *Artillery Through the Ages*, 1965).

Artilletry of World War I was indeed the King of Battle. It had become the greatest killer on the battlefield, accounting for more than 75 percent of the casualties. Trench warfare required the massive use of artillery to create penetrations. High-level planners still saw a role for the infantry, but most tactical commanders interpreted the new techniques as the artillery conquers and the infantry occupies.

The French, British and Germans began an extensive effort to produce more ammunition and guns and develop infantry-artillery tactics to win this "artillery war." However when the United States entered the War, it was unprepared to fight the artillery battle. The Chief of the Artillery, Major General William J. Snow,

wrote in February 1918 "...the condition of the Field Artillery as regards its organization, its equipment, its training...was nothing short of deplorable and chaotic."

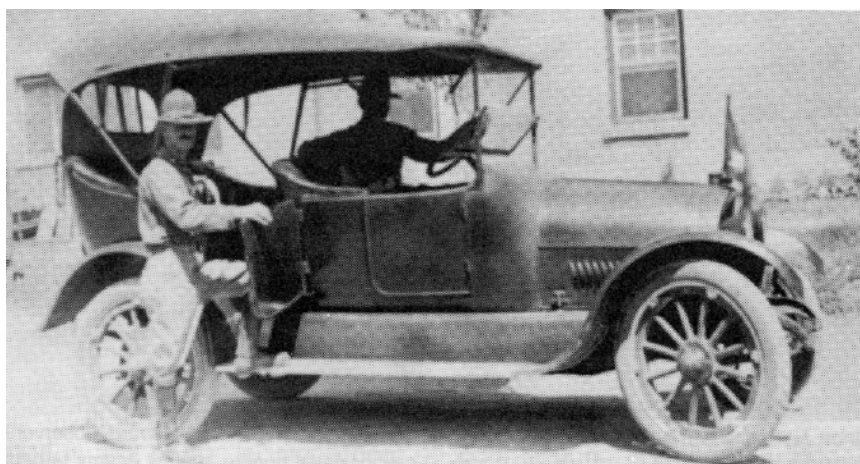
As a result of the lessons of World War I and the proven necessity of artillery support for successful operations, the United States thoroughly studied artillery employment and equipment. This study formed the basis of American artillery development for World War II. The US artillery was determined to enter the next war prepared.

American Artillery in World War I

World War I had been predominantly a set-piece artillery battle. The

static trench warfare that evolved relied heavily on artillery to reduce enemy strongpoints before the infantry made its assault. The principal artillery technique of the 1914-1918 War was to saturate enemy lines with shells (this effort sometimes lasting for days) in an attempt to break down obstacles, smash trenches and render the enemy incapable of defense. In many respects this technique failed. Assaulting troops found the ground impassable because of massive cratering caused by the artillery. Defenders learned to build deep shelters to protect themselves from the shells, allowing them to emerge and repulse the enemy advance when the shelling stopped.

The artillery tactics used in World War I revealed many problems. The lack of tactical flexibility in artillery employment was the most critical. The inability to maintain communications from the front line to the guns forced a reliance on rigid fire plans and made it impossible for the artillery to react to changing situations at the front. Communications, if perfected, would enable the artillery fire to be directed immediately to those areas where it was most needed.



Major General William J. Snow, Chief of Field Artillery, called for artillery organization, equipment and training reforms in 1918.

The artillery's lack of mobility also impeded its flexibility. Frequently, the infantry had pushed beyond the umbrella of its artillery support. Artillery didn't have the mobility to keep up with the advancing forces to help exploit successes. If artillery were made more mobile and the ranges of the weapons increased, the infantry would have more protection in its advance. The problems were recognized by all artillerymen at the close of the War. The pitiful condition of the United States' artillery, however, made these problems even more acute.

When the American Expeditionary Force (AEF) arrived in France in June



An American 75-mm Gun Crew in Action in World War I

1917, it brought no artillery. The Army had only "544 light field pieces, enough to equip 11 divisions....Since the mobilization plan called for 42 divisions, the staff planners estimated a requirement of 2,100 light artillery pieces" (Stevens). The Americans realized they could only meet this production goal in the near term by using existing French production facilities.

United States production levels never developed fully in World War I. "Of the 3,499 artillery pieces received by the AEF, only 477 were American-made and only 130 of the American guns ever were fired in combat" (Stevens). At the close of the War, the American Army found itself with virtually no artillery of its own. More importantly, the United States had not developed the ability to mass-produce artillery pieces at the rate required for mobilization in war.

The Westervelt Board

In 1918, General Snow, the new Chief of Artillery, recognized the pathetic state of the United States Field Artillery. On 5 December 1918, he petitioned the Army Chief of Staff to "study the armament and types of artillery material to be assigned to a field army."

The War Department acted immediately. On 11 December, it appointed a board of artillery and ordnance officers to review and recommend the calibers, kinds and proportions of ammunition and method of transport of future artillery. This board became known as the Westervelt Board, taken from the name of its presiding officer, Brigadier General

William I. Westervelt. The Board's 23 May 1919 recommendations formed the basis of American artillery development.

Since the American Army was critically short of artillery during the War, it was interested particularly in the Board's findings. The Westervelt Board convened in France where it was able to study first-hand artillery hardware and learn from the experiences of those who had used it in the field. The Board examined all the types of artillery used during the War (including those of the Central Powers) before it reached its conclusions.

The Westervelt Report recommended practical types of artillery for immediate development, as well as ideal types for future development. The most notable of those recommendations included—

- Adding artillery for strategic reinforcement, in addition to corps and division artillery assets.

- Using howitzers rather than field guns because howitzers could use protected positions that guns couldn't and could obtain angles of fall on objectives that guns couldn't.

- Using a light gun and light field howitzer to fulfill the division artillery missions. The Board determined the ideal howitzer was a weapon of about 105-mm in caliber.

- Using medium artillery for the corps artillery counterbattery mission. The 155-mm howitzer would be ideal for this mission.

- Having heavy artillery of both the 155-mm gun and a howitzer of approximately eight inches in caliber.

The Board also recommended the design of a split-trail carriage to increase the elevation and traverse of artillery pieces. In addition, it emphasized the need for a better time fuze, the design of projectiles to achieve greater range and destructive power and the development of motorized and self-propelled artillery.

Westervelt and the Board members also stated the "future development of tanks will be along the lines of better armor protection and carrying more powerful cannon. It is therefore anticipated that in the future, tank development will be such that neither the .50-caliber machine gun nor the 37-mm gun will be sufficient for their attack." The Board recommended armor-piercing shells and an anti-armor gun of at least 75-mm in caliber.



C Battery, 108th Field Artillery, 28th Division, fires on retreating Germans from the ruins of Varennes.

(During World War II, the Americans soon discovered the 37-mm and 57-mm anti-tank guns proved ineffective against German armor.)

Most of the Westervelt Board's recommendations remained on paper during the lean years following the War. Americans believed the "War to end all wars" was just that; the armed forces were demobilized quickly and completely. The economic hardships of the 1930s forced a reduction in men and equipment, as well as funds to pursue development. The United States once again drew back into its isolationist shell. The little money given to the services went to the Navy to protect America's natural barriers—the oceans. But, as was stated in *Sounds of the Guns—The Story of American Artillery* (1955) by Fairfax Downey, "Research and development continued though the national purse strings were kept so tight that it was a struggle to obtain funds even for pilot models."

Changing Artillery

Because of financial restrictions and the general peacetime neglect of the United States Army, major changes in artillery equipment and organization did not occur until the late 1930s. Hitler's rise to power and the growth of Nazi Germany no doubt helped loosen the purse strings.

The first major improvement was increasing the mobility of the artillery. The artillery needed mobility equal to that of the forces it supported. Substituting mechanical transportation for animals was a necessity. Mobile tactics required reliable, sustainable transport for artillery weapons. Different carriages were designed for the guns, allowing motor vehicles to tow the

artillery. The design of self-propelled artillery soon followed.

Great strides also were made to increase the ranges of the artillery. Use of split-trail carriages allowed greater elevation of the howitzer's gun tube, increasing range. Improvements in projectile design and gun tubes also increased the ranges of these weapons. The range of the 105-mm artillery piece increased from 10,700 yards to 12,000 yards; the 155-mm gun range increased from 17,000 yards to 25,000 yards; and the 8-inch howitzer increased its range by more than 6,000 yards.

The most significant development of the United States artillery came in the fire support arena. The Field Artillery School vigorously sought improved methods of adjusting and massing fires on targets of opportunity. Artillery fires during World War I usually were the result of detailed preplanned artillery concentrations. If the infantry needed artillery fire on a target of opportunity, it was difficult to bring more than one battery to bear on such a target. The inability to mass fires was caused by the observer's reliance on "land line" communications. This restricted the observer to communicate only with his battery. The reliance on wire communication also prevented the observer from advancing with his supported maneuver unit.

During the inter-war period, the Field Artillery School developed the means of concentrating any amount of available artillery fire on a target of opportunity. Forward observer and fire direction procedures were implemented, allowing accurate adjustments to be made from the observer's location rather than the battery's location. Survey techniques were modified to place



Somewhere in France, forward observers call for naval gunfire against enemy targets in 1944.

all artillery in the division area on a common grid. These procedures enabled the massing of artillery fires on a target designated by only one observer.

Unadjusted fire proved practically useless. Forward observers were the critical link for the artillery-maneuver team. The use of new, more reliable radios allowed observers to move with the ground-gaining arms, providing continuous fire support. The importance of the observer was recognized by all arms.

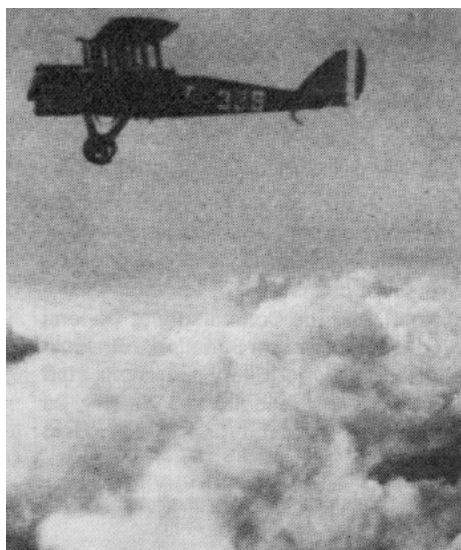
In its 1942 edition of *Field Artillery Tactics*, the Field Artillery School established criteria for selecting observers. Some of the required characteristics were as follows: reliability, initiative and judgment, perfect eyesight and hearing and at least an eighth-grade education. The Artillery School also spent a considerable amount of time training these individuals in observed fire procedures.

Armor also recognized the importance of the artillery's forward observers. Observers were viewed as so critical to armor's success on the battlefield that "each tank battalion, each tank regiment, and each combat command headquarters has a tank reserved for an artillery forward observer" (1942 *Field Artillery Tactics*).

