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Conflicts Of The Past As Lessons For The Present

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THE FUTURE OF U.S. ARTILLERY

IN THIS ISSUE

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Radically Rethinking the Field Artillery

By General Michael Combest

Introduction

The era of Great Power competition and confrontation has returned. The United States and its Western friends and allies face an increasingly hostile and assertive alliance of the People's Republic of China, Russia, Iran, North Korea, and their surrogates. The danger of direct military confrontation with these belligerent forces is significant and growing.

To protect America and American interests in this dangerous era, the U.S. military must be capable of decisively defeating modern, well resourced, very capable adversaries. Equally important, the U.S. military must be seen by likely enemies to be capable of decisively defeating any adversary, thereby deterring aggression and preventing war.

To be judged capable of defeating armed aggression, U.S. military forces must demonstrate an ability to apply military power around the globe in ways that adversaries can neither match nor endure. To do this, the U.S. force must transform. It must transform what it fights with, how it fights, and how it organizes to fight. A key part of this transformation will be using newly proven and still emerging technologies in ways that generate orders of magnitude more combat power than does today's force.

An essential part of this transformation must be making the nation's Army much more lethal, sustainable, and rapidly deployable than it is today. A key to achieving that objective is to make fundamental changes to the Army's principal source of lethal combat power—the Field Artillery—and radically rethink its role in land combat.

Radically Rethinking Field Artillery in Modern Combat

U.S. land combat is predominately executed by Combined Arms Teams which combine infantry, armor, artillery, and aviation elements to accomplish specific missions. These teams "Fire and Maneuver" to win tactical engagements and battles large and small; i.e., they maneuver to deliver lethal fire against enemy forces, and they deliver lethal fire to create opportunities to maneuver.

This "Fire and Maneuver" construct is the foundation of U.S. ground combat. The number and nature of "Fire and Maneuver" options available to Combined Arms Teams are largely determined by how precise and accurate or imprecise and inaccurate the team's Field Artillery fire is—and conventional Field Artillery is woefully imprecise.

The mainstay of U.S. Field Artillery is cannon fire, which mainly consists of exploding 155-millimeter projectiles. Fired at maximum ranges, conventional cannon artillery has a Circular Error Probable (CEP) of more than 250 meters.¹ As shown in Figure 1, CEP is the distance from a target at which 50% of fired rounds will land beyond, and 50% will land inside of the intended target.

