Modernizing for Victory:

U.S. Army Fires at the Battle of Palo Alto, 1846

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On 8 May 1846, a small American field army under General Zachary Taylor won a decisive victory over the Mexican army at the Battle of Palo Alto in the opening engagement of the Mexican-American War. While the U.S. Army's infantry and dragoon branches would go on to earn renown at fabled places like Monterrey, Cerro Gordo, and Mexico City, the day at Palo Alto, along the north bank of the Rio Grande, belonged to the artillery corps. Positioning ahead of the front lines with innovative tactics and new field guns, Taylor's batteries smashed the Mexican infantry at the onset of the fight and then continued to disrupt further Mexican attempts to close with Taylor's lines.[1] The resulting victory preserved United States' control of Texas and set conditions for further American invasions of Mexican territory.

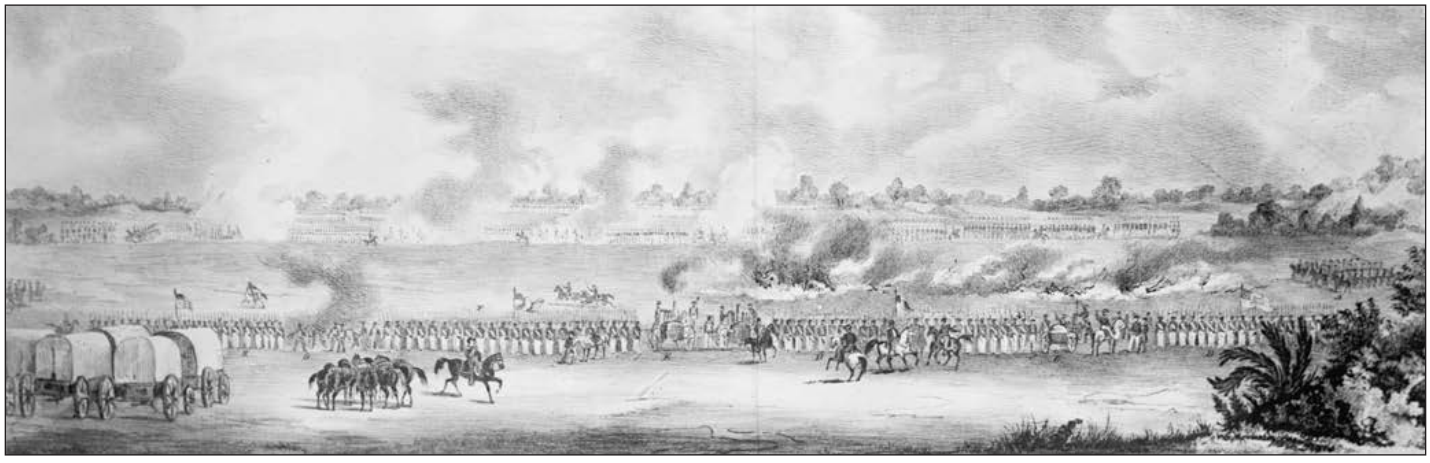
The degree of fires overmatch achieved at Palo Alto by Taylor's batteries can be attributed not only to the skill of the engaged artillerymen but to events that occurred before the war. Over the previous decade, despite having no expectation of an imminent war, the U.S. Army had implemented an ambitious modernization program designed to revitalize its artillery arm in preparation for potential conflicts. This program included establishing a light, mobile field artillery arm that could move quickly and engage at longer ranges with the latest advances in cannon technology.[2] The resulting evolution, which required a reinvention of the artillery corps between 1838 and 1844, provided an asymmetric advantage to the U.S. Army just two years later when it marched south to fight in Mexico.