Aerial observation used during World War I was recognized as an indispensable asset. Artillery using aerial spotters could engage targets at the maximum range of its weapons. Aerial observation techniques continued to be refined during the inter-war years. The Field Artillery recognized this capability as critical to success on the mobile battlefield of the future.

"Swift and devastating accuracy was achieved by the widespread use of forward observers and cub planes as

spotters. To an infantry colonel admiring the work of the little planes at the Louisiana Maneuvers...they had seemed to give heavy and long-range artillery an ability to adjust fire as quickly and accurately as light guns. Their radio reports afforded field commanders a grasp of the tactical situation—terrain, avenues of movement, concentrations of troops and artillery. Later the colonel, promoted to general, successfully advocated the adoption of cubs as standard equipment for every division. All the artillery for the invaluable eyes given it would stand in debt to that infantry officer, Dwight D. Eisenhower" (Downey).



During World War I, artillerymen spotted and engaged targets at the maximum range of their guns, using planes such as this American De Haviland.

Even from the air it was not always possible to see well enough to adjust fires. The Field Artillery School refined the rudimentary "sound and flash" and "high-burst-ranging" methods developed during World War I. These techniques would make the United States artillery effective in counterfire, and the use of high burst ranging would help observers adjust fires during periods of limited visibility.

The final step in artillery preparation before the American entry into World War II came in June of 1941. General Lesley McNair, who reorganized the Army to the triangular division, saw the need for greater fire support for these new divisions. McNair argued for more artillery and artillery of greater ranges for these divisions. These recommendations were approved, and the divisional artillery was reorganized.

The 75-mm guns in three battalions were replaced by 105-mm howitzers, and one battalion of 155-mm general support howitzers was added.

American Artillery in World War II

By the time the United States entered World War II, its Field Artillery was prepared. And for the first time in its history, the United States Army was equipped with a complete Field Artillery system. The success of the American artillery during World War II was due to its ability to learn from the bitter lessons of World War I.

General Snow and other forward-thinking Field Artillerymen like him made an invaluable contribution to the development of the United States Field Artillery. General Snow wrote in his memoirs:

As a result of digesting the lessons of the World War in the years following its close and among the many daydreams I had as the first Chief of Field Artillery, concerning the heritage I wanted to leave to my arm when I ceased to be chief, there were three that were outstanding: first, the idea of research and development of materiel in time of peace to keep abreast of the rest of the world; second, the institution of a system of schools that in time of peace would result in thorough training in the tactics and techniques of their arm;

and third, the formulation of a sound, workable war plan for the Field Artillery to be put into effect when the necessity might arise.

General Snow met his goals. The proof lies in the devastating concentrated fires of the United States Field Artillery during World War II that surpassed those of all other countries.

General der Artillerie Karl Thoholte of the German Army provided the following testimony to the US Field Artillery: "The fact that all US artillery is motorized is good. It is the most mobile artillery of all first-rate powers...in technology the American excels. The standardization of pieces, the quality of ammunition, the quality of communication equipment and the adjustment of fires on battery-and division-artillery levels is superior."

Conclusion

General Snow had a vision for the future of the artillery. That vision became reality during World War II. The artillery must maintain its vision of fire support.

The common phrase "to practice in peace what you will do in war" is an excellent axiom to follow. The come-as-you-are nature of the next war demands this attitude of all leaders. Artillerymen must be ever ready with the proper equipment and training to accomplish the mission.



This self-propelled M7, 105-mm howitzer was used for high-angle and direct fire during World War II.

If readiness is our peacetime responsibility, then training for war is our first priority. Units and leaders must stretch to the limit and set and enforce realistic wartime standards. Training must key on the basics—good units master the fundamentals. More importantly, training must relate to our wartime mission as a combined-arms effort. One division commander said it best, "If you are conducting training that cannot be related to your wartime mission, then you must seriously question why you are doing it." Training should challenge soldiers to think and act as they would in war because mistakes made and corrected in this environment will save lives in war.

Having the requisite tools to accomplish the mission is as crucial as having realistic training. Future fire support needs must be identified early, integrated into the combined-arms team and translated into weapons systems. This is not an easy task. The acquisition process poses a real challenge because of its complexity and length. And with deficit reduction programs underway, acquiring new weapons systems will be even more difficult in the years ahead. But given the proper focus, taken within a coherent strategy for the future, we'll realize the vision.



Artillery Units Training with a 155-mm Gun in England during World War II

"Field Artillery: Master Plan for Fire Support of the Future" by Major General Raphael J. Hallada [*Field Artillery*, February 1988] provides

such a strategy. But it will take the ideas, sweat and innovation of soldiers in the fire support business to keep the artillery on time and on target.



Major Andrew G. Ellis won Honorable Mention in the US Field Artillery Association's 1988 History Writing Contest with this article. He is currently an industrial exchange officer with McDonnell Douglas Astronautics Company in Titusville, Florida. Major Ellis holds a master's degree in business administration from the Florida Institute of Technology and is a graduate of the US Military Academy, West Point, and the Command and General Staff College, Fort Leavenworth, Kansas. He served as S3 for the 1st Battalion, 76th Field Artillery, 3d Infantry Division, West Germany, and as a Division Artillery operations staff officer, also with the 3d Infantry Division. He commanded Headquarters Battery, 2d Infantry Division Artillery, South Korea, and A Battery, 1st Battalion (Lance), 12th Field Artillery, Fort Sill, Oklahoma.

Level 3—King of Battle History Quiz



This is the third level of history quizzes in this issue. You must answer eight out of the 10 questions correctly to qualify as a "**King of Battle**." For the Level 1—**Redleg** and Level 2—**Artillerist** History quizzes, see pages 17 and 25, respectively.

1. What famous artillery piece did French Captains Emile Raimilho and Sainte-Claire Deville perfect in 1897?
2. Only one unit of the Regular Army of the United States can trace its history to the Army's beginnings. Which is it?
3. What is the name of the mammoth World War II artillery piece whose projectile could penetrate 90 feet of rock, and what country manufactured it?
4. Colonel George Bomford, an 1805 West Point graduate, developed a heavy gun that incorporated characteristics of

both the howitzer and the mortar. This weapon remained in service until the Civil War. What was it called?

5. What was the name of the Army's first graduate school and when was it established?
6. When and where was history's first atomic artillery shell fired, and what caliber artillery piece fired it?
7. What is the first US Army artillery missile to use a prepackaged, liquid propulsion system?
8. Who was the first artilleryman to win the Congressional Medal of Honor?
9. When was the first *Field Artillery Journal* published, and who edited it?
10. How did the term "Son of a Gun" originate?

For the answers to Level 3—**King of Battle**, turn to page 42.

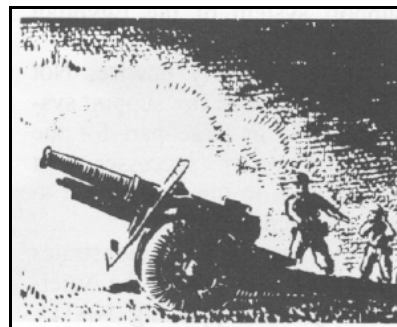
Answers to Level 1—Redleg History Quiz (see quiz, page 17).

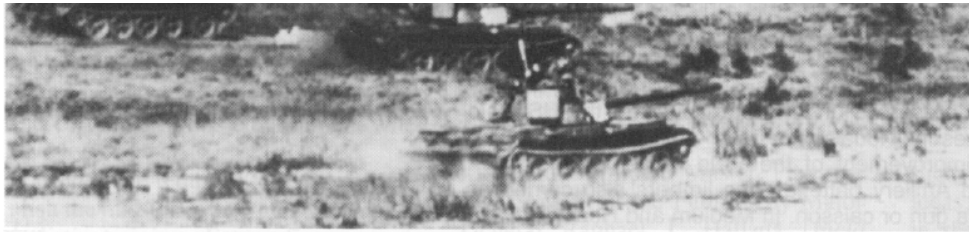
1. School of Fire for Field Artillery; 1911. 2. Captain (later Colonel) Daniel Tyler Moore; he served as Commandant until 1914. 3. The multiple launch rocket system (MLRS). 4. Molly Pitcher or "Sergeant Molly." At the Battle of Monmouth against the British on 28 June 1778, Mary Ludwig Hays took up the rammer and served as a gunner when the crew was too depleted to continue, including her wounded husband John Hays. The name "Pitcher" came from the task she was performing before serving as a gunner: bringing pitchers of spring water to cool the hot guns and parched throats of the soldiers. She also tended the wounded and, once, heaved a crippled Continental soldier on her back, carrying him out of the reach of charging Britishers. The Artillery Order of Molly Pitcher, an award and medal presented under the auspices of the US Field Artillery Association, recognizes individuals who have "voluntarily contributed in a significant way to the improvement of the Field Artillery community." 5. The caisson. In Light Field Artillery batteries, the limbers also carried an ammunition chest and pulled a gun or caisson. In Medium and Heavy Artillery batteries, the gun limbers didn't carry ammunition. 6. Brigadier General (later Major General) Henry Knox. 7. US Army Field Artillery Board. In 1776, Brigadier General Henry Knox established a Board of Ordnance to direct all matters relating to artillery and artillery stores. The Board was disbanded after the Revolutionary War and re-established in 1902 under its present name. 8. Before and during the Civil War, Field Artillery soldiers (corporals and above) had a red stripe down the legs of their uniforms. The Union and Confederate Armies both prescribed the red stripe for Field Artillerymen. 9. Brigadier General (later Major General) Henry Knox, serving as first Chief of Artillery, from 1775 to 1782. In 1775, he was 26 years old. 10. Saint Barbara. Legend has it she was the daughter of a wealthy heathen named Dioscorus (Asia Minor, 300 A.D.). Because of her unsurpassed beauty, Dioscorus imprisoned her in a tower to protect her from the influences of the outside world. When he found she had become a Christian, he dragged her to a prefect who ordered her death. The evil Dioscorus tortured Barbara and carried out the sentence with his own sword. As the brutal heathen made his way home, a bolt of lightning consumed him, leaving only his scorched sword behind. Since the 17th century, gunners have called upon Saint Barbara to protect them against the accidents and explosions so common with primitive artillery pieces. Under the auspices of the US Field Artillery Association, the Order of Saint Barbara award and medal is presented to individuals for "conspicuous, long-term service for or on behalf of the US Army or US Marine Corps Field Artillery."



Answers to Level 2—Artillerist History Quiz (see quiz, page 25).