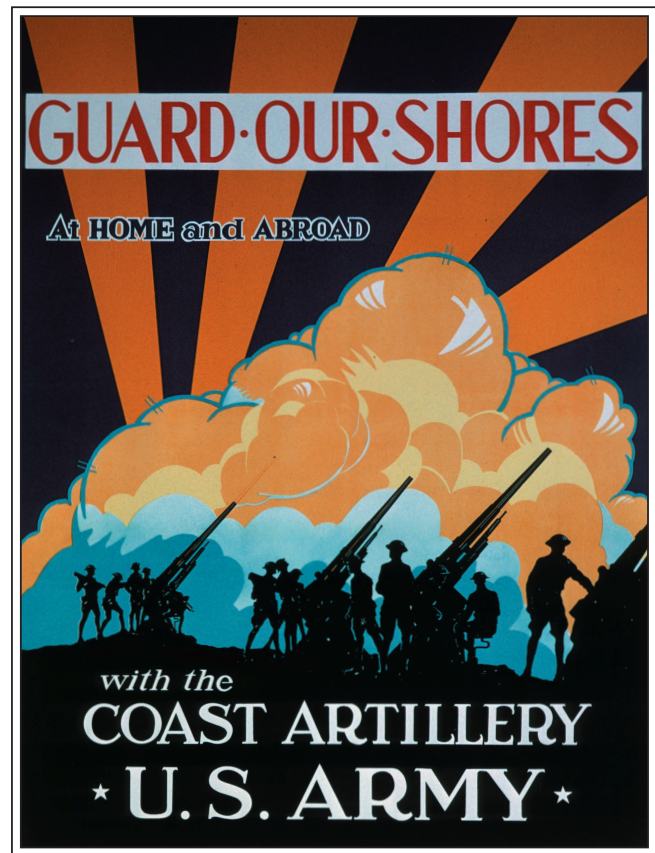


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Figure 1

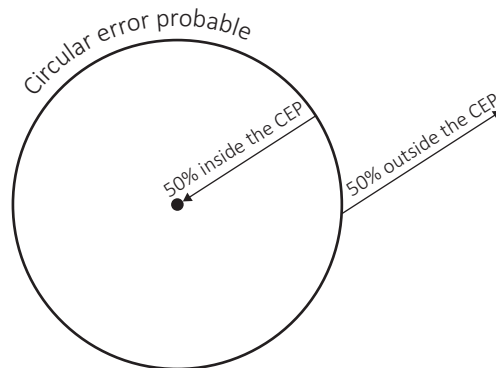
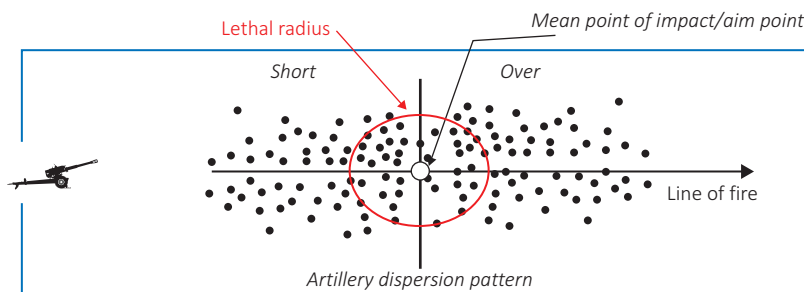


Figure 2



This CEP of 250 meters is five times the 50-meter kill radius of standard U.S. 155-millimeter projectiles.² In practical terms, this means that every conventional round fired has a greater than 50% chance of landing too far from its target to kill or damage it. In fact, only 25% of rounds fired will land within 100 meters of a targeted aim point; fewer still will land within 50 meters—about 12.5%.³

This lack of precision is not due to human error. It simply reflects inaccuracies inherent in shooting unguided projectiles 20-plus miles through constantly changing weather conditions into varying terrain—from weapons systems whose performance characteristics change with every round fired. Simply put, the standard Field Artillery system used today is too inaccurate to rapidly deliver the precise, deadly fires that modern ground combat requires.

Figure 2 shows a standard dispersion pattern for cannon artillery. As seen, a small minority of rounds impact close to the target, with only about 12.5% of rounds landing close enough to seriously damage or destroy the target being engaged.⁴

Field Artillery in Modern Combat

Despite its inherent imprecision and large dispersion patterns, history teaches, and modern conflicts confirm, that Field Artillery is very often the decisive element in ground combat at all levels of war. In the ongoing Russia–Ukraine war, Field Artillery fires routinely decide the outcome of small unit engagements, large scale tactical fights, operational level battles, and strategic outcomes.

Russia–Ukraine also confirms that conventional cannon fires are rarely rapid and accurate enough to decide fights quickly. Instead, reliance on conventional cannon artillery to decide engagements and battles is a recipe for battlefield stalemate and for sliding into wars of attrition and exhaustion. These are exactly the types of wars the United States seeks to avoid.⁵

The Army's Transformation Mandate

For a decade, Army leadership has mandated that transforming how the Army fights is an urgent, non-negotiable priority. But the Army hasn't met this mandate. While there have been significant technological innovations, a review of the most recent doctrinal publications shows that the Army operates essentially the same way it did 40 years ago. It organizes in roughly the same way and employs the nearly same operational doctrine.⁶ Most technical advances have been appliquéd onto long-standing structures and tactics. And as Theodore Tropp and others note, militaries that simply insert new technologies onto existing force structures and doctrines do worse than fail to capitalize on the battlefield potential these new technologies promise. They actually diminish the operational dexterity and power of the formations using them.⁷

One enterprise the Army can undertake immediately to achieve its mandated transformation is radically rearm, reorganize, and redoctrinate the Field Artillery, especially cannon artillery.

Precise Cannon Artillery

The U.S. Army has already developed and fielded artillery weaponry that can dramatically improve the speed and power with which Combined Arms Teams engage enemy forces, and help achieve the transformational advantages required to prevail in twenty-first-century warfare.

