

THE PENNSYLVANIA MILITARY MUSEUM'S SIX-TON M1917

A UNIQUE EXAMPLE OF AMERICA'S FIRST MODERN TANK

*Michael Siggins and Karen Dabney
Pennsylvania Military Museum*

ABSTRACT: This article examines the history and significance of the World War I-era American six-ton M1917 Tank through the one-of-a-kind example of this rare artifact owned by the Pennsylvania Military Museum in Boalsburg, Pennsylvania.

KEYWORDS: World War I, M1917 Tank, Marlin machine gun, Browning machine gun, Renault FT-17

The Pennsylvania Military Museum has many significant artifacts in its collection, but two from the World War I era stand out. The American six-ton M1917 Tank, armed with a Marlin tank machine gun, is the last known tank of its type left in the world. Displayed beside it is an example of the very rare Marlin tank machine gun originally installed inside. After surviving World War II scrap-metal drives and a subsequent role as a civilian parade attraction, the tank was donated to the museum in 1969. The Marlin gun was purchased from a historical weapons collector in 2006 to complete the exhibit.

The M1917 Tank was based on a successful French tank design that had its combat debut in the closing months of World War I.

During the early months of World War I, a stalemate on the Western Front developed rather quickly. After the German attacks of 1914 into France were blunted, both sides dug in and tried in vain to blast and pry each other out of their entrenchments with prolonged artillery barrages and fruitless infantry charges. Blown to bits by rapid-firing, breech-loaded heavy artillery, and stopped in their tracks by well-emplaced machine guns and thick barbed-wire entanglements, infantry units suffered staggering losses measured in thousands of casualties per day for advancements measured in yards.

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A change was needed, and that came in the form of a revolutionary new weapon—the tank. The concept of this new weapon was conceived simultaneously by the British and the French to neutralize machine guns and barbed-wire obstacles. In 1916, the first tanks made their combat debut with the British Army. The French, and to a much lesser extent the Germans, eventually developed and fielded their own tanks. Early tanks were slow and mechanically unreliable. Some were dead-end designs doomed to failure as soon as they appeared on the battlefield. The interiors were hot, cramped, and filled with exhaust and ammunition fumes. Merely driving them to the start of an offensive line could result in more than 50 percent of the attacking tank force out of action due to mechanical failure. This, coupled with the unimaginative tactical use to which the new weapon was employed by traditional-thinking commanders, nearly relegated the new weapon to the trash heap of history just as it was starting to show some promise. By the middle of 1918, due to gradual improvements in design, manufacturing, and tactics, the tank started showing its potential as a battle winner and revolutionary weapon of war.

Toward the end of the war, the French fielded an innovative, small two-man tank, the Renault FT-17, used by French and American Tank Corps. Considered to be the world's first modern tank, the FT-17 pioneered the basic layout from which tanks have been designed ever since. The main armament was placed in a fully traversable turret on top of the hull, and became the first use of a gun turret on a tank. The turret rotated 360 degrees, allowing the gun to be aimed in any direction. The driver sat in front, the fighting compartment/turret was in the center, and the engine was in a separate compartment in the rear.

The FT-17's engine placement was a significant improvement from engine placement in previous tank designs. Prior to the FT-17, the engine and power train components were placed in the middle of the crew compartment, exposing the crew to stifling engine heat and noxious fumes. As the tank lurched across the shell-scarred battlefield, the crew was routinely knocked against the hot engine and radiators, resulting in burns and other serious injuries. In the FT-17, the main armament consisted of either one 37mm cannon or one .30-caliber machine gun. The crew consisted of a driver and a commander who also served as loader and gunner in the turret.¹ Previous tanks were much larger in size and held more crew members.

The FT-17 would soon equip the established French tank units as well as the fledgling American tank force being formed in France. However, the quantity

of FT-17s required to fill out the ranks of the French and American tank units outstripped the manufacturing capacity of the French heavy industry. As a result, the United States agreed to build additional FT-17s in American factories. In September 1917, a single FT-17 and a set of plans were sent to the United States with the goal of producing twelve hundred FT-17s for the French army and a sufficient number for the US Army's tank units. Once in the United States, the FT-17 was reverse-engineered to fit American manufacturing techniques, including a change from metric to American measurements.