1. Katyusha. The trucks were made in Detroit, Michigan, and sent to the Russians under the Lend-Lease program. German troops called them "Stalin Organs." 2. Wernher von Braun. 3. Lieutenant General Charles P. Summerall, who was the first Redleg to become Chief of Staff of the Army. 4. 1346, Battle of Crecy in northern France during the 100 Years War. The victorious English used cannon against the French. 5. Cartridge. 6. Captain Alexander Hamilton. Ironically, the College had once denied him admission as a student. 7. 1543, England. 8. "Flying Artillery," nicknamed "flying" because it was the first time the entire battery was mounted on horses. 9. Captain (later General) Braxton Bragg in command of C Battery, 3d Field Artillery. With no foot soldiers to support him and almost face to face with the enemy, he fired an average of 250 rounds per gun, an amazing performance for the muzzle loaders of his day. The shower of "grape" from his guns turned the tide of the battle. 10. Major General Henry Jackson Hunt.





The Ramadan War:

Fire Support Egyptian Style

by Captain Robert D. Lewis, SF

At 1400 hours on 6 October 1973, an observer could have witnessed the casual vigil of Israeli soldiers manning the Bar-Lev Line. Five minutes later, their peaceful existence would have been shattered by the roar of 2,000 Egyptian artillery pieces. If these frightened soldiers had raised their heads, they would have seen the rubber boats of specially trained assault troops moving quickly across the Suez Canal. Behind these infantrymen lay the massive armored columns of T-62s, waiting to reclaim the occupied Sinai.

In the years following the Fourth Arab-Israeli War, the US Army has studied it thoroughly. This War represents the closest example of the application of AirLand Battle (ALB) doctrine in recent times. Much of this study has concentrated on successful Israeli operations, to include analysis of the Israeli fire support system. But analysts have paid less attention to the fire support system of the Egyptian Army.

This neglect is truly unwise. Not only was the Egyptian fire support system responsible in large part for the spectacular Egyptian successes, but also key failures in this system led to the ultimate Egyptian defeat.

Study of this War demonstrates some remarkable lessons for the American artilleryman supporting NATO. The War presented an example of a numerically superior attacking force supported by

Soviet doctrine, training and equipment. The force crossed a major water obstacle and attempted to continue combined-arms operations against a smaller defending force supported by American doctrine, training and equipment. It is a scenario in which I have participated during several return of forces to Germany (REFORGER) exercises. Further, the War demonstrates the absolute interdependency of all components of the combined-arms team in both offensive and defensive operations.

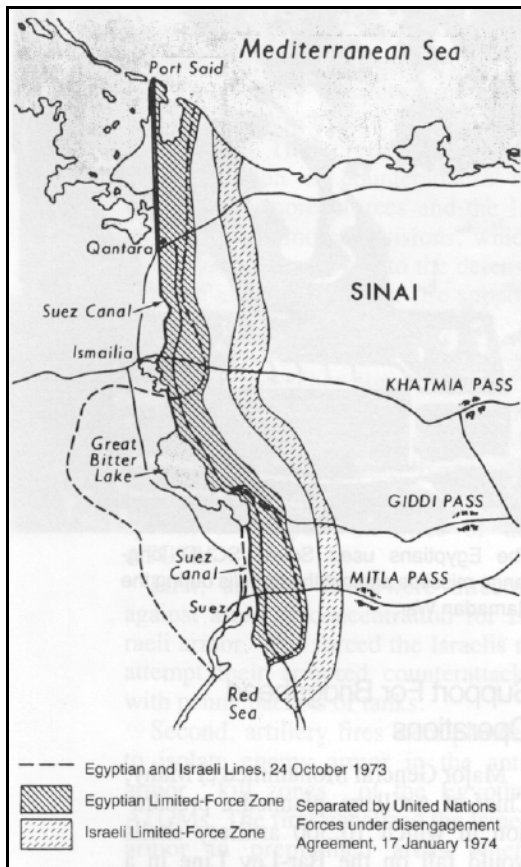
This article examines the operations of the Egyptian fire support system during the planning, preparation and execution of both its attack and ultimate defeat. It also evaluates those lessons learned in tactics, command and materiel that are germane to the American artilleryman. It examines the fire support system in the areas of target

acquisition, targeting in support of ALB and the impact of indirect and close air support (CAS) fires.

Planning and Preparation, 1967 to 1973

The Egyptian military was shocked by its defeat in the Six-Day War. Immediately after the defeat, the Egyptians were determined to liberate the occupied Sinai through a future offensive. Preparing its forces for this battle consumed Egypt's planning for the next six years.

The immediate concern was replacing Egypt's war losses. Its forces had all but ceased to be an offensive entity. Its government appealed to the Soviet Union for the new equipment, and by the end of 1968, the Egyptian Army's



Sinai Occupation Zones, 1974

equipment exceeded the quantity used in 1967. The majority of this new equipment was tanks, artillery pieces, air defense artillery (ADA) systems and engineer equipment.

Based on its analysis of the defeat, the Egyptian General Staff developed a mission essential task list (METL) for its next offensive across the Suez Canal. This METL was designed to dismantle systematically the Israeli combined-arms team and included:

- Neutralizing the Israeli Air Force's air superiority and CAS.
- Removing the Israeli air threat, which would expose the mobilization assembly areas of the Israeli armored reserves deep in the Sinai to the effects of the Egyptian deep attack.
- Preventing the concentration of Israeli armor, which would force the Israelis to attack in small armored groups (penny packets) without proper reconnaissance or synchronization of combat power.

August 1988

- Attacking the Israeli penny packets with canalizing artillery fires.
- Using artillery fires to force the Israeli armor into kill zones where the Egyptians could engage the tanks with anti-tank guided missiles (ATGMs).
- Exposing the Bar-Lev defenders to the mercy of Egyptian indirect fires by removing the Israeli armor, which would allow the Egyptian bridgehead to build to enough strength to permit the Egyptian Army to continue its offensive into the Sinai.

Equipment and Munitions

The Egyptian General Staff became enamored with three components of the combined-arms team: ADA systems, engineer systems (especially bridging) and anti-tank infantry weapons—ATGMs and rocket-propelled grenades (RPGs). The Egyptians invested both their best personnel and many resources in obtaining these systems.

The Egyptians' "tunnel vision" caused a lack of attention in three areas of their arsenal: long-range artillery, mobility in ADA and artillery systems, and battlefield observation devices. The Egyptians received some SCUDs (a NATO nickname for Soviet long-range missile systems) and free rocket over ground (FROG) weapons; however, the battle would later demonstrate their inability to bring these systems to bear against high-value targets in the Israeli rear.

Both the ADA systems and artillery weapons lacked enough mobility to participate in armored warfare. The surface-to-air missile (SAM) belt along the Suez was a series of fixed sites. Since Egyptian artillery consisted of towed guns, they were extremely difficult to emplace or displace rapidly when off roads. Finally, the Egyptians lacked any system that could provide enough observation to allow for target acquisition beyond the Suez Canal Zone.

War of Attrition

An important phase of Egyptian planning and preparation was the "War of Attrition." During 1968 to 1970, the Egyptian Army engaged in commando strikes deep within the Sinai and daily artillery programs against the Bar-Lev Line. Although the government's goal was to maintain a war mentality in both the armed forces and the population, it achieved several important military objectives. The commando raids showed the vulnerability of specific targets in the Israelis' rear area. Further, other commando operations gathered intelligence about areas the Israelis would use to assemble and move Israeli reserve formations toward the Canal. These operations helped determine deep targets for the Egyptians to strike.

The daily artillery program could be considered intelligence preparation of the battlefield (IPB) by fire. These



The Egyptians were unable to hit high-value targets in the Israeli rear area using weapons such as this Soviet FROG.

strikes caused the Israelis to call alerts. By carefully observing the Israeli armor's movement during these alerts, the Egyptians planned both direct and indirect fires to support their crossing of the Canal. Further, the shelling of the Bar-Lev Line allowed the Egyptians to develop good technical firing data to use later in the pre-crossing preparation of 1973.

The Plans

The Egyptian General Staff developed two plans for the attack against Israel. The first plan called for a Canal crossing by establishing a bridgehead on the east bank. They would fortify this bridgehead against Israeli counterattacks and hoped this change in the status quo would force the Israelis to negotiate a favorable settlement. A second plan called for them to exploit the bridgehead immediately with several armored thrusts directed against the liberation of the Giddi and Mitla passes.

The first limited-offensive plan enjoyed the greatest support in the General Staff. As observed from the equipment chosen by the Egyptians, their forces could best support a plan that didn't require rapid movement.

The Offensive

The Egyptian fire support effort during the offensive phase concentrated in three areas: deep attack, support for bridgehead operations and anti-armor defense.

Deep Attack

The deep attack was conducted in two phases. Initially, the fire support system was to support the Canal crossing by striking targets within the Israeli rear area. The plan for this phase of the deep attack was executed as follows:

- FROG long-range rockets struck Hawk missile sites and their supporting radars to remove this threat to the Egyptian Air Force.
- With the ADA threat reduced, 250 Egyptian aircraft attacked artillery positions, command posts, electronic warfare (EW) facilities, communications links and, in particular, the Israeli airfields at El Meliez, Bir el Thamada and El Sur. The Egyptians had hoped to

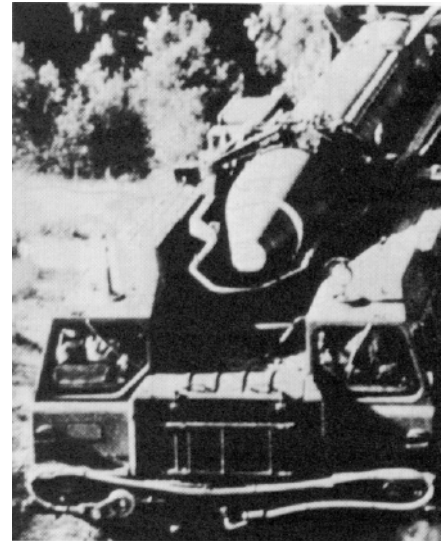
catch the Israeli aircraft as their own planes had been caught during 1967.

- The Egyptian artillery then followed the air strikes with FROG missile firings at the Bir Gifgafa and Tasa military bases. These strikes were attempts to disrupt Israeli command, control, communications and intelligence (C³I) and the assembly of the Israeli Southern Command forces.

The second phase of the deep battle was directed against decision points on Israeli routes toward the Canal. The Egyptians attacked with rockets, multiple rocket launchers (MRLs), aircraft and groups of commandos. The objective of this second phase was to prevent concentrated armor formations from moving forward.

On the whole, the deep attack was only moderately successful. The attack did accomplish four objectives. First, the Egyptians significantly degraded the Israeli ADA system in the rear area. Second, the deep strikes against decision points and command centers did disrupt the forward movement of Israeli armor. This disruption caused uncoordinated Israeli armored thrusts against the well-developed anti-armor defenses of the Egyptian bridgehead. Third, the command disruption caused the Israeli Southern Command and its subordinate divisions to react to the Egyptians without enough intelligence about the situation. Finally, the deep attack caused the Israeli combined-arms team to separate. These attacks were especially effective against Israeli artillery units. In fact, one division counterattacked. But because of Egyptian fires, it could muster only four howitzers to provide fire support.

