

Historian's Corner



- Part 8 -

DOTMLPF ARTILLERY INSIGHTS FROM THE AMERICAN CIVIL WAR: FACILITIES

An eight-part series by Dr. John Grenier, the FA Branch Historian

The “F” stands for facilities in the DOTMLPF scheme, and for American Civil War (ACW) studies, it’s useful to look at the production facilities for Field Artillery guns and munitions for both the federal and confederate forces.

The North was well positioned to overwhelm the South if the war’s outcome became dependent on industrial capacity, which it partially—but by no means solely—did. Before the war, northern states possessed 85% of the nation’s factories, 92% of iron and steel production and their transportation infrastructure was orders of magnitude superior to the southern states. A slave-based agrarian economy was not conducive to industrial development, and the North outpaced the South in every measure of the factors of production (land, labor, capital and entrepreneurship) that collectively comprise the building blocks of a prosperous economy. The percentage of northerners dedicated to agriculture work dropped from 70% in 1800 to 40% in 1860; for example, over the same decades, the numbers for southerners increased from 82% to 84%. In the years immediately before the war, too, Irish, British and German immigrants—therefore laborers and later Soldiers—flooded the North. Because slaves performed most of the labor in the South, comparatively few immigrants trickled into the states that seceded. The textile plants in Lowell, Massachusetts, in which many immigrants found work, offered a stark juxtaposition of the North’s industrial capacity compared to the South’s. Lowell’s mills operated more cotton spindles than all the eleven confederate states combined. Remember, the Confederacy could not clothe its Soldiers. The “butternut brown” (the name came from the dyes used to color them) “homespun” coats and trousers were as common among confederate Soldiers as gray uniforms.

At the same time, factories in the Connecticut River Valley produced more than 80% of pre-war America’s small arms. Besides the main federal armory at Springfield, Massachusetts, Colt, Remington and Smith & Wesson churned out millions of rifles and pistols for the federal armies’ use. Privately owned companies, each with decades of manufacturing experience under their belts, made all federal artillery during the war. The industrial plant was in place, and owners and shop managers simply needed to ramp up production—thus more workers and more hours, which meant more money for everyone—to meet the Army’s and Navy’s insatiable demands for cannons. The West Point Iron and Cannon Foundry of Cold Springs, New York became the Federal Ordnance Bureau’s largest contract-supplier of cannons, and it made fortunes for its investors in the process. The Fort Pitt Works and the Phoenix Iron Works in Pennsylvania as well as the Ames Manufacturing Company (which specialized in making large-caliber cannons) in Massachusetts augmented the output of the West Point foundry. They easily produced more pieces than all the South’s cannon manufacturers. The E.I. du Pont de Nemours Corporation based in Delaware, a slave state but whose legislature in January 1861 expressed “unqualified disapproval” of secession, produced 40% of the nation’s pre-

war gunpowder output. Hazardville, Connecticut's Hazard Powder Company provided another 40%; workers toiled in 125 buildings spread over hundreds of acres of land in Hazardville to produce a staggering 12,500 pounds of explosives each day. The Oriental Powder Mills of Gorham-Windham, Maine and the Laflin & Rand Powder Mills in Passaic County, New Jersey added to federal output.

When the fighting started in April 1861, the Confederacy owned almost no arms other than those that they gained when seceding states seized federal arsenals. Soon after the war started, federal troops abandoned and burned the Harpers Ferry Armory in Virginia. Confederates managed to salvage some of the arms-making equipment and sent it to the Virginia State Arsenal in Richmond and to Fayetteville, North Carolina, but they were faced with essentially building an arms-manufacturing industry from the ground up. Because the South lacked educated and experienced engineers, managers, administrators and other technical experts, it proved a very long row to hoe. The Tredegar Iron Works in Richmond, Virginia eventually provided about half the confederate armies' artillery. Josiah Gorgas, Chief of Ordnance for the Confederacy, knew the infant production facilities could not keep pace with demands, so he sent agents to Great Britain to purchase arms that, he hoped, blockade runners could smuggle past the federal Navy early in the war. However, blockade-running quickly became a fool's errand—one that could get you killed or locked up for an unknown amount of time in a federal penitentiary. Within a year of the war's start, Tredegar found itself devoting precious resources—raw material, labor and time—to making the iron plating for the CSS Virginia, the ironclad warship some within the confederate leadership deluded themselves into believing could “break” the federal blockade. The United States Navy's ironclad USS Monitor kept the Virginia contained in port, and the confederates scuttled it when they withdrew from Norfolk in May 1862, less than three months after it first went to sea. Gorgas nevertheless worked with what he had, and he organized small foundries for the domestic manufacture of weapons, munitions and gunpowder. His bureau's crowning achievement was the Confederate Powder Works in Augusta, Georgia far from the front lines between 1861 and late 1863 but also relatively isolated because of the South's poor rail network. Historians have judged Gorgas' efforts as one of the Confederacy's success stories, and they are keen to point out that when Lee's army surrendered at Appomattox Court House in Virginia on April 9th, 1865, each infantryman carried 75 rounds of musket ammunition. However, Lee's Soldiers also had not eaten for three days.