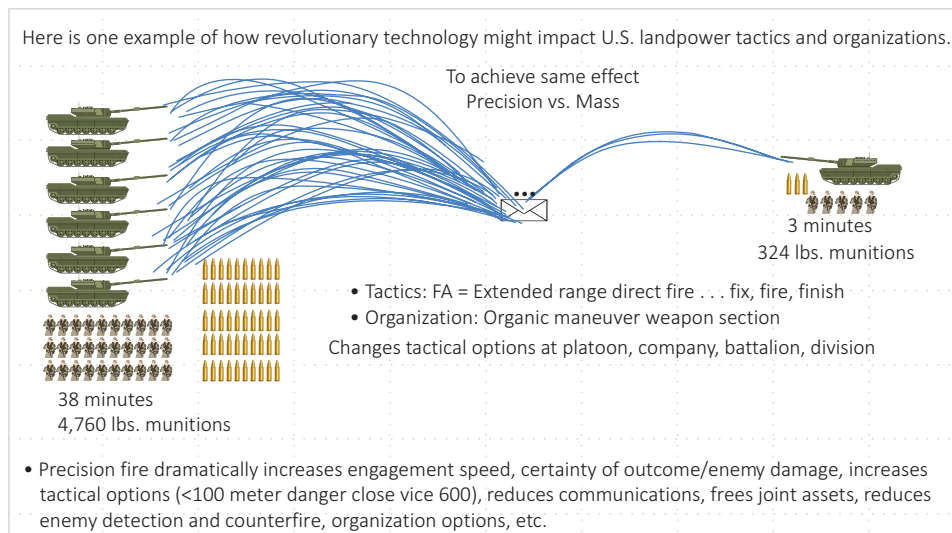
Two examples of this weaponry are the M982 Excalibur artillery round and the M1156 Precision Guidance Kit (PGK). These two developments eliminate cannon artillery's imprecision/dispersion problems.

Fired at its maximum range of 22 miles, the Excalibur has a CEP of 4 meters and has a greater than 95% probability of detonating within 10 meters of a designated target.⁸ Artillery rounds fitted with the PGK and fired at maximum range of 20 miles have a CEP of 50 meters.⁹ The battlefield consequences of this improvement in accuracy are potentially revolutionary. A Combined Arms Team that uses Excalibur ammunition can bring accurate, deadly fires to bear at unprecedented speed with unprecedented combat efficiency.

Consider, for example, an attack against an enemy platoon of about 30 soldiers (figure 3).

Using conventional artillery ammunition, a Field Artillery unit would need to fire 43 rounds (4,800 lbs.) of ammunition to have a 57% probability of destroying an enemy platoon. The engagement would take about 30 minutes and require at least 6 howitzers and 34 soldiers.

Figure 3



have a 95% probability of destroying that platoon by firing just 3 rounds (324 lbs.) from one gun, requiring 5 soldiers.

The operational and logistical impacts of this improved capability can be enormous. Operational impacts will most likely be realized in terms of increased operating speed and the enemy's morale destruction. A unit that can threaten an enemy's destruction tenfold faster than is currently possible gains decisive physical and psychological advantages over that enemy.

"Speed Kills" is an adage that speaks to the decisive impact of being able to repeatedly start and complete a tactical cycle or multiple tactical cycles faster than one's enemy. Being able to constantly outpace one's enemy with deadly fires and disorienting maneuver generates a battlefield confusion that leads to cascading degradation of the enemy's ability to fight. All our likely adversaries speak to the decisive advantages that superior battlefield speed generates. For example, China's new operational doctrine declares that war is a contest of "speed (and) . . . combat efficiency."¹⁰ Precision artillery ammunition creates an ability to generate operating speed and battlefield agility that current indications show China's People's Liberation Army and other modern forces will almost certainly be unable to match.

The logistical impact of precision artillery is equally important. In Figure 3's platoon scenario, the U.S. Combined Arms Team destroyed an enemy unit using only 7% of the amount of conventional artillery required. Furthermore, the enemy's destruction required only 16% of the number of howitzers, 15% of the soldiers, etc.