The American version was originally known as the M1917 Six-Ton Special Tractor. It eventually became known as the M1917 Tank and incorporated several improvements over the Renault FT-17. A fire screen bulkhead was built between the crew compartment and the engine compartment. Two additional vision slots were added to the sides of the driver's compartment to increase range of vision. To guide the caterpillar treads, the M1917 Tank used all-steel idlers instead of the steel-rimmed wooden idlers of the FT-17. To improve ease of construction, all M1917 Tank turrets were built as octagonal bolted turrets instead of the French use of both octagonal turrets and difficult-to-manufacture molded round turrets. Hull and turret armor thickness ranged from a quarter-inch to five-eighths of an inch. The American engine, a four-cylinder Buda HU gasoline engine, originally designed as a boat engine, had forty-two horsepower at 1,460 revolutions per minute, and a maximum speed of approximately five-and-a-half miles per hour. The selective sliding gear transmission had one reverse and four forward gears.²

Some M1917 Tanks were armed with a 37mm gun M1916, and others were mounted with a machine gun. The initial plan called for the machine gun tanks to be issued with a .30-caliber Marlin tank machine gun. The machine gun was adapted from a Marlin aircraft machine gun by adding cooling fins to the barrel and placing the gun in an armored sleeve mount. The fins prevented overheating when the gun was fired from within the confined space of its armored sleeve mount. However, soon into production the Marlin machine gun was replaced with the Browning .30-caliber machine gun. The change was made due to the superior performance of the Browning gun, according to tank historian and author R. P. Hunnicut.³

All of the previously built tanks armed with Marlin machine guns were mandated to be converted to the Browning version by changing the machine gun mounts and installing the new guns. Somehow, the museum's tank escaped the conversion process and became the only known surviving M1917 Tank that retains the original Marlin machine gun mount (Figure 1).



FIGURE 1 Marlin tank machine gun on display at the Military Museum. (Credit: Pennsylvania Military Museum, Boalsburg)

The M1917 Tanks were constructed by three companies in Ohio, the Van Dorn Iron Works of Cleveland, the Maxwell Motor Company of Dayton, and the C. L. Best Company, also of Dayton.⁴

The first tank was not completed until October 1918. Ten had been shipped to France before the Armistice, but none saw combat. By the end of 1918, 209 of the original order of 4,440 tanks had been completed. The US government decided to finish a total of 950. These served as the majority of the tanks in army and national guard units from 1919 well into the 1930s, along with several hundred French-built FT-17s.

The majority of US Army tanks during this period were painted olive drab, and given a coat of gloss varnish when in peacetime livery to protect and preserve the paint underneath. However, from 1919 to 1920, camouflage patterns were used briefly on tanks of the Sixteenth Tank Battalion at Fort George Meade, Maryland.⁵ While there is no definitive proof that the museum's tank was part of the Sixteenth Tank Battalion, its underlying original camouflage pattern offers strong evidence that this tank could have been with the Sixteenth Tank Battalion from 1919 to 1920. The tank currently displays a restored version of the very colorful blue, brown, and yellow-beige original camouflage pattern.

Soon after the appearance of any new or improved weapon system on the battlefield, the means to destroy it will be developed. With the combat debut of the tank by the French and British, the Germans needed an effective weapon to counter this new form of attack. Armor-piercing rifles and machine-gun ammunition needed to be employed close to the target to have any chance of stopping or destroying a tank. The Germans required a larger caliber gun that could fire over open sights at a distance to help protect the gun crew, and enough muzzle velocity to hit and destroy tanks at that distance. Their 77mm field guns met these requirements, and began to show success as the world's first antitank guns. The Pennsylvania Military Museum's German 77mm field gun is displayed near the M1917 Tank, creating a fitting juxtaposition between tank and tank killer (Figure 2).

Few M1917 Tanks survive today. The unofficial online Historical Registers for the AFV (Armored Fighting Vehicles) Association list two M1917 Tanks in Canada, and seventeen in the United States.⁶ The Military Museum boasts the only M1917 Tank on the list that is located in Pennsylvania. The museum's tank is also the only known example that has retained the mount for the Marlin tank machine gun.