This 19th century modernization program, and its successful combat debut at Palo Alto, holds insights for the modern U.S. Army as it similarly seeks to modernize its arsenal to attain competitive advantage. For Taylor's batteries in 1846, possessing technological overmatch was not sufficient; the real advancement in warfighting capability stemmed from the pairing of the new weaponry with a horse-centric battery organization, tactics that emphasized mobility and rapid fire as well as trained junior and mid-grade officers who understood the new system's potential. This alignment of form and function serves as a model for the current U.S. Army Modernization Strategy's imperative to "develop the next generation of weapons systems and maintain overmatch against near-peer adversaries."[3]

Investment Pays Dividends

The U.S. Army in the middle-19th century primarily comprised a small force of infantry, dragoon, and artillery regiments dispersed along the East Coast and across the young republic's expanding frontiers along the western expanses of the Mississippi River basin. Even after facing severe challenges during the War of 1812, the institution relied upon volunteer mobilization to expand its combat power for potential wars with nation-state competitors.

Illustration of the Battle of Palo Alto (Library of Congress Prints and Photographs Division)



On the eve of war with Mexico, the U.S. Army's strength stood at just 7,365 men dispersed in scattered companies and battalions across numerous frontier garrisons. Conversely, the Mexican army boasted a far larger force of 18,882 regulars and 10,495 militia in 1846 when conflict erupted along the Rio Grande.[4]

However, the U.S. Army's pre-conflict investment in modernization of its artillery arm, particularly the light field artillery, would in part offset the Mexican army's numerical superiority. This battlefield advantage originated with the War Department's fortuitous realization in 1838 that the U.S. Army drastically needed to modernize its expeditionary fires capability. The program that followed, which was personally led by Secretary of War Joel Poinsett, launched a robust debate over what kind of cannon and units would yield the degree of mobility and versatility required to project force along America's expanding frontiers. While the Ordnance Board of 1838 initially designated iron cannon based upon dated experiences in the War of 1812, Poinsett disagreed and dispatched a research team to Europe to learn about the merits of bronze casting. The survey results revealed conclusively that a bronze-based field artillery system would allow greater range, efficiency, and accuracy.[5]

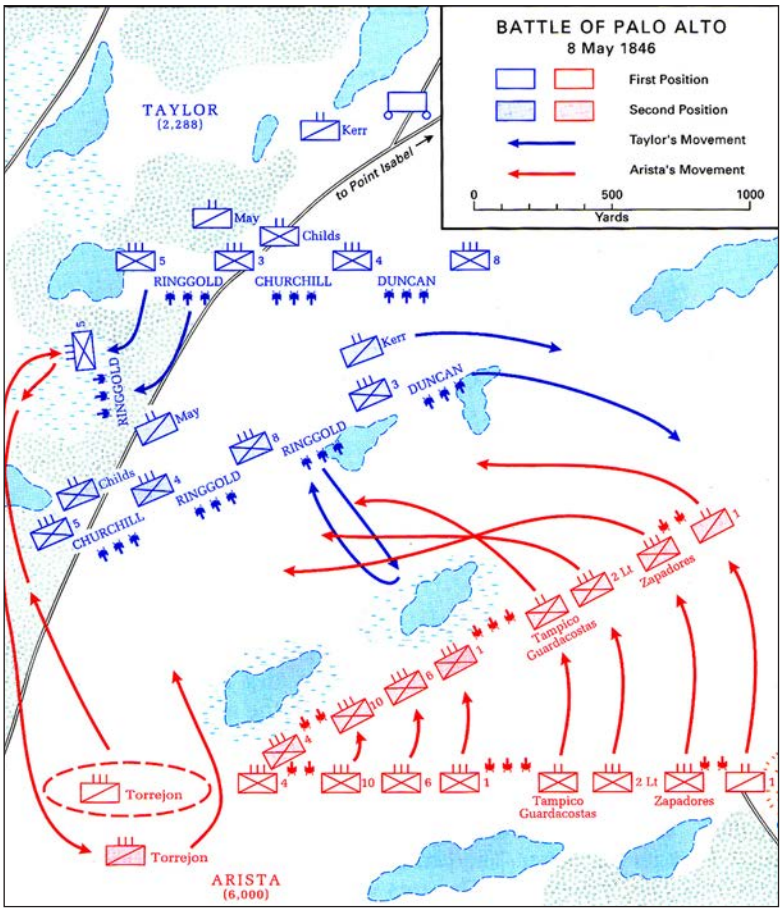
After two more years of debate over calibers, types of fuses and munitions, and designs for horse-drawn carriages, Poinsett empowered a team of forward-thinking officers to lead the creation of a light field artillery system that consisted of 6- and 12-pound field guns, an array of 12-, 24-, and 32-pound howitzers, and 12-pound mountain howitzers. In 1841, needing a new tactical doctrine to guide employment of the new weaponry, the artillery arm translated and adopted a French army manual, *Instruction for Field Artillery: Horse and Foot*, in order to provide a modern organizational structure and tactical methods. The new field artillery structure, which was designed to support maneuvering infantry and cavalry with forward, mobile positioning, comprised mounted light batteries of six guns each under a captain with each battery then subdividing into three two-gun sections each under a lieutenant.[6]