At the small tactical level, this battlefield "savings" is locally important. At the operational and strategic levels, it will likely be decisive. It's a near certainty that U.S. ground combat operations will be expeditionary in nature and take place on foreign shores. Thus, every instrument of war and soldier required to prosecute an overseas fight must be transported into the theater. This creates SLOC (Sea Lines of Communications) vulnerabilities, port vulnerabilities, Ammunition Depot vulnerabilities, Main Supply Route vulnerabilities on land, etc. Every tool that helps reduce logistics vulnerabilities that must exist throughout a theater of war can be decisive in increasing theater and national strategic force options.

Data from the Russia-Ukraine war illustrate these points. Thus far, both sides of the conflict fired—and continue to fire—incredible amounts of cannon artillery. Russia has fired 20 million artillery rounds while Ukraine has fired over 10 million. In tonnage, that's 1.25 million tons of artillery for the Russians and 620,000 tons for the Ukrainians.¹¹

But that's only a part of the logistics bill that relying on conventional artillery creates. Artillery tubes wear out and must be replaced at a fairly rapid rate. Cannon tubes last about 2,500 rounds.¹² This means that in 2½ years Russia has had to replace about 10,000 artillery tubes and Ukraine, 5,000. These are just parts of a logistics burden imposed by the requirement to field, sustain, and maintain Field Artillery systems that consume 3 million rounds per year and more.¹³

The logistics burden of relying on, but being unable to produce, sufficient conventional artillery ammunition has translated into several periods of operational paralysis.

The Operational Penalty of Imprecision

Consuming colossal amounts of artillery ammunition has substantially dictated the tactical, operational, and strategic pace and nature of the Russia-Ukraine war.

Forces that rely on massed artillery fires operate only as fast as their ability to position howitzers, establish local ammunition distribution points, and position ammunition haulers and other support. At the tactical level, this imposes a slow and deliberate pace that creates multiple opportunities to disrupt preparation and execution.

At operational levels, where major battles and campaigns are conducted, the requirement to position large ammunition stockpiles has severely limited both sides' ability to shift rapidly from defense to offense or

exploit breakthroughs or other opportunities. Feeding their insatiable demand for artillery ammunition has cost both Russia and Ukraine major opportunities.¹⁴

Strategically, options have been severely restricted by an inability to replenish artillery ammunition stocks. Russia purchases from North Korea, China, etc. Ukraine's ability to stay in the fight and wage a defense is determined by its ability or inability to persuade supporters and allies to meet Ukraine's almost bottomless demand for artillery ammunition.¹⁵

At key junctures Russia and Ukraine both became partially paralyzed by artillery ammunition shortages. And rather than exploiting narrow windows of opportunity to attack and finish an exhausted opponent, they were forced to resort to defensive stalls while awaiting replenishment.¹⁶

As already noted, switching from conventional "dumb" artillery rounds to precision ones creates opportunities to reduce all of these ammunition driven drags by orders of magnitude.

Reorganizing and Redoctrining

To fully capitalize on precision artillery's revolutionary potential, the U.S. Army should begin experimenting with dramatic changes to its organizational structure. For example, it's entirely reasonable to explore eliminating Field Artillery as a separate Army branch—especially cannon artillery.

If a single howitzer with a crew of 5 firing precision ammunition can deliver more destructive power than an entire howitzer battery of 6 guns, the need for the howitzer unit is probably outdated. The ideal would be to make a cannon an organic part of an Infantry or Armor battalion. This would be similar to battalion and company level mortars, which are organic components of Infantry and Armor units.

The logic continues that if Field Artillery company sized units (batteries) are obsolete, there is likely no need for their parent battalions. If individual cannons can fire at unprecedented speed with unprecedented precision, and generate unprecedented destruction, while maintaining unprecedented levels of safety for friendly forces near a targeted area, it is entirely reasonable to contend that the demanding staff work required to integrate artillery fires into a scheme of "Fire and Maneuver" is no longer required. Advances in Information Processing have given company level units the ability to manage information loads that previously required full Fire Support Coordination staffs, and the Army should explore capitalizing on that development.¹⁷

Transferring cannon artillery's combat capability to Infantry and Armor units is consistent with the Army's futures concepts, which advocate that to the maximum extent feasible, required combat assets should be integral elements of the formations most likely to employ them.¹⁸

POLL: Is there still a major role for conventional artillery in an age of cheap drones, cruise and hypersonic missiles, and smart bombs?

