ON HEAVY ARTILLERY: AMERICAN EXPERIENCE IN FOUR WARS

by

BRIGADIER GENERAL
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US ARMY RESERVE, RETIRED

The following is adapted from a study written by the late General Marshall in 1976 for the US Army Materiel Systems Analysis Agency, Aberdeen Proving Ground, Maryland. Our indebtedness to both Mrs. S. L. A. Marshall and Dr. Joseph Sperrazza, USAMSAA, is hereby gratefully acknowledged.

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When the United States declared war on Germany in the spring of 1917, its Army possessed literally no artillery. Regiments in the field that had recently come out of Mexico were armed with the 3-inch gun and the 4.7, both of which were on their way out and were not rated suitable for operations on the Western Front.

By that time, the battle lines in Northern France had become relatively stabilized. For approximately 29 months, the mode of warfare had been engagement out of opposing fortified zones extending from the North Sea to the Swiss border. The transition from mobile warfare, in which the front hardened, had occurred in November and December 1914 with the onset of winter weather.

From that season forward, heavy artillery became the preponderant weapon begetting deadlock in fighting operations, whereas before, when mass maneuver was possible, the machine gun had shared authority with the heavy weapons.

However, though the Army lacked artillery, the nation itself possessed some facility for the production of big guns and ammunition. That was because American industry was already producing war materiel for sale to the French and British.

Here, indeed, was the basic situation that, more than all other influences together, was to fix the future of US Army heavy artillery for the next 60 years. The lack of any feasible alternative in 1917 foreshadowed developments in Korea and Southeast Asia much later.

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Nothing written in this review is intended to imply that World War I was the first proving ground of the modern family of heavies in the US Army field artillery array. Most of the prototypes had been given an earlier testing by one side or the other in the Anglo-Boer War (1899-1902), and their operations were particularly prominent in sieges like those of Kimberley, Ladysmith, and Mafeking. The most persistent pieces were usually given pet names by the besieged. Thus one particularly annoying 155-mm was nicknamed "Long Tom" and the label thereafter became attached to the caliber.

What the review should make clear, however, is that almost without exception, every weapon in the pre-Vietnam American arsenal of heavy artillery was a US adaptation of a foreign make and not a reflection of originality in the national military.[1]

WORLD WAR I TO WORLD WAR II

When the United States entered World War I, the French artillery was already using a 155-mm howitzer, which was the direct forbear of the Long Tom that has now served the American artillery through four major wars.

Until then, the 155-mm had been produced successfully only by Schneider et Cie. in France. The United States purchased the complete plans from Schneider, and by October 1917, the specifications were changed from metric units to the American system.

To expedite production, contracts were let separately for the tube, carriage, and recuperator [recoil system]. The tube caused no difficulty. A contract for 3000 was placed with the American Brake Shoe & Foundry Company of Pennsylvania, and seven months later good tubes were coming off the line at the rate of 12 daily. Maxwell Motor Car was producing quality limbers in quantity within two months after contract, and Ford Motor Company had turned out 4373 satisfactory caissons within two months of getting the order.

The great hangup was with the recuperator, which started with a 3875-pound forging. Numerous contractors shied away from the project, and it was finally taken on by Dodge Brothers. The first recuperator was not produced, however, until 1 July 1918. Even then it did not work satisfactorily, and more changes had to be made, though by war's end Dodge was turning out 16 inspection-approved recuperators daily.

Like the 155-mm howitzer, the 155-mm gun was a French design purchased and adopted whole by the United States.[2] Neither the gun tube nor the carriage gave the American manufacturers undue trouble. With the recuperator, however, greater complications arose than in producing the howitzer. Dodge Brothers had manufactured only one when the Armistice came, though by New Year's Day 11 more were on hand.

As to the adoption of the 8-inch howitzer, practically no decision was required by the United States except to approve and purchase. The tube and carriage were being made by the Midvale Steel Company for the British Army when the nation went to war in April 1917. The War Department simply placed an order. Even so, 10 months passed before the first American-made 8-inch was delivered, and it was more than two years after the placing of the order, with the war long over, before the piece went into quantity production.

Some fraction of the hardware produced under these programs was used for training at various bases in the ZI [Zone of Interior] prior to the formal termination of hostilities, but not one US-produced gun or howitzer of any caliber was shipped overseas in time to participate in the fighting in any theater.

American artillery regiments shipped to France and Italy became armed, for the most part, with cannon of these same calibers and nearly identical design that were of either French or British manufacture. That was also true of light gun regiments. Whereas both the French and British were producing in quantity an efficient, quick-firing 75-mm (8 to 10 rounds per minute), the American artillery had no light gun of its own. It was most uncommon in the AEF [American

Expeditionary Force] for American infantry regiments in battle to have the backing of their own divisional artillery, and some of the time the support was either French or British, of which came much friction. Numerous of the American artillery brigades deployed to France in 1917-18 did not get their heavy batteries supplied with guns until after the fighting had ended.

All of these expeditious moves, necessitated by emergency, were by nature unsatisfactory compromises, beclouding the future of the heavier weapons in the American arsenal and denying the artillery arm a modern tradition and experience table for the future employment of these weapons.

Thus, the work of the Caliber Board, which grew from a memorandum signed by Major General W. J. Snow in December 1918, had much the character of a salvage operation, though its approved proceedings have over the years since provided the main guidelines for the development and building of the US field artillery.

Among its principal early findings and recommendations were the following:

> None of the present types of heavy howitzers (8-inch, 9.2-inch and 240-mm) is entirely satisfactory as a permanent type. Furthermore, it is highly desirable that they be replaced by a single type.
>
> Another field gun of greater range and power than the 155-mm is necessary. The project should be taken up and developed.

The claims for the guiding influence of the Caliber Board notwithstanding, it is apparent that a major constraint, historically, on the decisionmaking process in the American field artillery regarding its heavier guns has been the unsettling experience of adopting, out of necessity, a new and foreign family of weapons in World War I. The magnitude of the investment, plus economic realities in the postwar years, denied the artillery arm an opportunity for reorganization and development along original lines until World War II confronted it with a new order of necessities no less binding. In the intervening years, moreover, the rise of air power and armor had not only confused military thought but critically diminished the artillery arm's claim on any priority in funding. Just as the dive-bomber and tank, hitting in combination, had convinced many observers that the infantry arm was dead or moribund, its direct-support service was also at discount.

Of the medium and heavy pieces previously discussed, the American artillery had available as of 30 June 1940, as France was surrendering, the following:

155-mm gun	**973**
155-mm howitzer	**2,971**
8-inch howitzer	**475**
240-mm howitzer[3]	**320**

Though the war in Europe had been going for almost a year, there was nowhere present in the Army any marked pressure to build up these numbers with crash programs. The explanation of the lag is given in these words by the official history:

At the time of his death in December 1977, Brigadier General S. L. A. Marshall was one of America's foremost military writers and historians. His military career began in World War I, where he won a battlefield commission to second lieutenant, and continued through Vietnam, broken between intervening conflicts by periods as military critic and editorial writer for the *Detroit News*. Early in World War II, he established the Army News Service and later served as Theater Historian, European Theater of Operations. He is best known for his development of "a new method of covering combat," in which survivors of a particular action were interviewed collectively immediately thereafter, and which not only resulted in unprecedented detail and accuracy, but also provided for prompt corrective action based on the lessons learned from that operation. General Marshall's numerous books include such titles as *Island Victory*, *Bastogne: The Story of the First Eight Days*, *The River and the Gauntlet*, *Pork Chop Hill*, *Battles in the Monsoon*, and *Fields of Bamboo*. This article is part of an unpublished 1976 study prepared for the US Army Materiel Systems Analysis Agency, Aberdeen Proving Ground, Maryland.