On the debit side of the Egyptian ledger were some significant failures. First, the deep attack failed to damage the Israeli Air Force. Second, the accuracy of long-range artillery and rocket fires diminished as the battle proceeded. After the initial fires against preplanned targets, the Egyptians were unable to acquire additional targets to engage. The flow of Israeli reserves continued unabated after the initial disruption. Finally, the effectiveness of the commandos was extremely limited. Many of their deep raids were interdicted before they reached the targets.



The Egyptians used Soviet SCUD long-range missiles against the Israelis during the Ramadan War.

Support For Bridgehead Operations

Major General Mohammed el Mahy, Chief of Artillery, planned a preparation in which 10,500 artillery shells would fall on the Bar-Lev Line in a single minute. The preparation continued for 53 minutes. He executed the plan in the following way:

- Initial fires targeted Israeli command and observation posts in the Bar-Lev Line.
- Fires shifted to the infantry strongpoints in the Line.
- Fires then shifted to concentration points for local armored units.
- Additional fires were directed at certain sections of the Line to weaken desert sand formations. These sections were later targets for Egyptian engineers armed with water cannon. It was at these sections the Egyptians would breach the Line.

These fires were extremely successful. Israeli command within the Line quickly was disrupted. Further, fires against Israeli armor prevented its coordinated use against the breaching efforts of artillery and engineers. However, the preparation did fail to reduce all of the strongpoints. These stubborn Israelis continued to be a nuisance to Egyptian operations for several days to follow.

Anti-Armor Defense

Once the Egyptians established the bridgehead, they developed an extensive anti-armor screen on the East Bank of the Canal. This screen was prepared in anticipation of counterattacks by both local armored forces and the Israeli reserve armored divisions, which were mobilizing. A key to the defense was the integration of the fire support system.

This defense was truly a combined-arms effort. The Egyptians programmed the ADA system (SAM belt) to defend both artillery and ATGMs from the effects of the Israeli Air Force. They developed the artillery system to support the fires of the ATGMs.

First, artillery fires were directed against areas of concentration for Israeli armor. This forced the Israelis to attempt their armored counterattacks with penny packets of tanks.

Second, artillery fires were planned to isolate enemy armor in the anti-armor "kill zones" of the Egyptian ATGMs. The fires canalized the Israeli armor in preplanned areas where Egyptian anti-tank gunners could fire volleys at the flanks of the enemy tanks.

Third, the Egyptian artillery stripped the Israeli mechanized infantry from its combined-arms team. Removing the infantry precluded the Israelis from effectively engaging the Egyptian ATGMs.

The artillery support of the anti-armor defense provided great dividends. Israeli divisions lost up to one-third of their tank strength in attacks against the bridgehead.

The Defeat

The Egyptian defeat can be attributed directly to the fire support system's failure to sustain initial success. The system failed in the deep battle, the battle of the bridgehead and the battle for the rear area.

Failure of the Deep Battle

As mentioned earlier, the Egyptians failed to interdict the Israeli armored reserve's movement. This failure may

be attributed to two factors: the Egyptian's inability to acquire targets in the deep battle and the support system's inability to engage these targets.

In developing its force structure, Egypt hadn't acquired long-range target acquisition hardware. Due to the superiority of the Israeli Air Force in the Sinai, Egypt couldn't employ aerial reconnaissance flights successfully. As a result, the Israelis were able to move and concentrate their armored reserves without interference. This inability to attack the Israelis caused the Egyptians to lose the initiative.

Defeat at the Bridgehead

The battle of the bridgehead was lost in two areas: attrition by Israeli fires and dependency on bridges. Their initial successes confused the Egyptians. As a result, they paused after they crossed the Canal to decide either to continue the offensive or establish a defense. This pause proved costly as it allowed the Israelis to recover their balance. The Egyptians decided to continue the offensive.

This decision exposed their combined-arms team's two weaknesses. First, the ADA system consisted of fixed sites. As a result, the Egyptian armored columns moved forward without an ADA blanket. The Israeli Air Force quickly attacked these

forces. For example, the 256th Motorized Infantry Brigade departed the SAM Belt on 10 October 1973. It was engaged by Israeli air, artillery and armor. The Brigade suffered 90 percent losses in both personnel and equipment.

Second, the Egyptians discovered their towed artillery wasn't mobile enough to support the armored thrusts. This immobility caused slow emplacement and displacement times and poor reaction to counterfire. Further, the artillery had to move on either roads or hardpan.

The Egyptians depended on several bridges for their logistical support after crossing the Canal. Their planners believed they could counter any Israeli attack against these bridges. However, the Egyptians' failure to expand their bridgehead resulted in the bridges' lying within the range of Israeli indirect-fire weapons. The Israelis' fires disabled several of these bridges. The problem with the Egyptian fire support system lay in its inability to acquire and engage these Israeli guns. The Egyptians did not develop an integrated, counterbattery radar and howitzer system, and they never developed effective counterfire programs. As a result, Israeli fires began to interdict the flow of supplies to the bridgehead successfully.



Soviet ATGM Vehicle Launcher — the Egyptians developed their artillery system to canalize the Israeli tanks to help the counterattack with ATGMs.

Weaknesses in the Battle for the Rear Area

The Egyptian plan of attack was designed to overcome one great obstacle—the Suez Canal. To do this, planners had to establish a bridgehead on the Canal's East Bank. This bridgehead was fortified by concentrating all ATGMs, anti-tank guns and the bulk of the RPGs. The weakness in this approach was the lack of anti-tank fires in the Egyptian rear area. The Israelis discovered and exploited this weakness during their armored thrusts across the Canal. Both field artillerymen and air defense artillerymen quickly suffered the wrath of the Israeli tankers.

A lack of fire support planning had precluded the Egyptian's using artillery to engage the Israeli armor. The Egyptians lacked both the observers and the fire support coordinators to bring fires into their own rear area. Further, the artillery batteries hadn't prepared for anti-tank defense. The Egyptian artillery didn't have the anti-tank weaponry to engage the Israelis as they approached, and their direct-fire procedures weren't effective against the armor. Finally, towed artillery wasn't mobile enough to displace as Israeli tanks approached.

Lessons Learned

American artilleryman can gain many insights from Egyptian successes and failures. During the Egyptian offensive, one can observe the critical role of fire support in the suppression of enemy air defense (SEAD). Artillery not only must degrade the formidable ADA systems near the forward line of own troops (FLOT), but it also must coordinate deep attack weapons to reduce the C³I and radar capabilities in the enemy's rear area. Much of Egypt's early success in the deep attack can be attributed to the effects of SEAD.

A significant failure of the deep attack was the Egyptian's inability to acquire targets once operations had started. The US Army has this same limitation. We can't acquire and engage moving armored formations consistently and effectively with deep attack weapons.



An Israeli Armored Unit Passing through the Wreckage of Egyptian Armor

An important aspect of this problem is the use of deep-intelligence-collecting patrols. Like the Egyptian commandos, the US Army in Europe also has special operations force (SOF) units that can penetrate deep into the enemy's rear. These forces can locate high-value targets; however, due to communications equipment constraints, they can't communicate these targets in real time to agencies that can engage them. American fire support planners must arm these elements with real-time communication. Such intelligence-collecting patrols tied into the ATACMS could bring decisive fires to the enemy rear area.

A second series of lessons involves setting target priorities as the enemy approaches the main battle area. The Egyptians tried to engage Israeli air power, blind its C³I, destroy its armored forces and, finally, reduce its defenses. Once again, American fire supporters can learn lessons. To engage the Soviet threat in Europe effectively, the planner must sequence his targets by—

- Degrading enemy air defenses with an initially extensive SEAD program. This will allow aircraft to attack deep targets successfully.
- Blinding enemy command and degrading enemy air forces using air attacks.

- Destroying or stopping enemy formations moving along the major lines of communication (LOCs) using deep-strike systems such as ATACMS. We can attack using intelligence supplied from both SOF patrols and unmanned aerial vehicles (UAVs).

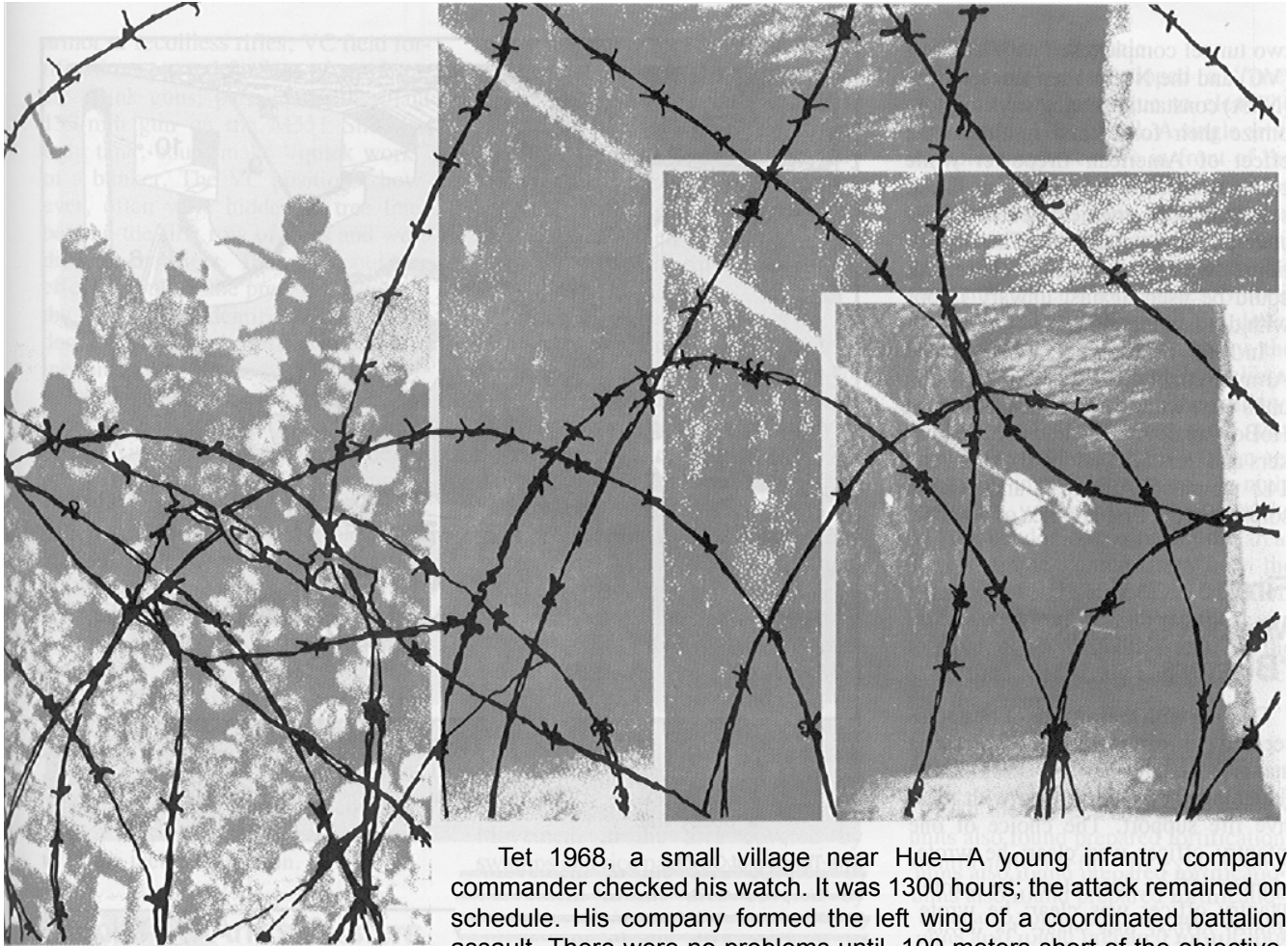
- Attriting the enemy combined-arms team. We can separate the enemy's soft targets from its tanks and then canalize the enemy's armor into anti-armor kill zones where we can engage it with ATGMs and tank fires.