- Artillery hasn't changed that much from World War I and is now outdated.
- Artillery is occasionally still effective but usually too cumbersome and costly on the modern battlefield.
- Artillery provides a valuable complement to drones and various sorts of missiles.
- Modern artillery is more lethal, accurate, and economical than most other delivery systems.
- Current wars in Ukraine and Gaza demonstrate the timeless supremacy of artillery.

Eliminating cannon artillery as a separate Army branch may very likely offer great opportunity to divert monies and other resources that are now spent maintaining what increasingly appears to be an obsolete organizational structure. Twenty-five thousand to 35,000 soldier slots might be transferrable to other combat arms branches. Likewise, the funds spent to acquire cannon battalions could be diverted to efforts that would accelerate and broaden the Army's required transformation.

The Problem with Precision Artillery

Skeptics will rightly claim that precision munitions like Excalibur require communicating with a GPS constellation, and that communication links are fragile and susceptible to disruption. They are correct. In fact, the Ukrainian Army has essentially stopped using Excalibur rounds because their kill rate fell to a low of 10% due to Russian GPS jamming and other measures. But that does not mean that precision artillery is perpetually doomed.

It is the nature of war that every new system and operating method will be forcefully countered—especially if they prove successful. It is also the nature of war that every counter can be counteracted—especially if the value of the operating system or method is of high value. Precision artillery is that high value system. In fact, the U.S. and others are developing and beginning to field counter-countermeasure that will enable Excalibur and PGK to operate as designed and required. Measure, Countermeasure, Counter-Countermeasure are normal unavoidable steps in fielding and exploiting new technologies.¹⁹ Effective Russian countering of Excalibur and other precision rounds is temporary, and definitely not disqualifying.

Furthermore, every military asset brings vulnerabilities to a fight. In the case of conventional artillery ammunition, the vulnerability is tied to the requirement to produce, transport, store, position, reposition, and secure tens of thousands of tons of explosive, very dangerous ammunition.

Skeptics will also rightly contend that Excalibur rounds are incredibly expensive compared to conventional ammunition. Again, they are right. Excalibur currently costs about \$100,000 per shell. Conventional ammunition costs around \$3,000 per shell. But these cost differences don't accurately reflect the cost of killing an enemy soldier or destroying their equipment. Taking into account the full system cost of destroying an enemy asset, the conventional shell cost soars to over \$350,000 per enemy platoon or communications van or radar, etc. The full system cost to destroy those same assets with precision ammunition is roughly the same.²⁰

Bottom Line

The United States Army stands at a crossroads. It has a clear requirement and directed mandate to transform the way it fights. Meeting that mandate cannot be accomplished by inserting new technologies into existing organizations and operating doctrines. To capitalize on the extraordinary potential offered by new weapons and support systems, the Army must explore dramatic, even radical changes to how it fights and how it organizes to fight. It should begin with radically rethinking the Field Artillery.

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MICHAEL COMBEST is a retired U.S. soldier—and field artilleryman. He served on active duty for 32 years, with assignments to every type of cannon artillery unit the army had. While on active duty, Mr. Combest served at every tactical unit level from platoon to field army; his staff assignments ranged from battalion level to Headquarters NATO and Department of the Army. Mr. Combest has been assigned and deployed as an artilleryman to every continent minus Antarctica. His military education includes the United States Military Academy, U.S. Army Command and General Staff College, School of Advanced Military Studies, and the U.S. Army War College. He and his family currently reside in North Carolina.

Has High Tech Made Artillery Obsolete?

By Bing West

For the past fifteen decades, explosives, not bullets, have inflicted most of the destruction in a land war. In the 1870 Franco-Prussian War, Krupp's breech-loading cannon annihilated the French army. His enormous guns were featured at the World's Fair in 1876, leading to the sobriquet that artillery was the "king of battle."

The Germans fired one million shells on the opening day at Verdun in 1916. During World War II, the Red Army fired two million rounds into Berlin, a city about to collapse from airstrikes. In three weeks at Hue City in 1968, one U.S. Army brigade fired 52,000 rounds. The volume of artillery in Vietnam was prodigious. In the two-month incursion into Cambodia in 1970, for instance, 847,558 rounds were expended.