> At the start of the defense period 1939-40 there was a tendency, stronger at the General Staff level than in Ordnance, to feel that big guns were outmoded, that aerial bombardment would in the future largely replace artillery fire. The ground forces believed that nothing larger than the 155-mm Long Tom would be needed. But experience soon exposed the error of these notions. There was no substitute for big, powerful guns to blast enemy fortifications.[4]

No lesson of World War II was plainer or more salient than this one. Nothing but heavy artillery could provide sustained fire, accurately placed, on a round-the-clock schedule, irrespective of the weather. The planners and logisticians had simply overlooked or discounted the imperative and indispensable function of the big guns.

Shortly after the invasion of Italy, the Allied armies found themselves outranged consistently by the German heavy artillery. Yet, though the consequences were embarrassingly costly, higher commanders accepted most reluctantly the assignment of 8-inch and 240-mm howitzers to their theater, such was their unfamiliarity with the uses and problems of these weapons.

One entry, moreover, is beyond argument. The overriding clamor for heavy (and still heavier) field artillery in World War II came directly out of the Anzio beachhead operation which was well along in the Italian campaign. The extraordinary circumstances that gave it rise are detailed in the volume *On Beachhead and Battlefront* of the Army's official history series.

TURNAROUND IN ITALY

The Army's official history describes the moment of change with appropriate dramatic emphasis:

> At the end of the first week of February 1944, the men at the Anzio beachhead heard the thundering scream, as they described it, of enormous German shells, the largest that Americans had yet encountered on any front. They saw geysers 200 feet high when the big shells fell into the sea. They saw thick-walled three-story buildings demolished, an ancient Roman cave split open, a whole cemetery plowed up unburying the dead. Ordnance experts studying the fragments determined that the shells were 280 millimeters, or 11 inches in diameter, and fired from a railroad gun with a range of about 63,000 yards or 36 miles.

It should not have been a surprise. Railway artillery had been the heaviest hammer in the German arsenal in World War I, and offshore naval bombardment like that at Salerno was certain to invite its return, if Hitler's army was similarly prepared. Undetected, the enemy big guns had arrived opposite the Anzio front earlier that same week. The largest was the 280-mm rifle that became nicknamed "Anzio Annie" by Allied troops. With a barrel 65 feet long, the gun was drawn by a diesel-electric locomotive hauling four cars, one of which was fixed with a turntable for the mounting of the gun. Another was an air-conditioned car for transporting powder.

That initial shock was short-lived, although on 7 February the Germans used a brace of 280-mm guns to shell Allied shipping off the beachhead. Then the weather quickly cleared, and the 280-mms were a small nuisance thereafter; they left the front, probably because the gun trains were a target too vulnerable to Allied air power.

Following the fall of Rome, two 280-mm guns were found on a railway siding at Civitavecchia. They had been named "Robert" and "Leopold." The latter was shipped to Aberdeen Proving Ground where study of its numerous unorthodox features contributed to the postwar development of the US Army's 280-mm atomic gun.

Due to Allied air superiority, the railway guns had to be housed in tunnels except when bad weather or darkness afforded them cover to roll forth and fire. The Germans kept trying. One month after the first two big guns had departed, the German High Command offered to send to Anzio another 280-mm

railway-mounted and a still more powerful 320-mm Skoda-made railway gun. But the commander of the German Fourteenth Army declined: There were no suitable tunnels available, since the one nearest the beachhead afforded a practical range of only three kilometers beyond the German infantry line of resistance.

But the technical difficulties the enemy was experiencing with his heaviest hardware did not clear the beachhead atmosphere. Continuing to batter the Allies' positions around the port was a battery of railway-mounted 210-mm guns that took cover in a tunnel west of Albano, not far from the Pope's summer home. Though it had a bigger "bang," that battery did less damage to the dug-in US VI Corps than the numerous 170-mm guns (30,000 yards range) bunkered-down in the surrounding hills. There were also 210-mm howitzers ranging-in from the high ground.

On 16 February, when the Germans launched their main counteroffensive, they fired 454 rounds from six 170-mm pieces and only 50 rounds from the 210-mm railway battery. On 29 February, they had 18 170-mm guns in action from which they fired 600 rounds, while the railway battery got off but 12 rounds.

In quite unequal terms, the German bombardment of the beachhead rolled on until the breakout in early May. The best gun that the Allies had at Anzio for counterfire was the 155-mm Long Tom with a range of 25,700 yards. And whose fault was it really? Higher commanders at and near the scene had badly underestimated the requirement for heavy artillery, having misjudged both the terrain and the capability of the enemy.

At Cassino, while the beachhead was being pounded, Allied forces were equipped with 60 155-mm howitzers and 12 240-mm howitzers, which had less range than the Long Tom but fired a projectile of triple the power of the 155-mm round.

It was practically a happenstance that the heavier guns were there. The theater had made no request for 240-mm howitzers. Early in October 1943, General Mark Clark had asked the War Department for 55 tubes for the 155-mm howitzer; the guns had been fired so often at extreme range with Charge 1 ammunition that the tubes were wearing out. The Chief of Staff of Army Service Forces, Major General Wilhelm D. Styer, replied to Clark that 155-mm tubes were not available and asked whether the theater could use the 240-mm howitzer for some of the missions that were being given the 155-mm.

The immediate reaction was negative. Major General John P. Lucas, who was then commanding US VI Corps, replied he was "doubtful of the value of the 240 howitzer in this country." Clark's artillery officer responded that "Both the 240-mm howitzer and the 8-inch gun could be quite useful," but that "The road net and the mountains made their movement and employment extremely difficult."

Having aired these doubts, the command agreed to take on two battalions of 240-mm howitzers and also requested two battalions of 8-inch howitzers, which had a range of 18,500 yards. But a curious entry in the journal shows that it yielded with marked reservations. The four battalions were to be employed to destroy field fortifications "and to relieve 155-mm units of many missions which are now causing rapid destruction of gun tubes." The language implies that the command still did not distinguish between targets suitable for medium artillery and those which were practical only for the heavy guns. By choice, there would have been continued reliance on the 155-mm for all long-range bombardment.

The two battalions of 8-inch howitzers got squared away on the main Italian front on 20 November 1943 and were successful from the start. According to the record, because of their extreme accuracy they were particularly effective in supporting infantry in the attack.

The arrival of the 240-mm howitzers was slowed by the nonavailability of the tractor built to move them, until the Ordnance Department recommended substitution of a modified T2 tank recovery vehicle. Over the objection of the Artillery Board, that was done, and the two 240-mm battalions were shipped from the ZI near the end of 1943.

On 27 January 1944, two batteries of 240-

mm howitzers, moved by T2s, took position near Migano and began firing the next day. Both 8-inch howitzer battalions were operating on the Cassino front by the third week in February. These combined fires were notably successful in destroying sensitive points far behind enemy lines, one of them being the Pontecorvo bridge, by which German traffic had moved from south and west into the Liri Valley. Cassino, a town structured of stone and concrete masonry strongly resistant to the rounds of the 155-mm, was shattered and neutralized by the big guns. According to a British artillery brigadier observer (and it is just as well to let him say it) the 240-mm and 8-inch batteries deserve the "credit" for the ultimate reduction of the Cassino monastery.