The final lesson we can learn is the absolute requirement for a comprehensive defense of the rear area, which the Egyptians also demonstrated during the Yom Kippur War. Qualified artillerymen must plan realistically to acquire targets and coordinate the fires in the rear. The American artillery also must have the weapons and personnel to defend against breakthroughs by enemy armored formations. These anti-armor defenses must be adequate to "buy time" to displace our batteries successfully.

The Ramadan War provides the most recent example of mid-intensity conflict using both American and Soviet weapons and doctrine. Although most writings about this War have concentrated on the eventual success of the Israeli tank against the Egyptian ATGM, the artillery was the greatest killer on the battlefield. Egyptian fire support successes and failures demonstrated its impact on the outcome of the War. We must accept and profit from these lessons.



Captain (P) Robert D. Lewis, SF, won Honorable Mention in the US Field Artillery Association's 1988 History Writing Contest with this article. He is the only contestant to have two articles place in the Contest. Captain Lewis is the S3 of the 2d Battalion, 10th Special Forces Group (Airborne), Fort Devens, Massachusetts. He commanded B Battery and Service Battery of the 1st Battalion, 36th Field Artillery, in US Army, Europe, and later transferred to Special Forces.



Fortresses and Firepower in Vietnam

by Captain James J. Carafano

One captain's bitter lesson in the balance of fire, maneuver and position recalls an often-neglected aspect of battle in Vietnam. Fighting from prepared positions was a constant in this war without fronts. Defense Department estimates concluded that during one period, for example, almost 40 percent of the combat actions included fighting

Tet 1968, a small village near Hue—A young infantry company commander checked his watch. It was 1300 hours; the attack remained on schedule. His company formed the left wing of a coordinated battalion assault. There were no problems until, 100 meters short of the objective, automatic fire from concealed positions slammed into the advancing troops. The company commander relayed to his platoon leaders the order from battalion: "Pull up." A network of invisible bunkers and trenches constructed just short of the village infested the area.

For the next four hours, the battalion called in air strikes, artillery and naval gunfire. The battalion commander employed massive American firepower to bulldoze the way for his advance. As shells ceaselessly smashed the earth, the young commander's troops hugged the flank of a line of burial mounds. Finally at 1745 hours, the order came—"Move out." The left trench complex was clear, but just as the company reached the outskirts of the village, the right trench line opened up. Heavy machine gun fire, small arms and captured American claymores leveled the company. Within 15 minutes, the battalion as a whole suffered 10 dead and 45 wounded. Smothered by a blanket of enemy fire, it took the young commander two hours to extract his unit completely. They never reached the objective. **What went wrong?**

against static positions (*Pentagon Papers*, Gravel Edition). In a war best remembered for the sound of chopper blades cutting air and the superior mobility of American forces, forgotten is the significance of fortified positions in modern combat and their intricate relationship with the employment of indirect fire support.

The Enemy's Tunnels

In the year before the Tet Offensive, a young engineer lieutenant spent what was probably his worst Christmas ever. For two weeks he was assigned to work with an infantry company clearing enemy fixed positions. In this short time, his platoon destroyed 150 bunkers and

two tunnel complexes. The Viet Cong (VC) and the North Vietnamese Army (NVA) constantly sought ways to economize their forces and minimize the effect of American firepower while continuing to inflict casualties. Their solution, as the engineer lieutenant discovered, was to dig in. These positions, well-covered and concealed, could be used against unwary troops with devastating effect.

In 1966, for example, American and Army Republic of Vietnam (ARVN) units were working in tandem along the HoBo Canal. A VC ambush from bunkers and trenches yielded 67 killed and 142 wounded American and ARVN soldiers in the first minutes of combat.

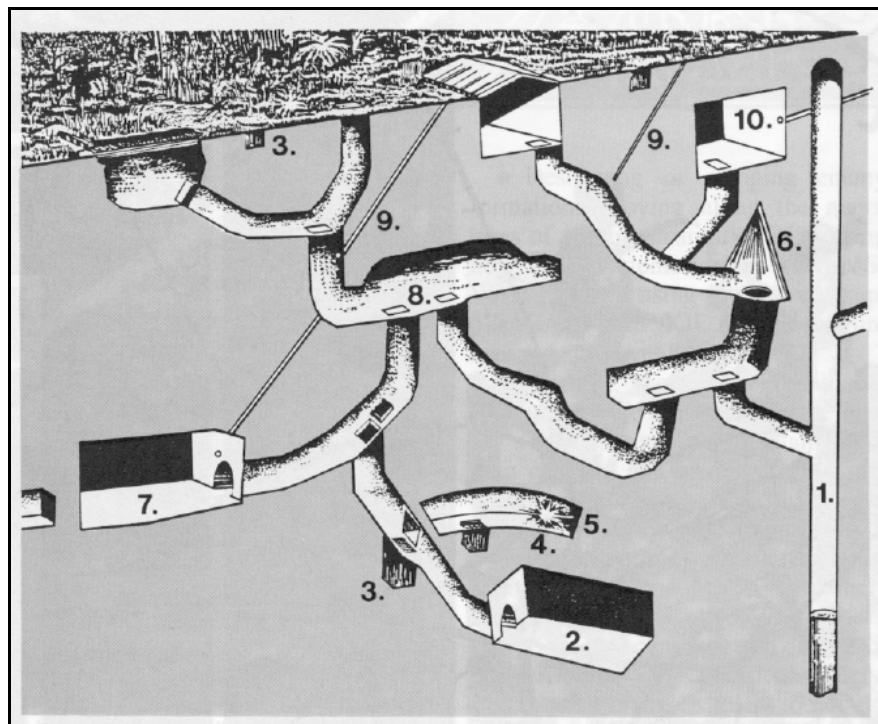
Firepower Versus Maneuver Bunker "Busters"

Dealing with these kinds of obstacles seemed to offer limited choices: a massed assault or limiting casualties by flattening the position first with massive fire support. The choice of one infantry officer was clear; he wrote, "No infantryman should be committed in what some people consider the traditional mass bayonet assault (bayonets are hard as hell to find these days in the infantry) until the position has been so devastated that the trip in is a 'cake walk.'"

Yet overwhelming firepower alone was not the answer to reducing these kinds of fortifications. Mortars, 105-mm howitzers or attack helicopters were usually the most readily available and the first called in, but they were often ineffective. They simply didn't have the punch necessary to "bust" bunkers. Naval gunfire (NGF), 175-mm guns, medium and heavy howitzers or air-dropped bombs could do the job, if delivered with precision and in a timely manner.

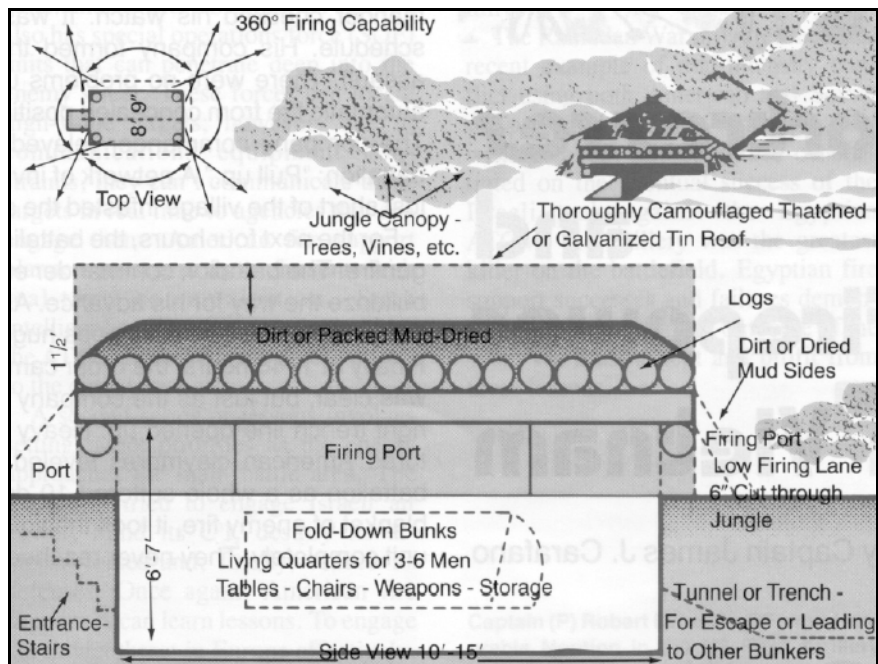
This precision could, however, be a problem. Both NGF and 175-mm guns had a large range probable error and were difficult to employ against point targets. One officer recalled that when his unit received support fires from naval guns, they had to evacuate the whole area before firing to avoid friendly casualties. Unfortunately, when they left, so did the VC.

More than once, the enemy would fight from a position and then exfiltrate before heavy fire support could be



- | | | |
|---------------|---------------------|--------------|
| 1. Well | 5. False Tunnel | 8. Dormitory |
| 2. Storeroom | 6. Air Raid Shelter | 9. Airshaft |
| 3. Punji Trap | 7. Hospital | 10. Mess |
| 4. Booby Trap | | |

The Tunnels of Cu Chi



VC Base Camp Bunker

brought on target. The tactic of limiting US casualties by simply standing off and "letting the firepower do it" gave the initiative of battle to the enemy, and the results for the American forces were often disappointing.

While firepower alone might be inadequate, the "spirit of the bayonet" or infantry assault proved equally disastrous. Unsupported infantry was no match for well-prepared positions. When the "grunts" were backed-up by

armor or recoilless rifles, VC field fortifications proved far less of an obstacle. Tank guns, particularly the giant 152-mm gun on the M551 Sheridan light tank, could make "quick work" of a bunker. The VC positions, however, often were hidden in tree lines beyond the first row of trees and were difficult to detect. Tank fire could be effective only if the precise location of the bunker was identified. In addition, dense jungle terrain restricted employing tanks.