Artillery doesn't require sophisticated communications, or clearance through several echelons of command in the rear. It responds immediately, 24 hours a day, regardless of weather. Artillery protects your flanks, your rear, and your front lines. Troops can never have enough fire on call. It is inexpensive and expendable. Fire and forget; force the enemy to remember to duck.

The problem was that America did forget the power of artillery, neglecting its role as the military budget was severely reduced, forcing dramatic trade-offs. Defense spending was 11% of GDP during the Korean War in 1953, 8% during the Vietnam War, and 5% in 1990. In the decade after the Soviet Union disintegrated, the Defense budget dropped to 3%, where it is today.

The rationale thirty years ago was that Defense could be cut because our only military peer, the Soviet Union, had disintegrated. Defense manufacturers consequently shrank from dozens to an oligopoly of five corporations, accounting for 70% of all Pentagon contracts. Between 2000 and 2020, the salaries, layers of bureaucracy, and lobbying budgets of the oligopoly skyrocketed. Both the providers (the mega corporations) and the consumers (the military services) of their products turned toward very high tech, very expensive systems.

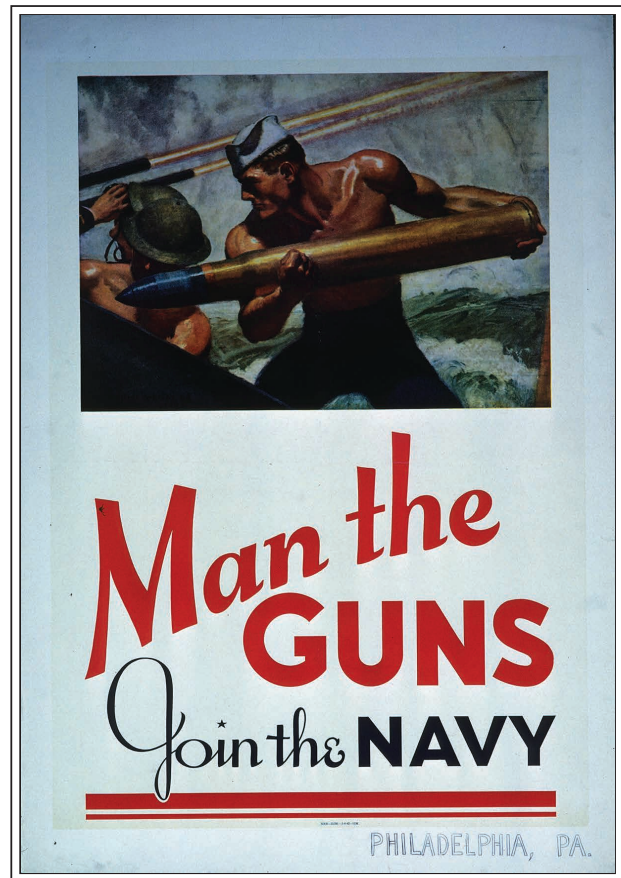
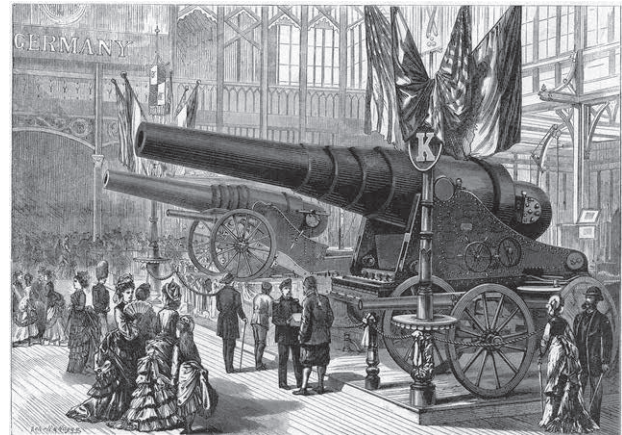


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This was called “info-centric” warfare. At the start of the twenty-first century, no nation could match our technological wizardry. For two decades, it proved successful. Our satellites and drones identified targets, and then our drones and aircraft picked them off, one at a time. One shot, one kill. There was no need for much artillery. In 2003, our forces drove 400 miles from Kuwait to Baghdad, easily shattering the Iraqi army. In both Iraq and Afghanistan, our drones roamed over hundreds of miles, pinpointing and killing individual terrorists with single shots. The combat results seemed to bear out the wisdom of investing in quality over quantity.

