

## Modernization and Representations of Artillery in Europe

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### ABSTRACT

While gunpowder was not a European invention, the development of artillery contributed from the late Middle Ages onwards to the emergence of European states, together with a military culture specific to the continent as a result of circulating technical knowledge. Artillery also contributed to the development of a specific way of conducting and experiencing war which culminated in the two global conflicts. In doing so, it led throughout Europe to a particular experience of war and the trauma of destruction and left a lasting impression on the Europeans through its devastating power.



A battery of katyushas in action during the battle of Stalingrad, October 6, 1942.  
RIA Novosti archive, image #303890

### Development of the Nation State and Technological Revolutions

While catapults and ballista were used during Antiquity and the Middle Ages, a revolution took place in the military use of projectiles during the fourteenth and fifteenth centuries with the appearance of firearms in Europe. The largest pieces, which were designed for collective rather than individual use and required animal haulage as well as a crew of multiple people, subsequently became what was referred to as artillery. The first pieces were produced in artisanal and empirical fashion, gradually giving way to cannons produced industrially and

scientifically. One of the major reasons for this evolution was the emergence of the early modern state beginning in the sixteenth century, which strengthened itself through artillery while establishing itself as the architect of its modernization. For financial and technical reasons, only the state could ensure the continued development of artillery, by relying on emerging taxation, an administration capable of managing increasing logistics, and an army at its service.

This state action provided support for the technical evolutions affecting the pieces that make up a cannon. For instance, bronze became the preferred choice for the cannon barrel from the Renaissance onwards, until a transition to steel began in the mid-nineteenth century. The nineteenth century saw another major innovation with the adoption of rifled barrels, which increased range and precision. Their rate of fire also accelerated during the same period, with the adoption of recharging from the breech of the cannon rather than its mouth. The projectile was also modified radically during the nineteenth century, with the abandoning of balls in favour of shells. This was also true of explosives, as at the end of the century gunpowder was replaced by cordite, melinite and guncotton, which were smokeless explosives offering greater power and less risk. Finally, there was the simultaneous invention of the hydro-pneumatic recoil brake for the French 75 cannon, which also increased firing rate and precision.

The serial production of cannons and the proliferation of heavy artillery were made possible by the Industrial Revolution, with a country's artillery capacities depending on its level of industrialization. For example, Prussia and later Germany were personified in European representations by the power of both the Krupp artillery and the industrial basin of the Ruhr. Finally, the modernization of artillery benefited from the circulation of knowledge on the European scale. From Italy during the Renaissance to France during the eighteenth century, and from Prussia in the mid-nineteenth century to France (again) in the late nineteenth century, technical innovations and theoretical reflections crossed from one European space to another.

## **At the Heart of the Fighting and Representations of the Great War**

Following upon the transformations of the preceding century, the Great War proved to be the apex of artillery. It also led to a diversification of the types of pieces, with mortars adapted to trenches and artillery that was hauled mechanically, which was called "special artillery" in France and would become the future armoured division. At the same time, anti-aircraft and anti-tank artillery emerged in response to new weapons. This conflict improved observation and communication methods, for instance with aerial photography, the telephone and wireless telegraphy, all of which were used in the service of artillery. The modernization of artillery therefore took its place within a European continent marked by rapid technical and scientific innovation, along with the extensive spread of literacy at the end of the preceding century, which enabled mass expansion of the artillery corps whose members were often trained in physics and trigonometry in scientific schools.

This modernization of artillery during the Great War led to a rebalancing within the armed forces to the benefit of artillery and the detriment of infantry. The experience of war, which had hitherto been overwhelmingly that of infantrymen, now increasingly became that of artillerymen as well. Due to its nature as a "technical" weapon, this experience was also linked to a more scientific and rationalized vision of war, at least in terms of perception.

However, this shift in the experience of war was also linked to how artillery affected soldiers in battle. Beginning with the First World War, the changes that had been visible since the Napoleonic wars began to increase. Noise struck soldiers to such an extent that it drove some of them insane, a syndrome quickly known in French as "obusite," or "shell shock." Furthermore, the battlefield was entirely remodelled by the action of artillery, eliminating any markers or feelings of protection. From the early twentieth century, the majority of wounds were inflicted by artillery, leaving a strong impression, especially with the "gueules cassées" (broken faces). Finally, the last factor that led to the definitive transformation of the war experience, one that was largely linked to artillery,

was the increasing anonymity of combat: in addition to the massive increase in the number of troops due to conscription, it was death itself—both given and received—that became anonymous. A long-term evolution thus came to a close, one that had accelerated in the preceding century with the evolution of artillery and firearms.

## **Artillery Marginalized from the Second World War?**

While artillery was at the heart of the Great War, it was also this conflict that marked the end of radical innovation in the field. Subsequent improvements were connected to range, precision, traction, and especially to the use of radar and radio, which made it possible, from the Second World War, to coordinate live observation with artillery strikes. Artillery became truly mobile during this conflict, in conjunction with the motorization of armed forces in general.

In representations of 1939-1945, artillery remains in many respects emblematic of the violence of combat, even though it lost importance to aviation, which could deliver hitherto unseen strike force. The power of the Red Army on the Eastern front was connected to both its armoured divisions and artillery, two military advantages associated with the USSR as a major industrial power. A discrepancy nevertheless emerged between this image and the reality of combat, in which the infantry played an essential role. In addition, while the reality of combat was that of traditional artillery, it was the *katyushas*, or “Stalin’s organs,” that left a deep impression. This innovation, which involved the installation of rockets on a truck chassis, distinguished itself from artillery strictly speaking but greatly contributed to inspiring fear within German ranks despite its lack of precision, due to its characteristic sound and reputation for effectiveness on barrages.

This innovation was also characteristic of a new shift in the history of artillery, marked during the second half of the twentieth century by the growing role of rockets in military arsenals. The modernization of artillery nevertheless continued during this period. For example, satellite images, lasers, and computerized calculations are all new innovations from fields outside of artillery, but which have since been integrated in its use.

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