The selection and training of a new cadre of artillery officers to operate the new systems posed another dilemma. After receiving initial resistance from conservative-minded senior officers of the 1st and 2nd U.S. Artillery Regiments over implementation of the new concept, the War Department first activated a pilot company under Major Samuel Ringgold — a trail-blazing officer who would lead, and die, with distinction at Palo Alto — and then followed with creation of three additional mounted companies as the production of bronze cannon and procurement of trained horses allowed. Realizing the dearth of existing expertise in the regiments, Poinsett also created a centralized camp in New Jersey for individual batteries to rotate through in order to receive specialized training in the new arms. In 1844 the U.S. Army began assigning new lieutenants directly to the mounted batteries, as opposed to detailing them from the artillery regiments, in order to create a depth of institutional expertise.[7]

The prospect of war between the United States and Mexico in 1846 thus found the U.S. Army dramatically outnumbered by its Mexican counterpart but in possession of a modernized, superior field artillery arm. When the United States annexed Texas in 1845 and inherited the Texas Republic's assertion that its territory extended south to the Rio Grande, the Polk Administration dispatched Taylor's diplomatically named "Army of Observation," comprising 1,500 Soldiers and including three of the new field artillery batteries, to enforce the claim. The small expeditionary force proceeded to first camp at Corpus Christi and then, as tensions escalated, established a fortified post called Fort Texas in the contested territory across the river from the Mexican city of Matamoros. On the southern bank, Mexico's Army of the North likewise postured to defend land and honor.[8]

Tensions over territorial disputes in South Texas then exploded into full-scale war when Mexican cavalry ambushed and defeated an American dragoon detachment near the Rio Grande. The engagement occurred on the north bank of the river and resulted in the embarrassing capture of two companies of the 2nd U.S. Regiment of Dragoons. President James Polk, learning of the skirmish in Washington, D.C., controversially declared that "American blood has been shed on American soil" — which actually occurred in disputed territory that the Texas Republic had never controlled — and called for the U.S. Congress to declare war.[9] This aggressive policy, which found some resistance in Congress, reflected the Polk Administration's real intent to employ the Texas dispute as a pretext to fulfill visions of Manifest Destiny by seizing New Mexico and California.

However, before Taylor could receive news of the declaration, the pace of events quickened in the Rio Grande Valley as the opposing armies maneuvered for positions of advantage. When the Mexican Army of the North under General Mariano Arista besieged and isolated the small American garrison at Fort Texas, Taylor advanced his main force from its primary logistical base at Port Isabel on the Gulf Coast to rescue the beleaguered defenders. Arista,



Map of the Battle of Palo Alto — 8 May 1846 (*Guns Along the Rio Grande: Palo Alto and Resaca de la Palma* by Stephen A. Carney)

leading force of 3,702 soldiers, turned to the northeast and established defensive positions across a broad and marshy plain at Palo Alto that blocked the road to Fort Texas. These actions, all reflecting judgements by commanders acting outside of a declared state of war, set the stage for the first major battle of the Mexican-American War.[10]

The Mexican defensive line extended for approximately one mile, with irregular cavalry anchoring the left end, heavy cavalry and several infantry brigades holding the center across the road, and additional light cavalry guarding the extreme eastern end of the line. Arista, who had significant combat experience in previous wars, deployed two 8-pound and six 4-pound cannon along his front. When Taylor's reconnaissance party discovered the Mexican dispositions, he responded by dividing the American force into two infantry wings, with the three batteries and their bronze field guns in front and a squadron of the 2nd U.S. Dragoons held in reserve. The plain's marshy center, clumps of trees, and patches of dense chaparral brush complicated both the defenders field of view and the advancing army's freedom of maneuver.[11]