Artillery shells were a high volume, low profit item that seemed vestigial. The apparent solution was to add high tech in the form of GPS devices into each shell. Each long-range, GPS-equipped shell, called Excalibur, was envisioned as destroying a sensitive target 25 miles away. Excalibur costs more than \$100,000 per shell. At that price, corporations profited due to cost plus fixed fee contracts, while the services supposedly gained by needing many fewer shells, with less logistics. Precision strike had replaced the brute force employment of cheap, bulk explosives.

In 2020, the U.S. Marines—of all services—provided the headstone for the grave of “the king of battle” by reducing their artillery battalions from 21 to 5. The Marine command decided that a few missile systems would produce, through precision, better fire support than the 96 artillery tubes that were jettisoned.

Most retired senior Marine generals and combat grunts like me disagreed. In 1966, North Vietnamese soldiers closed in on my Force Recon patrol. No friendly unit could rescue us; we were a dozen miles outside our lines. To save five of us, our brothers unleashed 22,000 pounds of explosives. There was no “precision target”; our artillery battalion hammered the jungle with hundreds of shells. But in 2021 the Marines did away with those battalions because that kind of war seemed antique.

Oops. Four months later, Russia invaded Ukraine, reminding everyone of the perpetual reality of ground combat. Nothing is harder to kill than an armed man who knows you are trying to kill him. Artillery was applied in massive quantities. After two years, the Ukrainian front lines resembled World War I, with muddy trenches protecting against the Russian artillery barrages.

Artillery was causing 80% of the casualties.

Yes, drones had emerged as the new weapons. But like a boxer, you need both a left and right hand. Drones complemented rather than substituted for the smashing effect of constant shelling. Artillery suppressed electronic warfare systems, permitting the drones to seek out enemy vehicles and individual soldiers. However, the ubiquitous drones made it imperative that artillery batteries move away very quickly after each fire mission.

The Ukraine war had caught the U.S. military out of position. On the one hand, the Pentagon did not anticipate, let alone adapt to the commoditization of high tech. Impoverished Ukraine was producing annually in its garage shops one million cheap (less than \$700 per copy) drones; the Pentagon paid thirty times as much, due to our pricing and cost structure. Nor did Congress adapt; it has authorized a Defense budget that rubber stamps the Pentagon’s request for expensive manned aircraft and ships, instead of shifting at least 20% into unmanned systems.

On the other hand, Pentagon and American business practices made impossible the production of raw munitions, especially cheap artillery shells. The cost of the 155 mm shell produced by the United States or other NATO countries was a minimum of \$5,000, while the Russian 152 mm shell costs \$1,000. Russia was firing 10,000 artillery shells per day, compared to 2,000 the U.S. and NATO were providing to Ukraine. As disturbing, electronic measures have taken away the advantage of sophisticated GPS-guided shells like Excalibur, despite their per unit cost exceeding \$100,000.

In early August, the Congressional bipartisan Commission on National Defense warned that “the threats the United States faces are the most serious and most challenging the nation has encountered since 1945 and include the potential for near-term major war. The United States is not prepared today . . . a real risk, if not likelihood, that conflict anywhere could become a multi-theater or global war.”

The Commission recommended a minimum annual real increase in the Defense budget of 4%. But a 40% increase is needed to get Defense back to 5% of GDP, where it was before we faced the three-headed enemy of Russia, China, and Iran plus its proxies. Four percent a year is a token; yet 40% seems far beyond the consensus in Congress and in foreign policy circles.

Ukraine illustrates that at both ends of the modern combat spectrum—high tech and brute force—the U.S. has fallen perilously behind. Of course, artillery is not obsolete. The Marines and the other services just pretended it was because they were out of money.

What to do? Two suggestions. First, advocate for a dramatic (10% a year) increase in Defense spending. But we know that without a shocking attack, such an increase won't happen. Nonetheless, a steady drumbeat of concern is better than silence. Our generals and admirals disappoint by not speaking out in unmistakable language.

