

# *Notes for POL 23700 - Modern Weapons And International Relations*

*Zeke Ulrich*

*June 24, 2024*

These are lecture notes for fall 2023 POL 23700 at Purdue.

## *Contents*

<i>Course Introduction</i>	1
<i>Military revolutions</i>	2
<i>The gunpowder revolution</i>	2
<i>The Napoleonic revolution</i>	3
<i>The industrial revolution</i>	3
<i>The airpower revolution</i>	5
<i>The nuclear revolution</i>	6

## *Course Introduction*

This course introduces the student to the roles that modern weapons systems play in contemporary international relations.

Learning objectives:

1. Identify and explain the elements and requirements of nuclear deterrence.
2. Discuss the role of technology in the emergence of modern total warfare.
3. Analyze the impact of contemporary information technologies on the conduct of warfare.

## *Military revolutions*

**RMA:** Revolution in military affairs. A major change in warfare brought about by a new application of technology. **Total war:** The full mobilization of a country for the war effort, where the entire economy, social organization, and civil population become dedicated to the war effort.

Technology is the great equalizer. Whereas historically power was held by trained warriors and those who commanded them, the democratization of force through modern war machines enables a nineteen-year-old boot camp graduate to have the same effect on the battlefield as a soldier with decades of experience.

The five most important RMAs are, in chronological order:

1. The gunpowder revolution
2. The Napoleonic revolution
3. The industrial revolution
4. The airpower revolution
5. The nuclear revolution

In general, these things are true of RMAs:

- They involve new technologies
- Technology is not limited to Weapons
- Strategic competition encourages military innovation
- Innovation in warfare is driven by the basic struggle of defense vs offense
- RMAs are driven by technology, which is self-accelerating. Thus each RMA occurs faster than the previous

## *The gunpowder revolution*

The gunpowder revolution lasted from the 1400s to the 1700s. Prior political power was decentralized amongst smaller localities. In Europe, these smaller localities were hundreds of lords guided by the overarching influence of the Catholic church. Defense had the advantage. Sieges could last months or years, allowing the defenders an ever-present option to retreat. Knights were the dominant power. The more numerous footmen were untrained peasants pressed into service by nobles. Between the 1400s and 1850 consolidated countries emerged, largely thanks to newly invented cannons capable of

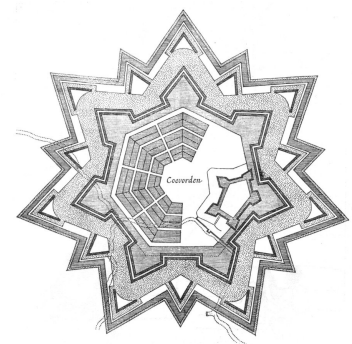


Figure 1: Bastion fort

The bastion fort was a very flat structure composed of many triangular bastions, specifically designed to cover each other. To counteract cannonballs, defensive walls were made stouter.

destroying castle walls. Defensive attempts to mitigate the destructive power of cannons, such as bastion forts, were expensive and rare. Now that cannons were able to easily destroy castles, royalty needed a strong, constant military force to protect themselves. These trained armies were able to combat the poorly organized feudal knights and led to the solidification of nation states. Feudal states, independent cities, and religious enclaves had no ability to forward standing armies and were conquered and assimilated. The battlefield advantage shifted from skilled knights to masses of peasants taught to hold a gun straight and fire on command. Discipline became more important than skill. Lines of riflemen faced off, firing and firing again until enough musket balls had found their mark that the opposing line fell.

As states with these larger armies assimilated their neighbors, Europe as we know it today began to emerge. Power solidified within families and individuals, and the medieval era of loose organization was supplanted by one of tighter regulation and control.

### *The Napoleonic revolution*

When Napoleon emerged as a great leader, the world experienced true nationalism for the first time. No longer did the poor need to be pressed into service, but now could be coerced in service of a greater cause. These patriotic soldiers were more motivated and their compatriots at home more willing to support the war. Citizens of French towns began thinking of themselves as French citizens, and national pride began to spread outwards from France. Napoleon structured his army into self-sufficient and purpose-built corps who supported one another. He promoted based on skill, improved logistics, and conquered large swathes of Europe before his enemies learned to adopt or counter his tactics. Angered by French conquest, nationalism flared in Prussia, Spain, and Britain and the disjoint European nations banded together to oppose the superiority of Napoleonic France. We thus learn an important lesson: good technology is adopted by everyone, eventually reducing the exclusivity its inventors at first enjoy. This lesson repeats itself in every RMA we will study.

### *The industrial revolution*

The industrial revolution allowed for the first true instance of total war, as states centralized after the Napoleonic wars became able to direct output and civilian population to drive large-scale wars. Three important technologies emerged under the industrial revolution:

- The railroad
- The telegraph

- The rifle

These innovations will be crucial going forward. Railroads allowed the mass transit of supplies and troops across land, allowing massive and rapid mobilization and effectively bringing countries closer together. Speed and response time became much more important once an enemy army could travel across several countries in the span of hours. Efficient and timely execution of orders necessitated efficient and timely communication of orders, which came with the invention of the telegraph. The telegraph sped up war even farther and shifted the advantage to the first mover in a war, such as the Prussians in the wars of German reunification.