The battle commenced at approximately 1400 hours on 8 May 1846 when the arrayed Mexican cannon opened fire on the advancing American Army. However, the defenders' dated, copper cannon proved unable to strike Taylor's men who halted one-half mile to the north. Then, in the moment of truth that would reveal the value of the War Department's modernization efforts, Taylor ordered his three batteries under Lieutenant William Churchill, Major Ringgold, and Captain William Duncan — who commanded the American right, center, and left artillery positions respectively — to return counterfire against the Mexican lines. The U.S. Army's updated Model 1840 bronze field guns, with a range of 1,500 yards, proceeded to both suppress the Mexican cannon and pour solid shot and exploding case shot into the ranks of the Mexican infantry.[12]

Realizing his inability to win the artillery contest, Arista ordered a western flank attack by his larger cavalry force under an aggressive officer, General Anastasio Torrejon, who had previously defeated the American dragoons. The 5th U.S. Infantry Regiment, with a two-gun section of 6-pounders in front, countered the assault and compelled

the Mexican cavalry to retreat back to their lines with high casualties. Meanwhile, in the center, Ringgold moved his battery forward to increase the deadly pressure on the Mexican infantry. At approximately 1700 hours, Torrejon led another flanking attack on the American right while Arista ordered his own artillery to engage Ringgold's battery, which had closed to within 400 meters of the Mexican lines. The Mexican's fire pushed the American battery back, and in doing so, mortally wounded Ringgold.[13]

Sensing an opportunity, Arista ordered a final flank attack against the American left with a mixed force of light infantry and light cavalry. He hoped to move around the 8th U.S. Infantry Regiment's extreme eastern position to destroy the American wagon train. Fortunately for Taylor, his modernized artillery again proved its worth: Duncan's mobile battery raced to the exposed flank and fired canister shot into the Mexican ranks as they emerged from the chaparral brushline. The 8th U.S. Infantry and the 2nd U.S. Dragoons then provided additional support, ultimately repelling the Mexican assault. Duncan, seeing the Mexican army in distress, completed the day's action by moving his battery to within 300 yards from the Mexican right flank to fire directly into the ranks. Bloodied and exhausted, Arista's soldiers withdrew to the southern edge of the battlefield and camped for the night. Their casualties for the day included 102 dead and 129 wounded in contrast to the five killed and 48 wounded for the Americans.[14]

Modernization Lessons

The American artillery continued its performance the next day at the Battle of Resaca de la Palma, where Ringgold's battery, now under new leadership, again led the way with devastating fire against Arista's battered forces. This continued fires overmatch set a precedent for the remainder of the war where the modernized U.S. Army, and its field guns in particular, won battle after battle as the Polk Administration dispatched additional expeditions into New Mexico, Alto California, Baja California, the Gulf Coast, and finally into the Valley of Mexico to seize Mexico City. While the U.S. artillery's modernized mounted batteries would not achieve such outsized impact in most engagements, they nevertheless proved instrumental in enabling American victory at places like Monterey, Buena Vista, Cero Gordo, Molino del Rey, and Chapultepec.[15]

The U.S. Army artillery arm's remarkable performance directly stemmed from modernization initiatives undertaken by the War Department prior to the outbreak of war. By conducting a rigorous, research-driven program to develop an enhanced long-ranged fires ability with the requisite battlefield mobility, American ground forces, with significant naval and marine support, were able to win repeatedly and decisively in expeditionary settings — almost always against numerically larger forces. This capacity for tactical overmatch enabled the attainment, however controversial, of the Polk Administration's strategic aim to expand U.S. territory to include South Texas, New Mexico, and California. It ultimately resulted in the rise of the United States as the dominant power in North America and provided it access to expansive markets across the Pacific Ocean.[16]