Rarely has the high command attitude made an about-face in such a hurry. Brigadier General Gordon C. Wells, chief of Ordnance's Artillery Division, had visited the Cassino front during Christmas week of 1943. He noted that the German 170-mm was outranging all of the Allied artillery, necessitating that the 155-mms be displaced so far forward for counterbattery action as to compound jeopardy. He reckoned that the 8-inch gun was the right remedy. But he found Fifth Army headquarters still sweating out the problem of moving the heavy guns about over the Italian roads. It would put in a request for the 8-inch guns "when they are ready for issue."

When initial reluctance and skepticism yield to enthusiasm out of first-hand, hard-won experience, everyone sees what might have been understood in the first place. That is particularly true in fighting operations. The quick conversion of the Fifth Army to heavy artillery makes the point. Once the heavy guns demonstrated their authority, the Italian landscape became labeled "heavy howitzer country." No doubt one reason the aversion, or doubt, persisted so long in Fifth Army was that relatively few men in the Army had in-depth combat experience in the employment of heavy artillery.

Once implanted, however, the faith strengthened. During operations in the high Appenines following the fall of Rome, Major General Alfred M. Gruenther said he rated the 240-mm howitzer the most valuable artillery piece the Fifth Army had.

In late March 1944, 12 8-inch howitzers and two 240-mm howitzers displaced from Cassino to Anzio. On their first mission they demolished a large tower in Littoria serving the Germans as an OP [observation post] from which artillery was directed broadly against the Allied positions and the port.

The howitzers were good at such work. But the true counter to the enemy 170-mm gun was not howitzer fire, but the 8-inch gun that outranged it by 5000 yards.

A battalion of 8-inch guns was by then ready in the ZI, but it had been earmarked for the ETO [European Theater of Operations]. The Fifth Army staff, quite satisfied with the howitzers, made no issue of it at the time, though within a few weeks the staff mind changed, and Washington was advised that the theater wanted 8-inch guns immediately.

Four 8-inch guns reached Italy by the end of April 1944 and were put in the 240-mm battalions, two going to the Cassino front and two to Anzio. They got there just in time to share in the bombardment that preceded the breakout on both fronts and signalled the start of the advance on Rome. That entry aside, the gun was present too briefly and in too small numbers to make an imprint. Immediately after Rome was taken, the shipment of the heavy guns to the high-priority Normandy beaches began, and by mid-autumn there wasn't an 8-inch gun or 240-mm howitzer left in Italy.

Viewed over distance, the initial resistance of the Fifth Army command to heavy artillery becomes more understandable when the following are considered: (1) the mistaken assumptions that had come from the campaigning in Africa, and (2) the inertia deriving from policies laid down by artillery authorities in Washington and at Fort Sill.

On returning from a visit to the African front in May 1943, Lieutenant General Lesley J. McNair, head of Army Ground Forces, had made the pronouncement: "Instead of

artillery becoming an arm which is tending to fade out of the picture, it is there in the same strength and importance as in the First World War." But McNair, though an artilleryman, was wrong about it. The Germans in Africa were not a heavy artillery army, though they did have the 170-mm gun. Their campaigns were masterminded by General Erwin Rommel, and he was fighting a highly mobile form of war.

The 240-mm howitzer had become standardized in the spring of 1943, the 8-inch gun the following December, but not without a great deal of trouble. General McNair rated the ammunition for the 8-inch gun unsatisfactory, and he also faulted the carriage. It had been planned that the same mount would be used for the howitzer and the gun. But that didn't come off. The 65-degree elevation for the howitzer could not be reconciled with the plus-10-degree elevation of the gun. So another carriage had to be built for the gun.

Contributing to the slowdown, the two components of the Army most directly concerned—the developers and the users—were in contentious disagreement on a main question of procedure. Artillerymen on McNair's staff took the position that gun and carriage had to be sound and nigh faultless in every part before shipment overseas. Against that perfectionist view, the Office of the Chief of Ordnance [OCO] argued that though improvements were always desirable, the guns should be brought to action just as quickly as possible. In early July 1943, Lieutenant General Levin H. Campbell had urged General Brehon Somervell, chief of supply services, to speed the production of the 8-inch gun and the 240-mm howitzer just as much as possible. Then, only a few days before the Salerno landing, Major General Gladeon M. Barnes, head of Ordnance R&D [Research and Development], laid it on the line in a letter to McNair's headquarters that there was nothing wrong with either of the two heavies and "not to be using them is a tremendous waste of fire power."

None of these exchanges within the Army higher echelons catalyzed action. It remained for the German fires around Anzio to do that. Once it became clear beyond doubt that only heavy artillery could effectively counter heavy artillery, there was no longer any argument.

IN OTHER THEATERS

Operational data and information on the effectiveness, fire rates, and circumstances of employment of heavy artillery in World War II derive almost exclusively from American fighting experience in France, Germany, and Italy, with some footnotes from North Africa. In the Pacific War, from early 1944 onward (the beginning of the recovery period), higher headquarters in both the Central and Southwest Theaters were urgently requesting the expediting of 8-inch and 240-mm howitzer battalions, anticipating the engaging of "large land masses" where a large part of operations would be conducted beyond reach of covering ship fire, or over terrain defiladed to flat trajectory fire. These requisitions remained unsatisfied; the heavy guns were in short supply and the European Theater had the highest priority. Ammunition for the heavies was also critically scarce. Only one battalion of 8-inch howitzers was shipped to Oahu to join US XXIV Corps artillery for the Okinawa invasion, because the shell shortage was such that more than one could not be supplied. Only one 240-mm howitzer battalion was sent to the Pacific; it participated in the Luzon operation. Illuminating and smoke rounds for these heavy pieces were nowhere available in the Pacific, though the need for them was clear from early 1944 on. The illuminated perimeter in night defense came into being at that time, consequent to successful experiment during the invasion of Kwajalein. Most of the lighting was supplied by the 60-mm mortar (the rounds were about 40 percent defective), air flares, and offshore ship fire.

The one 240-mm battalion that went to the Pacific had its most spectacular employment in breaching the walls of Intramuros during the battle for Manila. The target was an ancient 20-foot stone wall, 40 feet thick at the

base and 25 feet through at the top. In mid-February 1945, there was an artillery preparation by 120 guns, lasting six days, the maximum range of the fires being 8000 yards. The 240-mms employed in the bombardment weighed approximately 30 tons when emplaced for firing, and had to be separated into tow loads for movement. The 360-pound projectile was accurate enough over 25,000 yards, but most of the heavy shelling against the Intramuros wall was point-blank. The course of the bombardment proved, however, that the 8-inch and 155-mm howitzers were much more effective at wall-breaching than the 240 mm. That was due mainly to the availability of delayed action fuse settings for the first two weapons, which the 240-mm lacked. A battery of four 8-inch howitzers opened the bombardment of the wall on 17 February. After firing 150 rounds in approximately three hours, the 8-inchers had blown a hole in the wall, though the wall still stood. A battalion of 155-mm howitzers then took over, shelling the wall from 800 yards out, targeting its top at first, then working down toward the breach. One hundred and fifty rounds later, the 155-mm fire had blown 10 feet off the top of the wall over a 50-foot space. The piled-up rubble at the foot of the wall later served as a ramp for the infantry assault into Intramuros. About 8000 artillery rounds had been fired against the target area, of which approximately one-third were heavy shells fired against the wall.