Second, produce items offshore where costs are much cheaper, adding sensitive items back here in the States. Reliable counties like Poland can produce artillery shells for a third of our cost. At the high-tech end, Ukraine has shown that a dozen countries can produce cheap drones. Fine, contract for them to do so, and contract with U.S. companies to add any sensitive items here at home. But again, the populist sentiment infusing our domestic politics makes it highly unlikely we will do so. All of us together—our elected politicians, our press, and the few who read this essay—are gambling America will never again fight a major war. "Great civilizations are not murdered," Toynbee wrote. "They commit suicide." Perhaps we are exempt from history.

As a grunt, I'm grateful for the fire support that let me live so long. I am concerned that my fellow Marine grunts can't call on the same volume of artillery if they are stuck somewhere, alone. I have grandsons who have volunteered to serve. Put me down on the side of arty—lots of it.



F. J. BING WEST is a military historian who has written a dozen bestselling books about the wars in Vietnam, Iraq, and Afghanistan. His most recent books are *The Last Platoon: A Novel of the Afghanistan War* and, with coauthor General Jim Mattis, *Call Sign Chaos: Learning to Lead*. A graduate of Georgetown University and Princeton University, where he was a Woodrow Wilson Fellow, he served in the marine infantry in Vietnam and later as assistant secretary of defense for International Security Affairs. Among other awards, he is the recipient of the Defense Distinguished Public Service Medal (twice), Department of the Navy Distinguished Civilian Service Award, the Marine Corps Heritage Award (four awards), Tunisia's Medaille de Liberté, the Colby Military History Award, the Goodpaster Prize for Military Scholarship, the Free Press Award, the Marine Corps Foundation Award for Leadership, and the Veterans of Foreign Wars National Media Medal.

Discussion Questions

1. What advantages do drones have over conventional artillery?
2. In a cost-to-benefit analysis, which delivery system is the most efficiently lethal?
3. What have we learned about artillery, bombs, and drones from the Ukrainian and Gaza wars?
4. Is the U.S. military falling behind in artillery and drone technology and production?

IN THE NEXT ISSUE
Israel and Its Enemies



Military History in Contemporary Conflict

As the very name of Hoover Institution attests, military history lies at the very core of our dedication to the study of “War, Revolution, and Peace.” Indeed, the precise mission statement of the Hoover Institution includes the following promise: “The overall mission of this Institution is, from its records, to recall the voice of experience against the making of war, and by the study of these records and their publication, to recall man’s endeavors to make and preserve peace, and to sustain for America the safeguards of the American way of life.” From its origins as a library and archive, the Hoover Institution has evolved into one of the foremost research centers in the world for policy formation and pragmatic analysis. It is with this tradition in mind, that the “Working Group on the Role of Military History in Contemporary Conflict” has set its agenda—reaffirming the Hoover Institution’s dedication to historical research in light of contemporary challenges, and in particular, reinvigorating the national study of military history as an asset to foster and enhance our national security. By bringing together a diverse group of distinguished military historians, security analysts, and military veterans and practitioners, the working group seeks to examine the conflicts of the past as critical lessons for the present.

Working Group on the Role of Military History in Contemporary Conflict

The Working Group on the Role of Military History in Contemporary Conflict examines how knowledge of past military operations can influence contemporary public policy decisions concerning current conflicts. The careful study of military history offers a way of analyzing modern war and peace that is often underappreciated in this age of technological determinism. Yet the result leads to a more in-depth and dispassionate understanding of contemporary wars, one that explains how particular military successes and failures of the past can be often germane, sometimes misunderstood, or occasionally irrelevant in the context of the present.

Strategika

Strategika is a journal that analyzes ongoing issues of national security in light of conflicts of the past—the efforts of the Military History Working Group of historians, analysts, and military personnel focusing on military history and contemporary conflict. Our board of scholars shares no ideological consensus other than a general acknowledgment that human nature is largely unchanging. Consequently, the study of past wars can offer us tragic guidance about present conflicts—a preferable approach to the more popular therapeutic assumption that contemporary efforts to ensure the perfectibility of mankind eventually will lead to eternal peace. New technologies, methodologies, and protocols come and go; the larger tactical and strategic assumptions that guide them remain mostly the same—a fact discernable only through the study of history.



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