This achievement in combining pre-war modernization with successful combat validation holds several insights for the U.S. Army in the 21st century as it once again seeks to evolve warfighting capabilities in an uncertain world. The first of these centers on the War Department's decision in 1838 — despite institutional resistance — to compel a forward-thinking, process-driven modernization agenda to improve its atrophied ground fires capacity. While no definite adversary presented itself at that time, visionaries like Secretary Poinsett recognized the requirement to increase readiness by incorporating the latest technological advances from Europe and adapting them to the U.S. military structure in order to prepare for a range of potential nation-state and Indian conflicts. This process included overriding senior officers and officials who remained wedded to outdated notions and empowering agents of change to compel modernization.[17]

A second lesson from the U.S. Army's experience with modernization at the Battle of Palo Alto centers on how the institution successfully created new organization and tactics to wield the acquired weaponry. Beginning with a pilot company and then expanding to full capacity, the U.S. Artillery incorporated new organizational structures and doctrine specifically designed to enable an enhanced range of battlefield mobility and long-ranged fires. Poinsett, realizing the subsequent requirement to systematize the newly acquired expertise, rotated mounted batteries through a central training facility to ensure improvement of individual skills and expansion of institutional capacity.[18] This pre-war focus on aligning technology, organization, doctrine, and training paid clear dividends at Palo Alto when the U.S. Army's untried mounted batteries proved their value.

The third insight from the United States' experience with modernization prior to the Mexican-American War

pertains to how the War Department allocated, groomed, and trained a new cadre of officers and men to operate the new field guns. By initially empowering men like Ringgold, who could visualize the tactical potential of the fleet and lethal field guns, and then creating an institutional pathway to assign new officers to the units, the War Department professionally developed a cadre of trained and motivated light field artillery officers who mastered the new systems.[19] This alignment of personnel with the new organization and technology again proved its value at Palo Alto and throughout the Mexican-American War, when junior artillery officers repeatedly seized initiative to advance and reposition gun teams in order to forestall defeat and enable victory.

Looking towards a new century of challenges, the contemporary U.S. Army must follow its predecessors' example in modernizing its arsenal to achieve victory. As mandated by its own strategic imperative to "enable multi-domain forces to penetrate and neutralize enemy A2/AD (anti-access/area denial) capabilities while ensuring military over-match at every echelon," the institution requires leading visionaries to identify necessary evolutions and compel innovative and research-based improvements to its warfighting capabilities.[20] This remains especially true in the contest for superiority of long-ranged fires — which, more than a century later, remains instrumental for shaping operational conditions for all other ground forces. Given this enduring fundamental, the achievements of the U.S. Army's revitalized artillery at Palo Alto, and the modernization process that created it, remain an example to be emulated.

Notes

[1] K. Jack Bauer, *The Mexican War, 1846-1848* (Lincoln, NE: University of Nebraska Press, 1992), 52-57.
[2] Boyd Dastrup, *King of Battle: A Branch History of the U.S. Army's Field Artillery* (Fort Monroe, VA: Training and Doctrine Command, 1992); 67-71.
[3] 2019 Army Modernization Strategy: Investing in the Future, https://www.army.mil/e2/downloads/rv7/2019_army_modernization_strategy_final.pdf.
[4] Stephen A. Carney, *Guns along the Rio Grande: Palo Alto and Resaca de la Palma*, (Washington, D.C.: Center of Military History, 2005), 7.
[5] Dastrup, *King of Battle*, 67-68.
[6] Ibid.
[7] Ibid.
[8] Carney, *Guns along the Rio Grande,* 11-14.
[9] John S.D. Eisenhower, *So Far from God: The U.S. War with Mexico, 1846-1848* (Norman, OK: University of Oklahoma Press, 2000), 66.
[10] Carney, *Guns along the Rio Grande*, 15-18.
[11] Bauer, *The Mexican War*, 54.
[12] Carney, *Guns along the Rio Grande*, 17-20.
[13] Ibid, 20-22.
[14] Ibid.
[15] Bauer, *The Mexican War*, 397-399.
[16] Ibid.
[17] Dastrup, *King of Battle*, 67-71.
[18] Ibid.
[19] Ibid.
[20] 2019 Army Modernization Strategy.

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