During the course of the War, the Army made significant progress in increasing its area of operations by developing "jungle busting" techniques, such as employing heavy dozer blades (often called Rome plows) to clear vegetation. Still, there were few armor units in Vietnam, and infantry most often went into battle without its support.

When left to themselves, infantrymen often found the light anti-tank weapon (LAW) effective in reducing small bunkers. Anything was preferable to a direct assault, which often proved costly in time and casualties. The key was to find the right combination of firepower and maneuver forces to fit the tactical situation.

Combined-Arms Busters

The best method for taking on VC bunkers required a combination of indirect fire systems as part of a closely coordinated combined-arms operation. For example, 105-mm howitzers could provide air bursts to keep enemy troops out of the trenches and suppress enemy fire while 155-mm or 203-mm howitzers with delay-fuze rounds busted the bunkers. Air-delivered systems could employ what one officer called "snake and nape." "Snake" was a 500-pound bomb with a drag parachute that ensured a vertical descent and, as a result, greater accuracy on point targets. "Nape" was napalm, which proved quite effective in clearing trench lines. In short, adequate fire support against fortified positions had to meet two requirements: air burst ordnance to suppress trench lines and penetration ordnance to reach dug-in troops.

Often, however, even massive fire support was unable to eliminate well-prepared positions completely. Therefore, it was critical to coordinate the ground assault with the supporting fires. The assault had to be timed to move just after the second fires were

withdrawn but before the enemy could regain his balance. In this respect, artillery provided the best support. It was easier to coordinate than aircraft and could be brought in closer to friendly troops. "If I had my choice," one officer recalled, "I'd call in artillery to get things started, then snake and nape, then follow up with artillery and a coordinated assault."

Critics of American tactics in the Vietnam War often argue that our over reliance on firepower and concern for minimizing casualties resulted in a lack of offensive spirit and an inability to defeat a more agile, clever enemy. Although it is clear some units did indeed employ poor tactics, such shortfalls were not endemic to the American way of war. The dilemma of fire and maneuver was not unsolvable; an intelligent balance could be found.

In 1968, an infantry battalion conducted operations along the Hoc Mon Canal, west of Saigon. In the past, the VC often moved throughout the area with impunity. The battalion commander decided to start a campaign of aggressive patrolling to push them out. Movement in the area covered by swamps and rice paddies was limited to the hard dike lines that boxed the paddies. The VC constructed many expertly camouflaged bunkers in the dike lines. Since the terrain offered little opportunity to surprise, maneuver or assault the positions directly, it proved to

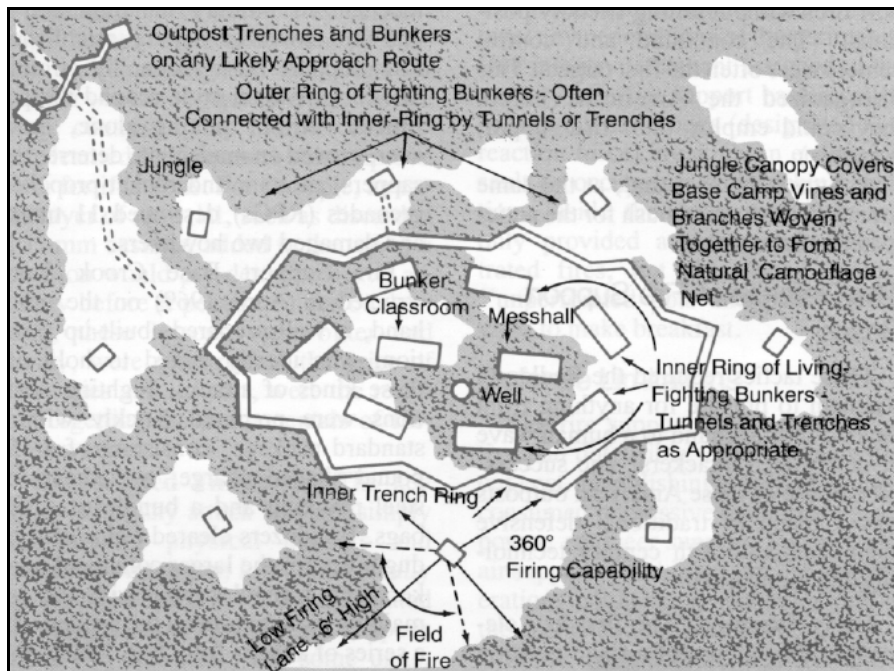
be a significant obstacle.

The battalion developed a "one-gun" artillery technique to clear the path ahead of the patrol. A single artillery piece adjusted fire in front of the infantry, destroying the dike line as the patrol advanced. This conserved ammunition, neutralized any hidden bunkers and minimized damage to the surrounding fields and paddies. Since it was impossible to disguise the direction the patrol was taking anyway, the infantry sacrificed nothing by deliberately clearing its way with the artillery.

The battalion followed these successful daylight operations with an aggressive, innovative series of night ambushes, which eventually forced the VC to abandon operations in the area. This example demonstrates how the balance of firepower and maneuver offered a compromise between the desire to hold down casualties and, at the same time, decisively engage and defeat the enemy.

America's Fortress War

Like the enemy, American artillery units also found prepared fortifications significantly useful. To exploit superior US firepower and the mobility offered by helicopter transport, the artillery created fire support bases. The fire support base was essentially a small fort that could be established almost anywhere to deliver indirect fire



Schematic of Typical Fortified VC Base Camp — Usually Platoon or Company Size

support for maneuver operations and provide its own security.

These bases often would become the focus of NVA attacks. This became especially true after the Tet Offensive in 1968 failed to achieve a general uprising in the South. Faced with massive casualties in NVA and VC main force units, the North needed a new strategy. It had to continue to inflict American casualties to exploit growing opposition to the War in the US and economize its efforts to allow time to refit and rebuild its army. Its solution was to increase the tempo of attacks against fixed installations where it could control losses and the pace of the battle more easily.

The Threat

To counter the fire support base, the VC and NVA couldn't rely on classic siege techniques since it was impossible to secure the time, manpower and fire support necessary to conduct formal sieges. Instead, they adopted the following tactics:

- Harass the base with mortars or attempt to infiltrate the perimeter with sappers carrying satchel charges.
- Attack during darkness when the US couldn't employ indirect fire systems as effectively as in daylight.
- Conduct a massed lightning assault to penetrate the perimeter before the artillery could fire its final protective fires (FPF) and employ "hugging tactics" so the US couldn't call in support fires without hitting friendly positions. (The command and control centers were often the first targets. This disorganized the Americans before they could employ their fire support systems.)
- Attack the base and, at the same time, establish an ambush for the anticipated relief column.

The Defense of Fire Support Bases

These tactics required the Redleg in Vietnam to prepare for anything from the odd mortar round to a human wave of determined attackers. The successful defense of these American outposts was a blend of traditional defensive techniques and 20th century technology and innovation.

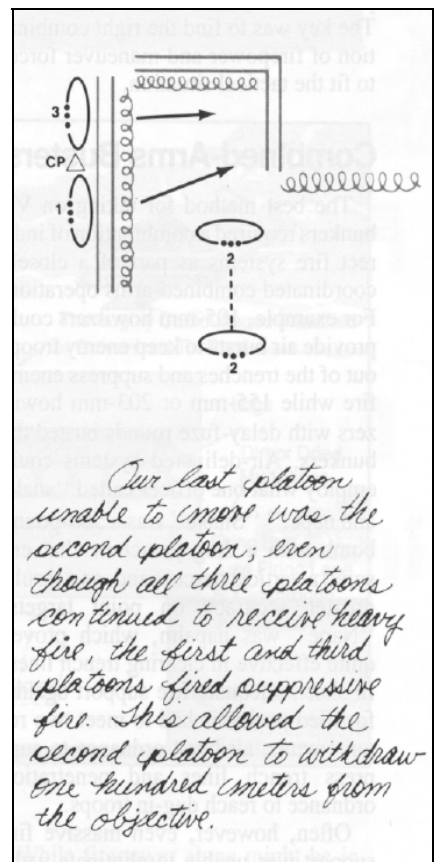
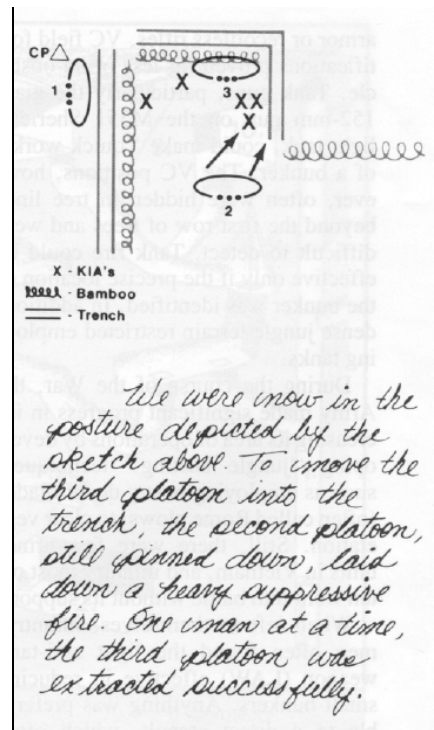
Early Warning. The first key element in the defense of a fixed position was early warning of an enemy attack. The NVA and VC used their experience

and stealth as jungle fighters to close with and even penetrate the perimeter of a base without detection. At the battle of Landing Zone (LZ) Bird in 1966, for example, the forward line of one NVA battalion crept within 12 meters of the perimeter and remained there six hours without being detected. The defenders of LZ Bird might have been alerted to the infiltration if they had established listening or observation posts around their positions or conducted patrols outside the perimeter. Failure to accomplish these requirements for a static defense resulted in the base's quickly being penetrated when the attack began.

In the later years of the War, American forces discovered that technology skillfully employed could supplement, although never completely replace, basic defensive techniques. For example, key to any defense was an active intelligence-gathering system that would alert defenders to the enemy's intentions. They could use starlight scopes, electronic sensors and radar to extend the fire support base's observation of the battlefield. One artillery lieutenant recalled how his unit beat off a sapper attack because its radar identified the enemy's mortar positions. The artillery quickly "took out" the VC mortars, and the VC's unsupported ground attack was beaten off easily.