In the fighting across France, the most persistent and essential employment of the heavy battalions was in siege operations. The attack on St. Malo, begun 6 August 1944, preparatory to the advance into the Brittany Peninsula by US VII Corps, proved unexpectedly costly. The Germans were dug-in behind the thick stone walls of an old Napoleonic fortress, defended by numerous 88-mm guns and a 210-mm coastal battery reversed to fire inland. The corps attack force included two battalions of 8-inch guns and one of 240-mm howitzers, all three hampered by a shortage of ammunition, so that for the first week the heavy guns had to be restricted to four rounds per day. Still, when in mid-August the German garrison in St. Malo surrendered, the direct hits scored by the 8-inch guns were largely credited with the collapse of the defense.

As the heavy siege weapons advanced west toward Brest, an initial stockage of 8700 tons of artillery ammunition was recommended for the investment. The battering of the post and its reticulation of stone-walled Napoleonic forts continued through the first half of September, some of the heavy units firing around-the-clock, since target acquisition presented no problem. When finally on 18 August the Germans gave up the defense, it was estimated that 22,500 tons of US artillery ammunition had been spent during the siege. More than 10,000 tons were left over to be shipped east by rail to the German border.

The glut of supply at that one time and place, however, was the exception. The main failure in the artillery-ordnance planning and programming pre-Pearl Harbor was that the requirements in heavy guns and ammo needed to invade Europe were not anticipated. The failure was not on the production front; the General Staff had miscalculated. In those months the Army planning agencies reckoned that the main chance lay in light and medium artillery and aerial bombardment. They did not foresee that heavy artillery would be needed also, and in large numbers. When the urgent demand for big guns and shells mounted suddenly in late 1944, it could not be met. Thereafter it was handled on a basis of catch-as-catch-can and halfway measures.

To summarize and recapitulate, as to heavy artillery, the United States entered upon World War II with basically the same weapons it had just begun to manufacture at the close of World War I, but had been afforded no opportunity to test in battle. In the period between, these arms had undergone certain modifications, but nothing new had been added to the arsenal, or yet initiated. The weapons stockpiled or used in training were either of French and British make or American-fabricated facsimiles

thereof. The 1918 Caliber Board (its report was published in 1920) is credited with providing the guidelines for field artillery development and direction during the two decades between wars. In terms of materiel, it brought forth nothing that was original or a significant new departure. Its recommendations as to main change and the R&D directions to be taken fell on barren soil. There had been no replacement of the main types of heavy artillery by a single type, and "another field gun of greater power and range than the 155-mm" had not materialized.

One other cause of the lack of stability and standardization of heavy artillery throughout the period under discussion was tonnage and the national attitude toward postwar liquidation of the wartime burden. The latter was influenced hardly, if at all, by the views of the military community. But it was shaped by the political interests of the Congress and more so by the pressures of American big business, better stated perhaps as the inevitable reaction of the free enterprise system. At the close of both World Wars in Europe, the heaviest drag on a quick return to normalcy or a peacetime posture by the expeditionary force was materiel in place, principally the sheer weight of the heavy guns and their ammunition. The ETO commanded by General Eisenhower had fielded approximately 42,000 pieces of artillery, including mortars, and surplus in-dump artillery ammunition—much of which had become mislaid and forgotten in the course of the fighting—totalled in excess of 11 million tons. The pressure from all quarters was to get rid of guns and other mass metal just as quickly as possible, and due to the sense of urgency, it was done with little discrimination or selectiveness. The greater part of the metal was sold as scrap.

In the secondary stage of the Korean War there was a comparable wastage or sloughing off of assets due to the policy of building a firm artillery base under the ROK Army which was begun in 1952 and the rapid expansion of military aid programming that had started two years earlier.

These headlong disposals or sell-offs, which paid little heed to future field artillery requirements, were damaging to Army progress as a whole and to orderly recovery. But no other arm was as directly affected as the field artillery, and the impairment was particularly bad in heavy gun development.

BETWEEN THE WARS

In the wake of World War II, there was no thorough reexamination of the role and requirements of heavy artillery in future war and no outcry for further development either from the users or from ordnance, though the General Staff was well aware that the Soviet artillery was in the process of overhaul and total modernization. The rather superficial work, as well as the conclusions of the Caliber Board (also called the Snow Board or Westervelt Board) that were consequent to World War I, were in fact radical attempts at reform compared with the complacency of 25 years later. One source makes the biting comment that "Major American materiel in Korea was not by one nut or bolt changed from World War II." While that is somewhat of an overstatement, its measure of exaggeration is hardly worth argument. The one noteworthy reform was the buildup of the firepower of the infantry division by increasing the number of organic 155-mm howitzers in changing from four pieces to six per battery in light (105) and medium (155) artillery organization. Along with some other marginal changes, the reform supposedly upped the firepower of a division by 25 percent. However, no review board recommended any simplification of the heavy artillery array, and no trend toward restandardization took place.

At an interservice conference at the Field Artillery Center, Fort Sill, Oklahoma, in March 1946, it was recommended that the 155-mm, 8-inch, and 240-mm howitzers, along with the 155-mm gun, all be retained. The retention of the 105-mm howitzer was also recommended, though the utility of that piece, particularly as to its lack of sufficient firing area, had come under heavy challenge.

The Army Equipment Reevaluation Panel of 1949 (its findings are sometimes called the

Devers Board Report, though the panel was in fact chaired by Lieutenant General Raymond S. McLain) in no way inveighed against the general position taken at Fort Sill. Annex "D" of the report, which covered field artillery equipment, committed the board to the suitability of calibers already existing and in use, specifically the following types of heavy artillery: "155-mm howitzer, 155-mm gun, 8-inch howitzer, 240-mm howitzer, and the 8-inch gun." The closest the board came to implying the possible need for change in the near future was when it voiced the opinion that "Scientific study should be initiated at once for the determination of suitable calibers." But in this connection, it did not specify the need for any change in the heavy gun array. It said:

> For long-range missions the present 8-inch gun and the 240-mm howitzer are required. There should be development to increase the accuracy and range of the gun.

As to the addition of any new type of heavy howitzer or gun to the arsenal, this was the sole recommendation:

> There should be developed a road type howitzer of the greatest caliber that can be transported with present day equipment and with a maximum range of approximately 20,000 yards.

The justification was that such a weapon would be needed in siege operations against heavy concrete works.

The McLain panel was convened at HQ, USAFF [Headquarters, US Army Field Forces], Fort Monroe, Virginia, in the early summer of 1949. Studies by its various sections extended into 1950. The panel was by no means primarily concerned with field artillery problems, its orders committing it to analyze and report on all US Army equipment across the board, guiding on lessons drawn from World War II. Thus, the undertaking embraced such diverse topics as the optimum load for the combat infantryman and the standby strength in strategic airlift required to keep the US Army in a competitive position globally.

The artillery section of the report was written by a subcommittee of experts from ordnance and the artillery branch. It should be noted, however, that the president of the panel, General McLain, was one of the Army's most distinguished artillerymen and that he personally joined in the conclusions of that section of the report.

ORIGIN OF THE 175-MM GUN

No specific recommendations as to the introduction of new calibers had been made at the Fort Sill field artillery conference in March 1946, and the Army Equipment Reevaluation Panel pretty much temporized with the subject during its meetings at Fort Monroe in the early summer of 1949.

There had been collateral developments at the Headquarters of Army Field Forces, however, that bore directly on the field artillery future. During 17-24 March 1949, a Tripartite Conference (United States, United Kingdom, and Canada) assembled at Fort Monroe to study and advise on that subject. The conference recommended the development of a new family of field artillery, the objectives being longer range, more accuracy, increased lethality, and higher mobility than was present in World War II weapons.

