What made the 75 MM so Revolutionary?

BY GENE FAX

By the late 1890s, breechloading rifled guns had replaced smoothbore muzzle loaders and solid shot had given way to exploding shells. Otherwise, field artillery operated much as it had since its invention in the late 15th Century. A charge of black gunpowder and a projectile were loaded separately. The crew aimed ("laid") the gun, then stood well back from the piece. A soldier pulled a lanyard, firing the gun and producing a cloud of white smoke that immediately obscured the gunners' view of the enemy and revealed the gun's own position. The carriage, on which the barrel was hard-mounted, lurched backward several feet. The gunners ran back to the gun, wheeled it by hand into its (approximate) starting position, and aimed it again, to the extent that they could see anything. The rate of fire was thus limited by the time it took to stand clear of the recoil, reposition the gun, and re-lay it. A typical firing cycle took 15 seconds. Constantly repositioning the gun quickly wore out the crews.

Artillery training at Camp Lee, Va.

In 1896, two French artillery captains invented a hydraulic shock absorber that took up the recoil of the barrel and returned the tube to its firing position, eliminating the rearward motion of the carriage. Self-contained ammunition combined smokeless powder and a projectile within a single brass casing. Improved devices for aiming and fuze-setting were also developed. These features became the basis for the 75 mm gun that the French adopted in 1897. Gunners could now fire as fast as they could load; this was some twenty to thirty rounds per minute with no need to re-lay the gun once shells were falling on target. Equally important, forward observers could now give target coordinates to the gunners, enabling the latter to fire accurately from concealed positions at targets they could not see.

A 75-mm gun crew in action was a wonder to observe. The designers

had thought hard about arranging the gun's controls for ease and speed of use. A rotating breech mechanism closed and opened by throwing a single lever; this replaced the usual door-like hatch that had to be shut and latched down. The shrapnel shell weighed 16 pounds and the high explosive (HE) shell weighed only 12; because the charge and projectile were combined in a single package, the projectile could easily be loaded by one man. The natural frequency of the gun's firing cycle exactly matched the loading and firing cadence of the crew, achieving a near-perfect integration of man and machine; neither had to stop to wait for the other at any point in the operation.

A firing cycle started with the gun barrel in its farthest-back position. The loader, standing to the left rear of the gun, shoved a shell into the open breech. As the barrel, propelled forward by the gun's hydraulic mechanism, reached the firing position, the breech-worker, at the right rear of the gun, closed the breech by pushing its handle downward. At the same time the gunner, stationed to the left of the tube, checked the barrel's aim, corrected it if necessary, and, at the top of its travel, gave the signal to fire. The breech-worker yanked the firing lanyard, the shell sped on its way, and the barrel, but not the gun's carriage, jerked backward. As the hydraulic cylinder slowed the tube's recoil, the breech-worker opened the breech by hauling up on the lever, automatically ejecting the spent shell casing. While he was doing this, the assistant loader took a fresh shell from the caisson and, using a device built into the caisson, set the fuze for the range called out by the gunner. The loader pivoted to his left and the assistant loader handed him the fresh shell. The loader then pivoted right, rammed the new shell into the open breech, and the cycle began again. A well-trained crew could perform this lethal ballet in three to four seconds and keep it up for hours. This drill can be seen in films taken by French and American cameramen; see, for example, CBS News, *World War I: The Complete Story*, 2008, Volume III, Episode "The Tide Turns," 3:25 (DVD).

The gun had its drawbacks because it fired in a flat trajectory, so it could not reach into trenches or dugouts; its shells were too light to penetrate fortifications or deep shelters. Heavy guns and howitzers were developed for those purposes. Against troops in the field it was deadly. The "75" is credited, along with the sophisticated French rail system and internal lines of communication, with stopping the German offensive in 1914.

The French kept the 75 secret until

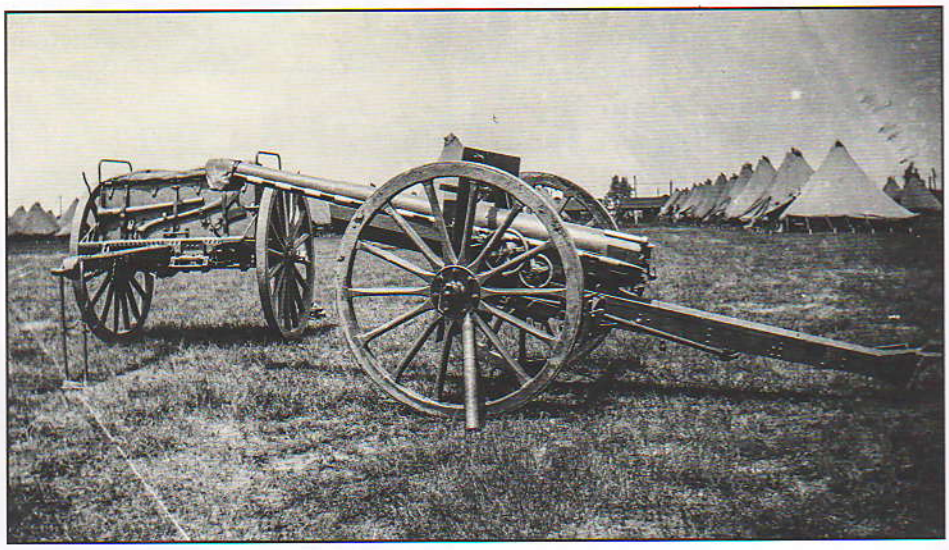
75 mm gun crew in training, showing gun breech and caisson. (National WWI Museum & Memorial)

75 mm gun crew taking a break on the road. (National WWI Museum & Memorial)

1901, when they used it in the Boxer Rebellion. Other countries quickly understood its revolutionary implications and developed their own quick-firing models. The British came out with a 76 mm (13-pounder) gun and an 83.3 mm (18-pounder) in 1904. A year later, Germany added recoil absorption and other improvements to its obsolete 77 mm cannon; even so, the upgraded gun's recoil mechanism was inferior to that of the French and it could achieve a rate of fire of only 10 rounds per minute. The United States, after several false starts, did not develop a practical weapon in time for World War I; it obtained all its field artillery, some 1,800 75s and 1,000 heavier guns, from the French.

As the first rapid-firing artillery piece, the French 75 can be credited, along with the machine gun, as being among the first manifestations of modern land warfare.

An engineering graduate of MIT, Gene spent the first eight years of his career conducting research and tactical studies in anti-submarine warfare for the U.S. Navy. The paperback edition of his book, *With Their Bare Hands: General Pershing, the 79th Division, and the Battle for Montfaucon,* was published in February 2018, by Osprey. Gene is a member of the Society for Military History, the Western Front Association, and the Army Historical Foundation. He is an Official Partner of the Unites States World War I Centennial Commission.



75 mm gun, caisson, and shell. (National WWI Museum & Memorial)

75 mm gun firing at the St. Mihiel Salient. Notice the shell casing flying through the air as another shell is being loaded.