Now, let's look at the final crucial invention: the rifle. Old muskets took half a minute to load under the best conditions, malfunctioned twenty-five percent of the time, and had an accurate range of around one hundred meters. Newly invented percussion rifles could kill at a mile, was much more reliable, and once repeating rifles were invented, soldiers could fire dozens of rounds per minute. The logical conclusion of this accelerating firing speed was the machine gun, capable of firing hundreds of rounds per minute. While the gunpowder revolution made firearms possible, each one had to be hand made and assembled. The processes of the industrial revolution made guns cheaper and faster, making guns accessible, interchangeable, and more common.

The tinderbox of heavily armed, nationalist European states was quick to ignite when the Serbian assassination of Austrian archduke Franz Ferdinand sparked WWI. Military thinkers of the time saw the success of the wars of German reunification and believed that victory would favor those who struck first. The Germans planned, in the event of war, to strike France by bypassing its defense through Belgium, then shifting attention to the lethargic beast of Russia, before fending off any attack from Great Britain, who would be threatened by the proximity of Belgian ports to the English coastline. After Franz Ferdinand's assassination, Germany struck first and launched an invasion of Belgium. Thanks to the railroad and telegram, France was able to quickly mobilize inwards and repel the German invasion miles outside of Paris. While fleeing, Germans turned around, dug trenches, set up machine guns, and fired backwards on the advancing French forces. Unable to advance, French and German forces tried to outflank one another, lengthening the trenches until they spanned the entire country. Nationalism drove thousands of young enlists to the trenches, where they shot one another with mass-produced rifles. Movement at the trenches stalled, casualties mounted, and poison gas floated across no-man's land to dissolve the lungs of young recruits. Primitive airplanes were unable to advance the front, and progress

seemed impossible until the invention of modern warfare's most iconic children: the tank.

The tank, along with the entry of the United States late in the war, broke through the German lines. Germany was routed as the tank could survive the machine gun and small-arms fire in no man's land, travel over difficult terrain, crush barbed wire, and cross trenches to assault fortified enemy positions with powerful armament. However, technology again diffused, and by WWII every major country had adopted this powerful war machine, again equalizing the battlefield. Germany's WWII Blitzkrieg doctrine combined intensive training, wireless radio communication, and novel tactics, allowing it to steam-roll Poland and France. The Nazis used radio communication to exploit weaknesses in enemy lines, create holes, push through, and respond rapidly.

### *The airpower revolution*

During the Combined Bomber Offensive from 1943 to 1945, the U.S. faced the problem of needing a fighter with the range to escort bombers deep into German industrial areas. This need was met with the deployment of the P-51 Mustang in large numbers in the winter of 1943/44, allowing the combination of B-17 bombers and P-51 fighters to achieve air superiority and expand bombing capabilities. The tonnage of bombs dropped increased dramatically over the years, from 31 tons in 1939 to 525,000 tons in 1944, with a reduction to 190,000 tons in 1945 as Germany surrendered in June.

In the years 1944-45, there were constant attacks on German industrial and population centers, leading to the leveling of cities through raids that used both explosive and incendiary bombs. Attacks on railroads aimed to prevent troops and supplies from reaching the Western front. The bombing of Dresden in April 1945 was particularly devastating, and Germany surrendered two months later.

Despite the heavy bombing, there was little evidence that it reduced German morale, as there was no sign of diminished will to fight, similar to the British experience during the Battle of Britain. Although some downplayed the role of the Combined Bomber Offensive by pointing out that German industrial output grew in 1944, targeting transportation and oil was critical and forced Germany to divert resources.

While strategic bombing certainly contributed to the German defeat, its decisiveness is debated, as air power alone did not bring victory. The campaign raised moral issues by blurring the distinction between civilian and military targets, resulting in total war where civilian casualties greatly outnumbered military ones.

*The nuclear revolution*

**Nuclear triad:** Nuclear weapons deployable from air (bombers), land (missiles), and sea (submarines)

The prevailing theory during the nuclear age was that mutually assured destruction would ensure the Cold War stayed cold. The potential of overwhelming nuclear destruction would deter the US and the USSR from attacking one another, ensuring no wars on a scale comparable to the World Wars would break out. This is debated: other researchers believe that the world was relatively peaceful because the memory of WWII was fresh in the memory of the globe. The United States, with its Marshall plan, rebuilt Europe at a cost of tens of billions of dollars and wasn't eager to have to re-build. People learned that war was destructive, war was pointless, and war robbed millions of their lives. Another competing theory is that Soviet ideology was cautious, since Marxist communism expected that capitalist societies would destroy themselves internally.

Traditional deterrence doesn't apply to non-state actors. If a terrorist faction was to obtain nuclear weapons, they have no return address for a retaliatory strike.