Pursuant to that meeting, a requirement published by Army Field Forces and forwarded presumably with General Staff knowledge if not concurrence, was put to the Office of the Chief of Ordnance in the form of a request for the development of a new family of field artillery. Caliber designations were not specified. The paper called for new light and medium howitzers and a heavy gun.

It is believed that the Assistant G-4 for Research and Development handled the programming at Army. The AFF requirement was incorporated into Ordnance Corps Technical Committee Minutes (OTCM) 33122 on 15 December 1949.

Predicated on that OTCM, a study group of the Ballistics Research Laboratory was

assigned to recommend the characteristics of the new artillery family. This study group, doing its assessment strictly on the basis of technical knowledge and analysis, determined optimum caliber in terms of muzzle velocity at given pressures and shell weights required to achieve maximum effectiveness at the desired range. Overall weapon weights were also considered. The study group recommended 115-mm for the light howitzer, made no recommendation on the medium howitzer, and specified 175-mm as the optimum caliber for the heavy gun.

Then, on 15 January 1951, one month after the commitment to the technical study group, the latter's proposals were reviewed at a conference of representatives of the General Staff, AFF, and OCO. This group chose a 110-mm howitzer, the 155-mm howitzer, and the 175-mm gun for development.

Work on the 175-mm gun began almost immediately, the project having been anticipated, since the family requirement had been published in the December 1950 Army Equipment Development Guide. The towed version of the weapon was officially initiated at Watervliet Arsenal (guns and spare tubes), Watertown Arsenal (carriages and recoil mechanisms), Frankford Arsenal (fire control), and Picatinny Arsenal (ammunition) in June 1951, under the provisions of OTCM 33724.

The project for the development of the self-propelled version was officially initiated in April 1952.

After a number of alterations in both projects, the 175-mm gun was standardized as the M-113 in November 1960. Watervliet and Watertown contracted design work from the Franklin Institute.

As OCO, the developer of the project, interpreted the AFF requirement, the main object in projecting the new family was to achieve overall improvement in the combat characteristics of each weapon.

The records make clear, however, that a main aim of the basic plan was to reduce the World War II family of seven pieces to five.

The most enigmatic aspect of that general objective is that it was intended that the 175-mm gun specifically would replace the 155-mm gun. They are of different categories.

The 240-mm howitzer and the 8-inch gun at that time were ordered retained but without further development. They became phased out by 1958.

While in general the reasoning and consequence of this post-World War II epoch of artillery reform appear to be singularly congruent with the conclusions and recommendation of the post-World War I Caliber Board, there are no indications that the initiators guided on the judgments of an earlier generation, or that main lessons from World War II experience were specifically passed along to the developer.

On the other hand, the body of evidence would seem to say plainly enough that the basic requirements did come from users and that the project door stayed open for users to modify or change the objective at several stages as development proceeded.

No foreign manufacturer or military materially influenced the design. As heretofore reported, the United Kingdom and Canadian professionals were participants at the outset. They were concerned with the combat characteristics of the new family even as they were interested in standardization. But their roles were advisory only, and they did not stay long.

It would appear also that the opening thrust toward the development of a new and better-balanced artillery family ran out of energy somewhere in the course of producing the 175-mm gun.

THE KOREAN EXPERIENCE

Given this background, which virtually by default made artillery operations in the Korean Police Action an extension of procedures in World War II, it should not be surprising that the employment of heavy artillery in Korea, 1950-53, reached unprecedented heights, far exceeding the averages in any theater in World War II. In a very real sense, it was an artilleryman's war.

In the field, on the American side, a majority of the leaders were the same World War II artillerymen. Confronted by new and unfamiliar problems, when not knowing

what do do, they did what they knew best, which was usually what had seemed to work before in a different environment. There were other reasons for the escalation that promptly followed the first engagement. Availability in particular played a large part. Large war stocks left over from World War II were at hand in Okinawa, the Philippines, and other Western Pacific bases. The Communist enemy in Korea was strong in heavy artillery to begin with, and the American fighting line throughout was short of infantry, a condition that invariably makes for excessive use of artillery. In approach marches, advancing US infantry habitually called on the artillery for softening-up fires just on suspicion that the enemy might be there.

The fighting zone was largely devoid of viable natural cover such as forests, caverns, and stream embankments. Once embattled, both sides became disposed to bunker-in, and the longer the war extended, the deeper and heavier-walled and roofed the protective earthworks became. After the opening "war of movement" phase ended in the early summer of 1951, heavy artillery employment dominated the positional warfare and continued as a major force until the fighting ended in the midsummer of 1953. The main scandals of the war had to do with reported shortages of heavy artillery ammunition, though these proved to be more fancied than real.

At hearings before the Senate Armed Services Committee at about the time of the Battle of Pork Chop Hill (April 1953), the Army Chief of Staff, General J. Lawton Collins, reported that ammunition expenditures in Korea from war's start until the end of 1952 (2½ years) had been approximately as follows:

105-mm	**600,000 tons**
155-mm	**300,000 tons**
8-inch	**75,000 tons**
mortars (all types)	**150,000 tons**

These are larger tonnages in all categories than the combined expenditures of the Pacific and Mediterranean Theaters during World War II, though the figures are slightly inflated in that they include stores static in theater or in movement thereto.

After the fortified front came into being, the Chinese Communist belt of defensive works gradually broadened to an average depth of between 11 and 12 miles. That meant that only the heaviest guns could put interdictory fires on the supply-support zone and erupt such sensitive targets as railheads, bridgeheads, and supply depots. The CCF [Chinese Communist Forces] troops were quartered in underground chambers at the base of reverse slopes. CCF artillerymen worked their guns from the mouths of tunnels dug through the ridge tops. At rest, the guns were protected by a roof of rock five to eight feet thick. Against targets of this character, as against heavily-timbered bunkers, the fire of light artillery was relatively useless. It hardly scarred the earth's surface and even splinter-proof protection denied it shock effect. Its rounds were of benefit chiefly during fighting in the open against troops in movement.

TWO KOREAN SHOOTS

On 26 November 1950, in the Battle of the Chongchon River northeast of Tokchon, the 37th Field Artillery Battalion (105-mm howitzers) was firing in support of 1st Battalion, 9th Infantry Regiment, 2d Infantry Division. Its commander, Lieutenant Colonel John B. Hector, called in to tell Lieutenant Colonel James Hill, the infantry commander, that he was out of ammunition, his trucks having been used through the morning to shuttle infantry.

Hill had just taken command of the battalion a few minutes before. The main body of the regiment at this time was wading the icy Chongchon, moving away from Hill, and already in need of resucitation. To round out the picture, Hill's own people, in their foxholes, were under direct assault by the Communist Chinese attacking in regimental strength.

Out of sheer desperation, Hill called on the 17th Artillery Battalion (8-inch howitzers) for direct fire support. Several of its FOs [Forward Observers] were already with him.

Within the next five minutes, the 8-inchers were dropping their shells within 50 yards of the foxhole line, which was on a downslope. One entry says that "Enthusiastically the observers reported that the stuff was accurate and very effective." Further, it was hitting into the CCF rifle groups as they worked their way up and over the rock ledges. And it visibly brought the CCF assault in check, resulting in a standoff that lasted for 15 or 20 minutes while the 17th's howitzers maintained their fire. Then the defenders began to run out of grenades and carbine ammunition, and a partial withdrawal took place. Enigmatically, at the same time the CCF attack lost vigor, and the Chinese suddenly quit the battlefield.