FIGURE 2 The Pennsylvania Military Museum's German 70mm antitank field gun. (Credit: B. R. Howard & Associates, Inc., Carlisle, PA)

In January 1969, J. William Richey of Everett, Pennsylvania, donated the tank to the newly built Pennsylvania Military Museum.⁷ When he purchased the tank from the Frankford Arsenal in Philadelphia in the early 1930s, the original Buda motor had been removed to power a boat owned by a lieutenant of ordnance. Richey replaced it with a Ford Model A engine. A friend hid the tank during World War II to prevent it from being taken during scrap-metal drives. Richey said he later drove the tank in parades until the tank crashed into a car in York, Pennsylvania.⁸ To prevent damage to the roads during parades, he bolted wood blocks to the steel treads through two holes that he had burned through each steel tread with an oxyacetylene torch.⁹

After its donation to the Military Museum, James Altman of New Kensington, Pennsylvania, restored the tank in 1970. According to the original service purchase contract to engage Altman's services, the restoration included "interior painting, exterior camouflage painting, cleaning and repainting engine, replacement and installation of missing engine parts, upholstering driver's seat, replacement and installation of pertinent military accessories."¹⁰ The museum installed the restored tank in its room-sized diorama of a World War I trench. Restoration work included splashes of cement and pigmented plaster on lower parts of the tank to create the appearance of mud splatters from battle.

Altman touched up the exterior camouflage paint, which Richey had applied before the early 1960s on areas that could be easily seen. The camouflage pattern consisted of irregular areas of bright blue and yellow paint, separated from each other by black lines. In some areas, where the 1960s camouflage had not been applied, two earlier layers of paint were visible: olive drab and an earlier layer of brown-and-tan camouflage with no black dividing lines.¹¹

In 2006, the museum contracted with B. R. Howard & Associates, Inc., an artifacts conservation company in Carlisle, Pennsylvania, to perform treatments to stabilize the tank. These included: removal of the wooden blocks on the treads and the concrete "mud" accretions, degreasing and cleaning; reduction of areas of surface corrosion and coating them with an archival varnish. After draining fluids from the Ford Model A engine, motor oil was injected into the cylinders in accordance with National Park Service preservation guidelines. The conservators replaced incorrectly fabricated parts from the Altman restoration with more accurate reproductions, including the driver's seat and backrest, the leather grab straps in the turret, the ammunition bins, and a shovel and pick ax (figures 3 and 4).



FIGURE 3 The M1917 Tank before treatment. (Credit: B. R. Howard & Associates, Inc., Carlisle, Pennsylvania)



FIGURE 4 The M1917 Tank after treatment. (Credit: B. R. Howard & Associates, Inc., Carlisle, Pennsylvania)

Conservators also removed minute samples of paint and sent them to Orion Analytical, a laboratory in Williamstown, Massachusetts, to identify the pigments and the layers of paint and varnish. In small test areas on the tank, they removed three layers of overpaint with a solvent gel to expose the original 1918 paint. The overall camouflage pattern could not be determined by viewing the sample test areas. After consulting with museum staff, the conservators removed all of the overpaint to expose the original blue, brown, and tan camouflage. The paint had extensive abrasions and losses, but approximately 85 percent remained intact. They confirmed that the original camouflage pattern did not have black dividing lines between the colors. They sprayed an isolating coat of reversible varnish on the tank to protect the paint, then repainted the camouflage pattern over the varnish with Golden MSA Conservation Colors (mineral spirit-based acrylic resin paints) that can be reversed with mineral spirits. They then applied a thin, transparent glaze of oil-based stains over the reproduced camouflage to recreate the yellowed varnish found covering the 1918 paint layer. The addition of the glaze shifted the colors to golden yellow and warmer shades of blue and brown.¹²

The Pennsylvania Military Museum's exhibit of the M1917 Tank, the Marlin tank machine gun, and the German 77mm field gun offers museum visitors an opportunity to view these key military innovations together, and provides a concise visual summary of armed conflict during "the war to end all wars."

MICHAEL SIGGINS, former president of the Friends of the Pennsylvania Military Museum, is an award-winning master model builder specializing in tanks and military vehicles set in historically accurate miniature dioramas. His work has been published in *Fine Scale Modeler Magazine*. He is a registered architect and maintains an active practice in State College. He continues his association with the museum as a volunteer, guest lecturer, and tour guide for their armored vehicle collection.

KAREN DABNEY is a former conservator for the Pennsylvania Historical and Museum Commission and the Pennsylvania State University's University Libraries. She maintains her relationship with the Commission by serving as a volunteer for the Pennsylvania Military Museum in Boalsburg, Pennsylvania, and is a freelance writer based in State College, Pennsylvania.

NOTES

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