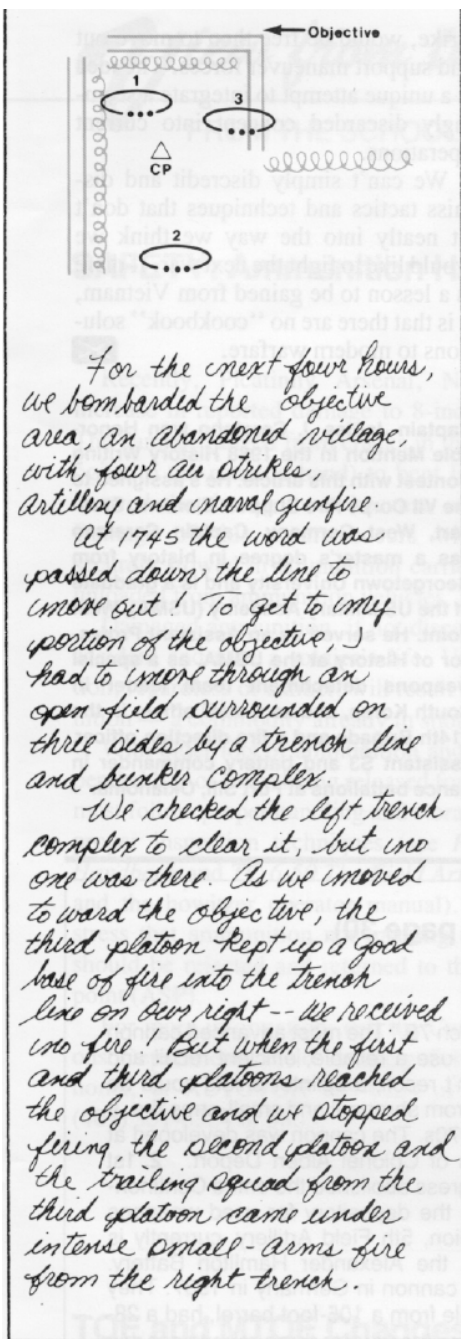
Fortification. Digging in and fortifying the perimeter also enhanced survivability. In February 1968, a mechanized infantry battalion and a 155-mm howitzer battery established Fire Support Base Jaeger by circling the tracks wagon style around the perimeter. Armor plating alone, however, proved an inadequate deterrent as sappers, mortars and rocket-propelled grenades (RPGs) destroyed 11 tracks and damaged two howitzers.

Fire Support Base Crook (constructed in April 1969) on the other hand, a well-prepared, built-up position, was ideally suited to hold off these kinds of attacks. Fighting positions were prepared quickly with a standard package, consisting of a 15-pound shaped charge, two sheets of steel planking and a bundle of sandbags. Bulldozers cleared fields of fire, dug holes for the larger command bunkers and formed berms with the remaining earth to protect the artillery. In a series of attacks from 5 to 7 June, the defenders suffered few casualties while killing more than 400 of the assaulting



force.

As the War progressed, American units became convinced the key to defeating assaults on the fire support base



was to emphasize preparing these static positions. Increasingly, they used engineer support to enhance the survivability of fortifications.

If the enemy employed medium or heavy howitzers, the requirements for preparing a static position became even more elaborate, as the Marines who defended the combat base at Khe Sanh in 1967-68 found out. The Marines received mixed reviews on their efforts to fortify the base. However, their howitzers were well protected during the two-month siege. Enemy fire only destroyed four pieces, one of which was a 155-mm howitzer parked in the open

waiting for airlift to Dong Ha. Preparation of the rest of the Base against heavy artillery, however, proved inadequate. Hits on the largest ammunition dump set off a chain of explosions that burned for two days. Although some journalists attributed these shortfalls to Marine bravado ("Digging in is not the Marine way"), a number of more practical limitations better explain the obstacles to fortifying Khe Sanh.

Unlike the determined defenders who fought from entrenched positions along the demilitarized zone (DMZ) in the last year of the Korean War, the American infantryman in Vietnam had little practice or expertise in preparing elaborate defensive positions against heavy artillery. Constructing a fortified bunker on the Korean model was a lost art. For much of the War in Vietnam, typical bunkers constructed by forward infantry units were thrown together quickly, were designed to be occupied for only a few hours and provided protection only against small arms and the occasional mortar round.

The Marines' bunker-building efforts were hampered further by poor terrain and flooding from the monsoon rains. When the Marines received medium and heavy artillery fires, it became apparent many of the bunkers were inadequate.

Since the Khe Sanh Base was under siege and could be resupplied only by air, heavy construction material was at a premium. There were plenty of sandbags, but the essential element for bunker building—logs or thick cuts of lumber—were in short supply. As the siege continued, the Marines eventually learned techniques to help improve their fortifications. For example, an extra layer of material, such as discarded 105-mm casings, added to the top of a position would pre-detonate heavy artillery before it penetrated the bunker. Still, these lessons were bitter and costly, were relearned at the price of casualties and, in part, were the result of forgetting the fundamentals of fortress warfare.

Coordinated Firepower. The key to repelling any attack was not simply constructing physical barriers and overhead protection; it required a fully coordinated defense. This necessitated the integration of FPFs for all weapons along the perimeter. For some units, this included air defense systems such as the Duster (twin 40-mm guns) or

Quad .50-caliber guns. The howitzers used the newly developed "Beehive" round and "Killer Junior" (a 105-mm high explosive round with variable time fuze and a minimal time of flight) or "Killer Senior" (155-mm) in the howitzers' new role as assault breakers for attacks on the perimeter.

Surprisingly, many artillerymen found more use for the "killer" technique than in the vaunted Beehive round. The killer technique required no special shell or fuze. Its dispersal pattern exceeded the Beehive's. The Beehive flechettes dispersed in a gradually descending horizontal pattern and couldn't cover depressions. In some cases where howitzers were dug-in behind built-up berms, the tubes could not depress to cover the area immediately in front of the position. The VC sappers were able to escape the effects of the Beehive by crawling along the ground. On the other hand, the killer burst in all directions, creating a wall of flying steel in front of the howitzer.

In addition to the base's FPFs, the fire direction center or command post would coordinate air support and fires from mutually supporting artillery units. During night attacks, these units would respond with a combination of high explosive and illumination rounds. The result was that when all indirect fire systems were brought into play, they were a formidable obstacle.

Reaction Forces. As in any positional defense, a well-prepared unit also would establish a reaction force to repel any penetrations of the perimeter. One infantry lieutenant assigned to the security of a fire support base recalled he actually saw cooks (designated as a reaction force) break up an enemy assault by occupying two blocking positions inside the perimeter. They not only provided accurate and concentrated fires, but also found enough "unperforated pots and pans" afterward to make breakfast.

Defense Limitations

The fire support base, while effective and defensible, didn't come without cost. Establishing a deliberate base consumed impressive amounts of manpower, engineer support, logistics and air support. In addition, predictable operations could telegraph intentions to the enemy and limit initiative.

Some commanders worried about "fire base psychosis" or the reluctance of units to maneuver outside the support

of a base's indirect fires and fight the enemy on equal terms. As a result, some critics argued the VC simply could draw a circle with a 10,000-meter radius around a newly inserted fire support base (approximate range of a 105-mm howitzer) and operate with impunity outside that circle.

Establishing fire support bases before major operations might alert the enemy to the intentions of US forces. On the other hand, emplacing bases could be a deception. For example, a number of positions might be reconnoitered and prepared to confuse the enemy. Establishing these bases was a significant factor in tactical and logistical planning. But in a war without fronts, it was difficult to measure the impact of tactical innovation. No data indicate the success of deception efforts or the extent of the impact of "fire base psychosis" on unit operations. Still as the War progressed, Americans became convinced that investing time, resources and manpower in fixed positions paid dividends.

Fortresses, Firepower and the Future

Combat in Vietnam demonstrated that the fixed position still is useful on the modern battlefield. Positional warfare is neither inherently good nor bad; nor is using massive firepower necessarily stupid, immoral or wasteful. The key is to assess use to balance objectives and available resources within the context of the commander's operational plan and the enemy's intentions and capabilities.

The relationship of firepower and maneuver is dynamic. History can't prescribe how this balance will tip in the future. For example, in Western Europe today, as the trend accelerates away from nuclear war-fighting, fixed positions may be useful. VII Corps recently has developed a technique where its artillery could occupy protected positions against the anticipated artillery preparatory strike that would precede a general Soviet offensive. The American artillery, having survived the initial

strike, would be free then to move out and support maneuver forces. The idea is a unique attempt to integrate a seemingly discarded concept into current operations.

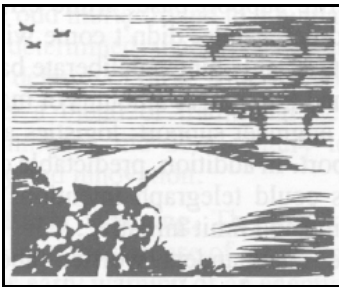
We can't simply discredit and dismiss tactics and techniques that don't fit neatly into the way we think we would like to fight the next war. If there is a lesson to be gained from Vietnam, it is that there are no "cookbook" solutions to modern warfare.



Captain James J. Carafano won Honorable Mention in the 1988 History Writing Contest with this article. He's assigned to the VII Corps Fire Support Element, Stuttgart, West Germany. Captain Carafano has a master's degree in history from Georgetown University and is a graduate of the US Military Academy (USMA), West Point. He served as an Assistant Professor of History at the USMA, as a special weapons detachment team leader in South Korea, and as a staff officer in the 214th Brigade and a fire direction officer, assistant S3 and battery commander in Lance battalions at Fort Sill, Oklahoma.

Answers to Level 3—King of Battle History Quiz (see quiz, page 30).

1. The 75-mm field gun, model of 1897—the "French 75." The most advanced cannon of its time, it was the first Field Artillery piece to use a reliable, efficient recoil and recuperator system. Because the entire gun didn't recoil, a splinter shield could be placed in front of the gunners to protect them from shrapnel and small-arms fire. It was still in service in some countries in the late 1970s. The cannon was developed at Puteaux Arsenal near Paris, under the direction of Colonel Albert Deport. 2. 1st Battalion, 5th Field Artillery. On 2 June 1784, Congress abolished the entire Continental Army. It did, however, retain the Battalion as the depository for used weapons accumulated throughout the War. The 1st Battalion, 5th Field Artillery, currently is at Fort Riley, Kansas, and includes D Battery, the Alexander Hamilton Battery. 3. "Gustav" and "Dora." Krupp built two of these cannon in Germany in 1937. They each had an 80-cm caliber, fired a 7.5-ton projectile from a 105-foot barrel, had a 28-mile range and weighed 1,500 tons. These weapons fired two to three rounds per day and had an estimated life of 100 rounds. A detachment of 1,500 men commanded by a major general served in each gun-crew. 4. The Columbiad cannon, which incorporated the first perfected fretage method of barrel manufacturing. It was used primarily by coastal artillery but also by Field Artillery as a siege weapon. 5. Artillery School of Practice, April 1824. Secretary of War John C. Calhoun ordered the Army to establish the School at Fort Monroe, Virginia. After graduating from the US Military Academy, West Point, each lieutenant assigned to artillery received one year's additional training from artillery instructors in mathematics, engineering, chemistry and drawing. 6. 1953 at Frenchman's Flat, Nevada. An Army 280-mm gun, nicknamed "Atomic Annie," fired the projectile. 7. Lance surface-to-surface missile, brought into service in 1972. 8. 1LT Adelbert Ames, 5th US Artillery. He won the Artillery's first Medal of Honor at the First Battle of Bull Run, 21 July 1861. He remained in command of a section and continued to direct fire after being wounded severely. The US Army Field Artillery Training center, Fort Sill, has a training area named after him. 9. January 1911, Captain (later Major General) William Josiah Snow. 10. Originally an abusive term, it insinuated the person was the son of one of the camp followers accompanying the "Trayne d' Artillerie" on campaigns.