Probably the most eccentric artillery shoot of the Korean War was in the final defense of Kunu-ri on 30 November 1950. It was staged by three batteries of the 15th Battalion (105-mms) under Lieutenant John W. Keith, Jr., and was the climactic rearguard action covering the withdrawal of the US 2d Infantry Division to begin the long retreat into South Korea.

While the 15th was a light battalion, several 155-mm howitzers from one of the heavy battalions had been left behind and were worked by the 15th's gunners during the defensive battle, which had the dual object of beating back an attack-in-main by the CCF moving in strength against the division rear and preventing the artillery rearguard, along with its guns, trains, and ammunition, from falling into enemy hands. Standing by were the survivors of the 23d Infantry Regiment, preparing to get away via the road running westward to Anju, and their commander, Colonel Paul L. Freeman, Jr., was the senior officer present.

The decision had already been made to fire off all ammunition (if possible), destroy the guns, and try to send the artillery vehicles out over the Anju road. The main body of the division had already become trapped in a CCF fire gauntlet mounted along both sides of the road that led southward.

Two FOs had completed adjustment on two main targets for the artillery: approximately two battalions of CCF infantry moving toward the perimeter from the far side of the Chongchon River, about 3800 yards distant; and a second body of about 500 Chinese advancing parallel to that column, at a distance of about 4000 yards.

There was a third prime target in the background: the village of Pugwon, which had been a focal point in the CCF attack from the west. The main enemy thrust of the night before had come that way. Pugwon was about 11,500 yards in front of "Charley" battery which had the 155-mm howitzers. "Able" and "Baker" batteries were given the closer-in human targets.

The battalion worked all of its cooks, clerks, and walking wounded into an assembly line to feed the guns. The gunners and layers did their assigned work, but all the other artillerymen present, as well as a few infantrymen, were pressed into the daisy chain.

From the moment Keith signalled his order until the firing of the final round was exactly 22 minutes. In that interval, the battalion fired off 3206 rounds, at a rate of over eight rounds per-tube-per-minute. The paint peeled off the guns, and breech blocks turned black, but no piece blew up. Such was the overheating from this fire that it is likely all tubes were ruined by the excessive strain, though that is simply speculation. All of the guns were thermited as soon as some cooling made it possible. The bombardment had stopped the CCF in its tracks, and while the enemy was still in recoil, the gunners and the covering infantry got away to the west.

INTENSITY BOMBARDMENT

The most intense and prolonged artillery shoots by US forces in modern times were those at Kwajalein Island in February 1944 and Pork Chop Hill, Korea, in April 1953. Kwajalein was a four-day shoot by four battalions of artillery, three of them 105-mm howitzers and one of 155-mms. All of these batteries were crowded together in an area 800 by 150 yards. The total shoot was 73,158 rounds. Prolonged offshore shelling by US

naval forces present and systematic preparatory air bombardment extending over several days also contributed to the near-obliteration of all vegetation, defensive works, housing, and communications lines on the atoll's surface. Afterward, its rubbled condition made it impossible to assess the havoc wrought by field artillery alone, although one survey of an eight-acre area indicated that in excess of 70 percent of the Japanese garrison's dead had been killed by artillery fire. In the first day's preparatory shoot, which lasted four hours, the four battalions fired 20,940 rounds, of which 759 rounds were 155-mm shells. For the 155-mm guns, the fire rate during action periods (the guns were operated by crews of eight, which permitted them to be served in relays) averaged three to four rounds per minute. (The bombardment as a whole is described in the volume of the Army official history titled *Seizure of the Gilberts and Marshalls*.

In the defensive bombardment at Pork Chop Hill, Korea, nine artillery battalions, two of them 155-mms, were kept firing under the direction of one FDC [Fire Direction Center] for 48 hours. During the first 24 hours, the guns fired 37,655 rounds in defense of the general outpost line, the proportions being 9823 rounds fired by the heavy batteries and 27,832 rounds fired by the light batteries. By the second day, the attack on three of the outposts had been repulsed and only the main hill (Pork Chop) remained in jeopardy. By nightfall of that day, the supporting artillery fire had built up to 77,439 rounds, of which 26,142 rounds had been fired by the 155-mm howitzers.

THE VIETNAM CHAPTER

Unlike the Korean experience, the American heavy artillery involvement in Southeast Asia, 1963-72, was not an extension of similar operations carried on during the final months of the war just past.

Once the Korean War got going and the US Army settled to its task, the state of deadlock between the contending sides made it possible for the American artillery in late 1951 to take up where men and guns had left off on VE and VJ Days.

At hand were the same heavy weapons and many of the same experienced people. Further, the nature of the countryside and the conditions of engagement did not forbid the tried and proved tactics, logistical arrangements, and control systems with which the operators were familiar. The routines changed somewhat with the onset of position warfare, particularly after the Communist Chinese intervened massively. The CCF defensive system pivoted around stoutly-timbered bunkers so placed along the ridge tops as to command the approaches via the valleys and to break up infantry attacks moving lengthwise along the ridge lines. Heavy howitzer fire was virtually powerless to destroy these positions due to the looping trajectory, the slitlike embrasures, and the enemy's disciplined use of hard cover. However, the range being feasible, the heavy recoilless could knock them out from the cap of an opposite ridge.

In Vietnam, the artillery problem from begining to end was diametrically different. There were no ready-made, book solutions, and the day-to-day situational changes were of such order as to require nigh incessant experiment and improvisation.

Two of the main functions of heavy artillery are counterbattery fire and irruption of the support zone, which includes the destruction of sensitive points such as headquarters, supply dumps, and communications nodals.

A secondary function is direct fire support for friendly forces moving in the attack when the terrain and the conditions of engagement (more specifically, the distance between the fighting sides) make it possible and provident.

Until the four closeout years of the war in Vietnam (1968-72), counterbattery fire but barely entered into the calculations of any US fire direction center. Except for occasional use of mortars by the Communists, which was usually followed by a speedy displacement thereof, there were no enemy batteries on which to target. It was during the Tet Holiday "Battle of the Cities" that the

122-mm rocket and the 240-mm mortar were first employed by the enemy in such numbers as to start a steadily-widening alarm, and it was not until the following May that Saigon came under a persistently-mounting attack by these weapons, the crews of which were siting from the old French benchmarks to get accuracy of aim. But the fire-and-flee tactics of these weapons crews made target acquisition of such brief duration that, if it ever occurred, the heavy artillery still had no counter utility.

At about the same time in May and June 1968, during the Communist offensive in the I Corps zone, several enemy heavy gun batteries were uncovered by American patrols in the higher levels of the forest-covered Piedmont. Their crews had fled, and there were no signs that the guns had ever been used, so the episode ended in mystery.

The battle for Khe Sanh that developed that same spring, with General Giap boasting that he would make it another Dien Bien Phu, might possibly have become just that, had the surrounding high ridges been tunneled and adequately artillery-armed. There was continuous enemy artillery fire from these same heights, and air bombing and US heavy artillery ultimately suppressed it. But like the incursion by the 1st Cavalry Division into the A Shau Valley that soon followed, the Communist enemy was found to be ready mainly with heavy rockets and mortars, which were nuisance enough for infantry in the attack.

Hence, by fall of that year—and the NVA offensive power had clearly petered out in early summer, as indicated by a marked degradation of their tactics and the drafting of boys in their early teens—three years of fairly heavy fighting for US forces came to a close with no continuing opportunity for counterbattery fire.