When we consider Dr. Earl Hess's observation that the typical artillery battery commonly fired between 200 and 300 rounds per day it was engaged in battle, the scale of the numbers takes some effort to comprehend. At Gettysburg, for example, the Army of the Potomac's (AoP) 362 field pieces fired 32,781 artillery rounds over three days. The AoP went into the battle with about 270 rounds per cannon, which means that it expended about one-third of its stockpile in “only” 72 hours of operations. We previously mentioned the Battle of Stones River in the discussion of “O” for organization. During that three-day battle, federal Redlegs fired 20,307 rounds, or 781 rounds per battery on average, or 130 rounds per gun if we assume each battery contained six pieces. Averages can be deceiving, however. Batteries H and M of the 4th U.S. Artillery, which found itself at the center of the action for most of the battle, combined to expend a mind-boggling 2,299 rounds. H Battery used four 12-pound Napoleons while M Battery employed four 3-inch model 1861 ordnance rifles manufactured by the Phoenix Iron Works. The federals' 3-inch rifle—the confederates did not have the plant or expertise to produce a comparable gun—proved one of the few effective mid-range guns during the war. When it disgorged spherical case shot, it was useful for breaking apart confederate formations, as the Kentuckians in Major General John Breckinridge's confederate division learned first-hand. Note that similarly sized cast-iron 10-pound Parrott rifles often burst and killed the federal crews that operated them. Because of this, Redlegs tried to avoid using them like they avoided the plague.

Beyond sterile number crunching, Stones River also offers insights into FA's value as a defensive weapon during the war. Near 4:30 p.m. on January 2nd, 1863, former U.S. Vice President Breckinridge's division broke through the federal line and rushed headlong to rout the Yankees before the sun set and darkness engulfed the battlefield. It proved a fatal mistake. As soon as the retreating Infantry

were safely out of the way, 58 federal guns (eight of them in batteries H and M of the 4th U.S. Artillery) opened fire at a rate better than 100 rounds per minute together. “They simply slaughtered the Kentuckians,” and in the process turned the tide of the war in central Tennessee. General Braxton Bragg withdrew the Confederate Army of Tennessee from the region; though, it had so badly mauled General William Rosecrans’s Army of the Cumberland that the latter could not campaign for another six months. If the Army of the Cumberland had been able to go on the offensive, it might have found success—by the spring of 1863, the Army of Tennessee was reduced to a stockpile of between 66 to 171 rounds per gun, depending on the cannon. Confederate munitions facilities, as Gorgas predicted, simply could not keep up with demand, which meant the confederate Infantry faced fighting with only minimal artillery support in the West during the war’s last year. Near the same time Bragg fretted about his dearth of shells, the Army of Northern Virginia’s artillery arm expended nearly 50% of its munitions supply at Gettysburg. Its 272 field pieces fired nearly 22,000 rounds over the course of that three-day battle—the bloodiest of the war. As we have seen, however, they failed to break the federal formations on Cemetery Ridge and enable a confederate victory. Stones River—the war’s battle with the highest percentage of casualties on both sides—and Gettysburg lend credence to the dictum that “fire power solves all tactical, most operational and no strategic problems.” More significantly, they point to the absolute importance of ensuring adequate facilities are in place to support the Redlegs before they ever fire a shot in anger.



So where does all this examination of the DOTMLPF aspects of the ACW FA take us? The ACW, as Hess notes, saw the largest and most powerful FA forces yet to appear in the Western Hemisphere. Over 209,000 men and over 260,000 equines (horses, mules and donkeys) served in and supported 752 FA batteries across the federal and confederate armies. There must be something significant in that, one can assume. Their performance was largely improvised by amateur Soldiers devoted to studying foreign artillery manuals and constrained to on-the-job training. Hess’s more technological assessment is: “Field Artillery did not come to dominate the battlefield in any clear or consistent way largely due to technical limitations.” We hope that the readings over the previous weeks have shown, however, there were significant problems when it came to ACW FA beyond just the “M” in the DOTMLPF construct. As we try to make sense of the significance of FA in it, “The Civil War represented, in short, a very small step forward in the global development of field artillery.” Hess left us with an alibi fitting for the end of a long staff meeting— “If we take World War I as a model,” he wrote, “the Civil War Armies completely failed to field a modern artillery arm. But compared to the past, Civil War armies fielded a more advance artillery force.” That, from inside Snow Hall, seems about right. Let us ask “What lesson can we learn from FA in the ACW?” A good answer is that we will be better served moving forward on leveraging evolutionary change than in trying to kick start a revolution, regardless of the DOTMLPF realm.

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