View from the Blockhouse

FROM THE SCHOOL

SAFETY: Ammunition Handling

Recently, Picatinny Arsenal, New Jersey, cited an increase in reported damage to 8-inch (M106) projectiles. The damage ranged from cracks in the projectiles (from the ogive to the rotating band) to bent lifting plugs. Evidence showed the damage was because of *improper handling*. Damage of this nature occurs when projectiles aren't securely stowed in ammunition carriers or when carelessly unloaded from ammunition vehicles.

Damaged ammunition, if not discovered, could cause an accident and take a soldier's life. Unserviceable ammunition, regardless of caliber, will result in less training ammunition — a commodity already in short supply.

With older lots of ammunition and other previously suspended lots of fuzes being released for training, artillerymen must follow proper handling and storage procedures and use proper inspection techniques (see *FM 9-13 Ammunition Handbook* and *TC 6-50 The Field Artillery Cannon Battery* and the howitzer operator manual). Commanders should stress that ammunition not meeting the inspection criteria should be rejected and returned to the ammunition supply point (ASP).

For more information, call the Cannon Division, Weapons Department, Field Artillery School, Fort Sill, Oklahoma, at AUTOVON 639-6224 or 5803 or commercial (405) 351-6224 or 5803.



An M106, 8-inch Projectile with a Crack the Length of the Shell Casing.

TOE and MTOE Changes

The following information should help resolve many units' questions about tables of organization and equipment (TOEs) and modified tables of organization and equipment (MTOEs). The US Army Field Artillery School (USAFAS) develops the TOE using the latest doctrine and regulatory guidance. Essential references other than Field Artillery doctrine are *AR 570-2 Manpower Requirements Criteria (MARC)—Tables of Organization and Equipment*, *AR 310-34 The Department of the Army Equipment Authorization and Usage Program* and *AR 611-201 Enlisted Career Management Field and Military Occupational Specialties*.

The TOE is a "requirements" document with three levels. Level 1 documents the minimum essential

personnel and equipment required to perform the unit mission. Levels 2 and 3 reduce the unit strength and capabilities by about 10 percent each time. A unit organized at Level 3 has about 80 percent of the capabilities of a Level 1 unit.

After developing it, the Training and Doctrine Command (TRADOC) and the Department of the Army (DA) review and approve the TOE, which the Major Army Commands (MACOMs) receive next. The MACOMs create a specific unit MTOE, or "authorization" document, from the TOE. Each MACOM considers both modernization equipment fielding and the resources available within the MACOM when developing the MTOE. The MACOM commander then allocates these available resources, and the MTOE

developers implement the MACOM commander's guidance in the unit MTOE.

However, there may be serious differences between the TOE and the MTOE. For example, authorized level of organization (ALO) reduction to ALO 2 or 3 reduces the number of personnel authorized in the unit. By reducing ALO levels, the MACOM commander can use personnel resources to create more units, though the units can't perform as well as when manned at ALO1.

A unit may request a change to the TOE and MTOE. The procedures for each, however, are different. A unit should request an MTOE change if it has a unique requirement—for example, due to local climate conditions or specific operational missions—and send the MTOE change request through the force modernization chain to its MACOM. If the change applies to all units of this type, the MACOM will send the request to TRADOC for a TOE change. TRADOC staffs the request to USAFAS, which considers the requirements of the entire Army when making its recommendation. Units should understand that when requesting personnel changes, they should offer personnel trade-offs for any additional personnel requested.

A unit can submit a TOE change request directly to USAFAS, using DA Form 2028 Recommended Changes to Publications and Blank Forms. The TOE change request should apply to all similar units. Using doctrinal or regulatory references (if possible), the request justification must illustrate clearly the benefits of the item of equipment. Nice-to-have items are not appropriate for TOE change

requests. If USAFAS makes a recommendation for approval, it acts to have the change included in the TOE.

DA has directed that substantive changes (increases in personnel or equipment) to the H- and J-Edition TOEs be held until the resources are available to implement the change. Changes to L-Edition TOEs are accomplished more easily. However, the change may not appear in unit MTOEs until 18 months to two years after the TOE change. It takes this time for the MACOM to include the changes in a future MTOE.

Some recent changes include:

- The division artillery (Div Arty) TOE will get a two-man (captain and sergeant first class) fire support section for each attack helicopter battalion in the division. The corps artillery headquarters and headquarters battery (HHB) will get five sections for the attack helicopter battalions in the corps aviation brigades.

- A communications terminal—AN/UGC-74A(V)3 (LIN V36146)—is documented incorrectly in the survey platoon headquarters of the Div Arty HHB in TOE 06302H000, 06302J200 and 06302J400. The 24th Infantry Division Artillery, Fort Stewart, Georgia, detected the error and called USAFAS, which notified the MACOMs of the error.

For more information on the TOE or MTOE process or on unit TOEs, write to USAFAS, Directorate of Combat Developments, Organization and Personnel Division, Fort Sill, Oklahoma 73503-5600, or call AUTOVON 639-2726 or 6084 or commercial (405) 351-2726 or 3702.

Redleg News

ITEMS OF GENERAL INTEREST

Soviets Revive Heavy Artillery Formations

The introduction and mastery of the new generation of heavy artillery systems has resulted in the USSR's paying greater attention to heavy artillery and dedicated, major artillery units. After a growing emphasis on the integration of battalion-sized "divisions" and batteries into combined-arms, reinforced battalions and regiments, the Soviets have revived interest in the use of heavy and long-range, large artillery formations. Of special significance are the reorganized artillery division (ArtDiv) and the new, high-powered artillery brigade (HP ArtBde).

The emphasis in these new units is on self-propelled (SP) mortars and tube and rocket artillery, with surface-to-surface missiles absent from the tables of organization and equipment (TOEs). The USSR always has given priority to artillery, although between the mid-1970s and the mid-1980s, the heavy artillery received secondary consideration behind the sub-units assigned to the

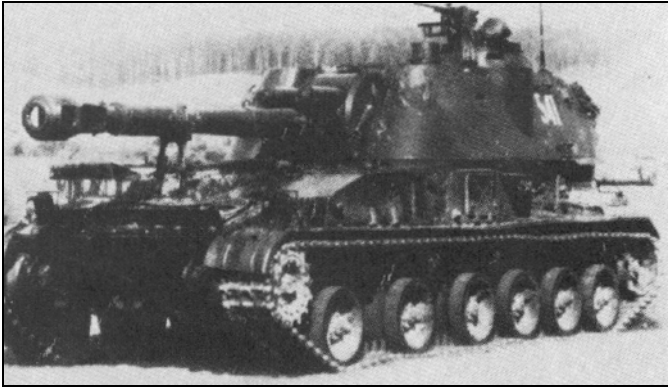
combined-arms units.

Artillery units designed to operate at the tactical level were broken into battalion-level sub-units and batteries and assigned to the combined-arms reinforced battalions and regiments so they could cope with the growing rate of advance and tactical flexibility of the non-nuclear battlefield. The Soviet return to the primacy of the non-nuclear battlefield and especially the anticipation of heavy attrition and demand for reinforcements and reserves, brought back the interest in heavy artillery. Soviet studies pointed to the revival of monolithic ground-force sub-units and formations in the front line.

The Soviets have intensified their organization of artillery brigades and divisions since 1985 as their handling of the new artillery weapons and their ammunition improved. At present, there are two unit TOEs and several variations that reflect the Soviet adaptation of the TOE.



Artist's Impression of the 203-mm Self-Propelled Gun SO-203 (2S7)



The Soviet's 152-mm 2S3 Self-Propelled Howitzer

The HP ArtBde is a flexible artillery unit found in army-and front-level formations. Some HP ArtBdes are well-structured for the possibility of nuclear escalation. These brigades have two batteries of 203-mm SP gun SO-203s (2S7), each with six to eight heavy guns, and two batteries of 240-mm SP mortar SM-240s (2S4), each with six to eight heavy mortars. A derivative of this ArtBde is the heavy ArtBde, which is more flexible.

The heavy ArtBde has two batteries of SO-203s (2S7) and (or) 2S5s, each with six to eight heavy guns, two batteries of SM-240s (2S4), each with six to eight heavy mortars and a

battery of six to eight 220-mm BM-27 (16-round) multiple rocket systems, all self-propelled. In addition, there is a headquarters company with reconnaissance, artillery radar, communication and command vehicles. Each battery is assigned specific artillery radar and command vehicles, also. The 40th ArtBde (Heavy) deployed in Kabul-Baghram is one of the first heavy ArtBdes to be so organized.

The reorganized artillery division is built around several single brigades, which in turn can be reorganized into composite, brigade-level task forces. The ArtDiv has two brigades of 2S5s, each with 48 to 64 heavy guns (eight batteries), two brigades of SO-152s (2S3), each with 48 to 64 heavy howitzers (eight batteries), a brigade of BM-27s with 72 systems (eight to 12 batteries) and an antitank regiment with 36 BRDM-3s, each carrying five rail and 10 reload 9M66 (AT-5)—NATO codename Spandrel—antitank guided missiles.

Each headquarters from division down to battery level has the appropriate command, communications, reconnaissance and artillery radar vehicles as required for the effective use of the sub-unit. Most of the ArtDivs on the frontiers of the USSR are organized more or less according to the structure.

The growing emphasis on non-nuclear, offensive military operations, especially sudden and highly flexible surges at the initial stage of the war, forced the Soviets to introduce a sharp distinction between nuclear-capable sub-units designated for the possible use of nuclear artillery munitions and nuclear-capable sub-units not expected to deal with nuclear munitions until special demands so dictate.

The ArtDivs expected to operate on the main axes of advance were reinforced with a special HP ArtBde, which retains its unique position within the divisional organization. This brigade is an addition to the regular divisional TOE. Recently, the 34th ArtDiv in Dazū, East Germany, was organized in such a manner.

The extent of the revived Soviet commitment to heavy artillery as a primary weapon system became apparent when a new, towed gun, the 152-mm M-1976, was introduced in the early 1980s. It is a towed version of the 2S5. The primary objective of the acquisition of these guns is to upgrade the performance and capabilities of the artillery divisions in the reserve and rear-area fronts. This upgrade includes 130-mm M-46 and 122-mm D-20 towed guns, as well as BM-21s and T-12 and T-12A antitank guns. The nuclear-capable M-1976 enables these artillery divisions to cover the scope of missions expected from the new ArtDiv, albeit with reduced performance, speed or flexibility. Several towed artillery sub-units are deployed in the frontiers where they are earmarked for operations against known objectives, primarily counterbattery preemptive fire.

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