The irony of Vietnam from the American artilleryman's view was that the Communist powers who were arming the NVA [North Vietnamese Army] so echeloned their weapons supply to the Communist fighting forces afield that the net result was to deny the American heavy guns any decisive opening against traditional targets. The heavy batteries continued all dressed up with literally no place to go.

Of major targets in the support zone there had been none. As General William C. Westmoreland put it, "The other people have no rear." There was no tangible, organized Communist communications belt other than the DMZ [Demilitarized Zone], the trails through Laos and Cambodia, and the network of tunnels in the South Vietnam interior that were used less as shelters than as supply forwarding points. For reasons of range if none other (and there were other reasons), none of these was target territory for the medium and heavy guns. The heaviest shell could not crash or penetrate the six-foot earth roof of a tunnel, nor could a bomb from a B-52.

As for fire in direct support of attacking friendly infantry, it had been tried numerous times with the 155-mm howitzers, with results that were generally unsatisfactory, both because it was inaccurate and could not be brought in close enough, and because at times it had killed or routed some of the friendlies.

The high ridges of Korea and South Vietnam (for example in the Central Highlands, the upper Piedmont, and along the Cambodian border) are much alike in height, steepness of slope, sharpness of crest, and general configuration. But there the resemblance ends. There are more transverse ridges, switchbacks, and folds in the Vietnam highlands. And there are far fewer bare saddles or natural clearings to which heavy artillery may be lifted and from which the guns can operate fairly well around the circle.

These conditions imposed by nature—the terrain itself—made any mission that required the guns to mount the high ground as strenuous an experience as any in the prior history of American artillery. The amazing thing is that the people could adapt to it so well.

But the topographical differences are minor compared with the fact that most Korean ridges are nakedly barren and the South Vietnam ridges are well-clad. Phenomenally, it is on the very highest ridges

and usually along the upper slopes, including the crest, that the densest jungle is to be found. Yet that was the setting for much of the bitterest and most costly fighting between Americans and the Communist enemy.

The paradox is that it was during these same four largely sterile and most frustrating years that the heavier guns were worked hardest and their ammunition expenditures became prodigious. This abnormality—that the fire output by the heavy guns was excessive and of major concern to MACV and higher authority, while at the same time appropriate target opportunities for heavy artillery were either fleeting or wholly lacking—is the salient peculiarity of artillery usage during the Vietnam years.

It is explainable only in the context of the history of how the United States became committed step-by-step to an ever-broadening involvement, with consequences that at the beginning were unforeseen in any quarter.

The turning point was 1963. It was then that the decision to harden US policy in support of the Saigon government by "beefing up" the advisory body and deploying American Special Forces and helicopter units to South Vietnam was acted upon.

At that time, there was no heavy artillery south of the 17th parallel, and no requirement for such was anticipated. The ARVN [Army of the Republic of Vietnam] artillery was equipped with 105-mms in the main and seldom operated afield. During General Paul D. Harkins' first year commanding MACV [Military Assistance Command, Vietnam], the Viet Cong [VC] stayed furtive in base camps and risked engagement chiefly when the chance arose to lure ARVN forces into ambush in the near vicinity. The VC had no artillery, and most of its hand-carried weapons were antiquated. Quick strikes by helicopter-carried ARVN infantry were the main tactics of the government forces. The aircraft were not even fitted with door gunners or any effective armament, and in the usual circumstance the infantry sortie could not be artillery-supported, since means were lacking for moving the guns about quickly. Success depended on the reliability of intelligence, the speed of the scramble, and surprise. But these ingredients were seldom all present at the same time.

Where American units based, in the average situation, their personnel were forbidden to move more than one-half mile beyond the built-up area unless they traveled in an armed convoy. All base camp security was entrusted to ARVN forces and so remained for the next two years. No calculated risk, it was purely an expediency due to the lack of American tactical forces to do guard duty.

As an instance of the innocence at high levels of what lay ahead, in 1964, when it became apparent beyond doubt that the army of North Vietnam was infiltrating tactical forces southward, the Joint Chiefs of Staff was asked by the White House how much American ground force would be required to "clean up" South Vietnam. The JCS replied that it would take four and one-half divisions, and that the figure was prohibitive.[5]

In early 1965, the Holloway Barracks incident precipitated a dimensional change not only in the American prospect, but also in the fundamental character of the war. Whether history will see what followed as an overreaction on the part of the Washington government and a catalyzing of decision by Hanoi to go full length, may be a good question. What is known for certain, however, is that from there on, heavy artillery's role became ever ascendant.

In midsummer 1965, President Lyndon B. Johnson announced that the airmobile 1st Cavalry Division would leave at once for South Vietnam and that a ground force buildup to 170,000 strength would quickly follow.

The 1st Cavalry settled in at An Khe in the Eastern Central Highlands, this by decision of its commanding general, H. W. O. Kinnard. What quickly arose there was no mere base camp, but a stoutly armed and barricaded perimeter large enough to enclose the entire division. It amounted to a fortress. No Vietnamese, military or civilian, were

allowed within it, and only Americans were allowed to stand guard. So long as 1st Cavalry Division camped there, the perimeter was never penetrated.

Here was a design that, in general, other US divisions and independent brigades would seek to follow, with some variations according to the limitations of the terrain, as they were deployed to Vietnam. A secure base, armed around the perimeter and guarded by Americans, was the primary consideration. The organic artillery was enclosed along with other elements and became more or less permanently based. The Cavalry Division was organically equipped with Flying Cranes, Chinooks, and other transport with which they could shift their heaviest hardware from base camp to any quarter where an enemy threat had been sensed, and do it in four hours or less. It had also the ARA [Aerial Rocket Artillery], a new kind of flying artillery, its Huey helicopters fitted with rocket pods on either side of the aircraft and its door gunners noted for their daring and accuracy. Other divisions and brigades were less fortunate, less mobile. Their people and guns could be shifted about only as theater-controlled airlift was made available. The organic artillery stayed a main fixture of base camp security, and as ammunition became more and more available, the pattern of its defensive employment was pretty much according to what the artillery commander willed. That left a very broad door wide open.

In the late fall of 1965, the bulk of the hitting power of the 1st Cavalry Division was shifted westward to engage North Vietnamese Army forces mounting an offensive-in-main out of Cambodia with the object of cutting South Vietnam in two by taking the Central Highlands. Known as the Plei Me and Iadrang Valley campaign by the Americans, here was the first venture by the NVA in large strength and in the open.

From that battle onward, the US artillery, including the heavies, ceased to starve for targets. The problem lay in the fixing and finishing of an extremely elusive, clever, and combative enemy infantry operating practically without artillery support. The form of warfare was neither conventional nor irregular but a combination and mixture thereof, shaped largely according to the Communist design. Maximum use was made of ambushes and terrorist techniques, and what seemed to be meeting engagements were most often proved to be enemy-contrived encounters, if not deadfalls.

The summer of 1966 was a summer of great battles, mostly staged in the Central Highlands. Crazy Horse, Nathan Hale, Toumorong, Hawthorne II, and Thayer-Irving are a few of the names. In all of these operations, heavy artillery was employed, usually after being lifted from main base, and in few instances were the results more than marginally satisfactory.

Except in Hawthorne II, most of the main actions were fought on high ground, and the fights ran anywhere from one hour to three days in duration. Where the ground of engagement was jungle- or rain forest-covered, the contending sides fought it out anywhere from 10 to 25 yards apart, probably the shortest distances over which American combat units have ever engaged. Some of the time the 105-mm howitzers could provide worthwhile, close-in fire support to the engaging infantry. The 155 howitzers and heavies could not. When they tried, the consequences were either tree bursts or "overs" that fell so far beyond the enemy line as to do it no harm, not even interdicting the escape route. The configuration of the Vietnam ridge caps simply did not accommodate the loop of the trajectory. By contrast, the ARA or tactical aircraft or gunships coming in for a strike parallel to the line of the enemy deployment were quite effective. The heavy guns became less and less used for direct support, even in emergencies, because American infantry was fearful of them.

In between spells of firefighting when enemy force was directly engaged, some heavy battalions and occasionally single batteries would be detached and repositioned on a lone hill that overlooked the base camp or on a ridge dividing two valleys, from

which enemy traffic along a main artery could be interdicted by the guns in either direction. In this solitary duty, the artillerymen provided their own local security. Random fires were rarely used from such positions, and after registration, which was done in daylight, watch duty was the usual rule. During the active firefighting, the 155-mm howitzers would be airlifted to ridge saddles or other commanding heights and sometimes to forward, well-prepared fire bases from which their fires could be turned against enemy movement over the low ground. Such missions, however, were the exception for heavy artillery.

From 1966 on until near war's end, most of the shooting by the heavies was out of the base camps. The preponderant part of the theater's vast ammunition expenditure came from that type operation. As to dollar costs, it far exceeded every other item, and the steadily mounting volume was of pressing concern to the high command.

These random defensive fires (and the adjective is not misplaced) had as their object the "harassment and interdiction" [H&I] of enemy forces, though no VC or NVA grouping was known to be immediately present in the target area. Not that they were loosed on mere suspicion. The guns ranged-in on known or suspected enemy base camps (and while numerous such became located, enemy personnel were rarely in residence). They also targeted on crossroads, trails, bridges, and approaches to villages. Reconnaissance afterward seldom, if ever, established that these shoots were in any sense productive, though they did brew up much of the countryside. And because the batteries worked nigh nightlong, they cost the garrisons much sleep. Ammunition being in good supply, and an overly astringent rule against such fires being onerous to the artillery arm, control from higher up was hardly more of a constraint than was the principle of force conservation. When shells are present in generous numbers, the overweening inclination of the artilleryman is to seek reasons justifying another shoot.

Thus in a general way, and more particularly as to the employment of heavy artillery, the years 1965-66 marked another turning point in the war. In that same period, units armed with the 175-mm gun and the 8-inch howitzer (true heavy guns at last overshadowing the 155-mm howitzers that had deployed with the divisions) arrived in South Vietnam and quickly went into action. The suppliers of heavy weapons on the Communist side—Soviet Russia and China—still had not made the NVA artillery a viable combat force.

That threat began to mature stage-by-stage in 1968. If earlier the guns were present in sufficient numbers either in the DMZ or at training bases immediately to the north thereof, the crews still lacked the training essential for success or survival in fighting operations. Either that must have been so or, under Big Power tutelage, the North Vietnamese Army had begun to store up heavy weapon power—artillery and armor—to mount major surprises in the near future.

In contrast to this lag or holdback in enemy heavy weapon power, the US Army's buildup of artillery strength continued. It peaked in 1969, after 59 artillery battalions had been deployed to South Vietnam, of which 13 were the long-range 175-mm gun and 8-inch howitzer battalions. Artillery battalions had become almost as numerous as combat infantry battalions, whereas at the start, the force structure allowed one light gun battalion and one medium gun battalion for every three infantry maneuver battalions—roughly the composition of a brigade. In ratio, there was more artillery support than in any conflict of the century, including World War I, when the proportion had been one artillery brigade to provide fires for two infantry brigades, each at that time consisting of two regiments.

More than commensurate with the build-up rate of artillery power was the rise in ammunition availability. In 1964, the limited stocks, the bulk of which was stored in old French magazines, averaged out through the year at about 5000 tons. By 1968, the

ammunition supply at the using sites, in dumps, and at depots had risen to 385,000 tons, and approximately 86,000 tons of ammunition per month were being distributed to combat units in South Vietnam via air, the road system, and the intercoastal waterway.

Some of the large increase in expenditure rates came out of joined battle, as in the Khe Sanh siege during the spring of 1968, where for the first time the Communists used heavy artillery in significant numbers, firing from the ridges that almost surrounded the US Marine base on the low ground. The counter-battery fire by the friendly artillery came from bases 10 or more miles to the eastward in the general vicinity of Camp Carroll. Two Marine battalions, working 155-mm howitzers, and 16 Army-manned 175-mm guns fired more than 100,000 rounds into the area of the NVA encirclement during the 77 days of the siege. The daily expenditure rate was about 1500 rounds.

Overall, however, it was the nightly fires out of the base camps, ordered in the interests of local security, that accounted for most of the consumption. Some commanders objected to these "H&I" fires. One division and one independent brigade in the Tay Ninh-Long Binh region eschewed them altogether, the reasoning being that most of the inhabitants of that countryside were friendly to Americans and the random shooting was therefore counterproductive.

With these and other marginal exceptions, the heavy shooting out of the base camps continued until well into the period of US forces redeployment to the ZI which got underway in June 1969. As with most practices in war, or any other movement that gets underway, it is always more easy to start than to break it off.

In June 1969, a Department of Defense committee was set up to determine what changes could be made in tactics and usage by American forces in Vietnam to lower casualties and costs. One key witness recommended a cutback in "H&I" fires immediately and arbitrarily by 80 to 90 percent, and a regulating of ammunition supply to the field by high command to insure that it would be done. Major General John F. Freund, who was the Army member of an all-service committee acting as advisers to the White House on redeployment and related problems, gave his unqualified endorsement to the proposal, saying they ["H&I"] had done little good and may have done much harm. However, it was a little late in the day for any reform.

A great part of the heavy hardware herewith discussed was either destroyed or captured when the Communists overran South Vietnam in the spring of 1975. The American experience with it while the guns were still in friendly hands has not yet been collected and analyzed to determine what long-term lessons are to be learned. There may be none.

NOTES

1. It is sometimes said that the only truly American heavy is the 175 mm. Although it was of post-Korean War development, it was employed by US forces only on a relatively limited basis during the war in Southeast Asia and therefore is of questionable rating as a combat-proved weapon. But since the 175-mm is essentially a cut-down version of the 240-mm, the claim is of questionable rating also.
2. In very general terms, a howitzer is an artillery weapon with medium range, medium muzzle velocity, and a relatively high trajectory; a gun is another type of artillery weapon with long range, high muzzle velocity, and a flat trajectory.
3. The 240-mm howitzer was another American makeover of a Schneider et Cie. product dating from World War I. The piece started as a 280-mm howitzer originally built by Schneider for the Russian Army in 1911. The American contract with Schneider, signed in June 1918, specified the reduction in caliber. The first 240-mm blew up under test as did the three or four that soon followed. Another 10 years of experiment and development went by before the piece was rated fieldable, during which time Schneider engineers directed the modifications. Thus the 240-mm is connected with US operations in World War I in only the vaguest sort of way.
4. The history here refers to the command under General Lesley J. McNair and not to the General Staff as such, though the same feeling did exist in the Army high command.
5. It was in this same year that the Artillery Board at Fort Sill first tested the 175-mm gun. There was no premonition that the initial step was being taken in readying the piece for a going war.