

**Enriching Knowledge Series for Junior Secondary
History Revised Curriculum: War and History:
New perspectives to Study the Military History
(Lecture 1) “War and Technological Innovations”
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War and History
Lecture Series (I): War
and Technology

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Part I: Introduction

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Part I:

Introduction

War and Technology: In Short

Technology
is about
Innovation

Technology
is about
Perception

Technology
is about
Adaptation

Technology
is
about Choice

Nature of Tech Change

- Technological change: Linear?
- Perception and application
- Integration of technology in existing framework
- Is there war-winning weapon and Decisive Technologies?

Nature of Modern Warfare

- 16th to 20th Century
- Moving gradually towards...
- Firepower dependent
- Standardisation
- Mechanisation
- Division of labour (combined arms)
- Multi dimensional (air, sea, land...)
- Mass mobilization
- In many cases driven by technological changes

Part II:

Early Modern Period

The European “Military Revolution,” 1453-1650

- Medieval Warfare: [Heavy cavalry tactics](#) and its counters
- Changes in Infantry
 - [Pikes](#) 長矛 & [firearms](#)
 - The return of formation 隊型: from the [Swiss Pikemen](#) to Spanish Tercio 西班牙方陣
 - Training and Organization
 - Return of [Roman](#) doctrine
 - Importance of [discipline](#) 軍紀 and [drill](#)
 - New form of courage
 - Evolutionary and gradual – formation as example
- Changes in Cavalry
 - [Lighter, swifter](#)
 - Division of labor: light and heavy
- [Emergence of Linear Battle](#)

The European “Military Revolution,” 1453-1650

- Emergence of Gunpowder Weapons
 - Firearms (as above)
 - [Cannons](#)
 - Fortifications
 - From [castles](#) to [trace italienne](#) 義大利式堡壘
 - Naval Warfare
 - [Oared ships](#) 槳船 VS [Sailing ships](#) 帆船
 - Cannon platform 火砲平台
 - Power projection of navy
 - Specialists: [Artillerymen](#) and Engineers

Impact of these Changes

- Increase in army size
- Increase in cost
- Return of combined arms
- Rise of the townsmen
- Decline of nobility?
- Ship building and industry, Cannon Foundry – early moves towards industrialisation
- Centralization – Emergence of Modern State
- European global outreach and power projection

A Revolution or Evolution?

- Causes for the changes
 - Causality – Change in war led to change transformation of the state, or vice versa?
 - Technology only?
- Other causes
 - Medieval Warm Period – Beginning of Little Ice Age 小冰河期 (1350-1850) – Economic and Population Pressure
 - Ottoman pressure
 - Renaissance – rediscovery of tactics, science, and philosophy
 - Age of science – mathematics, ballistics, chemistry
 - Age of Discovery
 - Urban growth and economic change...
- “‘Modernisation process’ that encompasses all aspects of civilization”

Limitations...

- Things that did not change much:
 - Reliance on natural/animal power
 - Political structure
 - Military structure
 - Medical care
 - Communication
 - Logistics

Part III:
The 19th Century

The 19th Century

- Unprecedented technological change
- Speed and extent
- On land
 - New bullets and rifles
 - New shells and breech-gun
 - Black powder 黑色火藥 (Smokeless powder)
 - Machine-gun 機關槍
 - The “Firepower Revolution”
 - Where is the place for human in industrialised warfare?

The 19th Century

- At sea
 - [Steamship](#)
 - Larger guns
 - Armour-plate 裝甲
 - Torpedoes 魚雷
 - Ranger-finders 測距儀
 - [Emergence of Modern warship](#)

The 19th Century

- Support Technologies
 - [Telegraph](#)
 - [Railway](#)
 - [Field Medicine](#)
 - [Canned Food](#)
- [Advances in Military Engineering](#)
- [Failed Technologies/Weapon Concepts](#)
- What lagged behind?
 - Medicine
 - [Logistics after railhead](#)
 - Tactical communication

The 19th Century

- Impacts and Qualifications
 - Really widened the [gap](#) between the European countries and the rest of the world
 - Has to be supported by the society
 - Industrial base
 - [Modernisation](#) of non-European countries
 - [Globalisation of the European way of war](#)
 - No single “revolutionary” weapon
 - Coordination of different arms/components

Preludes of the First World War?

- [Russo-Japanese War](#) 日俄戰爭, 1904-1905
- Lessons learned and unlearned
 - Firepower VS Manpower debate
 - Emergence of Offensive Cult in Europe?
 - “Short War illusion”? – End of war by Christmas
 - [“Long War projection”? – Ivan Bloch](#)
 - Offensive as a means to avoid “Long War”
 - Plan XVII of France
 - Schlieffen Plan

Part IV:

The Two World Wars

The Two World Wars

- Problems and solutions
 - How to overcome defensive firepower?
 - How to destroy enemy's capability to collect resources, produce, and deploy?
- On land
 - Armoured warfare
 - John Fuller and Basil Liddell-Hart
 - Experimental Mechanised Force (1927)
 - [Concentrated use of tanks](#)
 - [Auxiliary vehicles](#)
 - [Motorized infantry](#)
 - Get the right tools! [Development of Interwar tanks](#)
 - The good German students
 - Other Mechanical Aid: [Maginot Line](#)馬奇諾防線

The Two World Wars

- Aerial Warfare
 - The Proponents:
 - Giulio Douhet (Italy)
 - Air force to destroy not only industry, transport, communications, government but also “the will of the people”
 - Arthur Harris (Britain)
 - Mutual destruction: destroying the opponents’ cities quicker than your enemy
 - Billy Mitchell (The USA)
 - Protect US from outside threat by air force alone – [scrap the navy!](#)
 - Independence of air force!

The Two World Wars

- New Machines
 - [Emergence of aluminum planes](#)
 - More powerful engines
 - Faster (from 150 to 350 km/hr)
 - Longer range (from less than 1,000 to 1,500km)
 - Retractable landing gear
 - Bomb bay (from around 1,000 to 2,000kg bombs)
- Naval Aviation
 - [Separation of roles for aircraft on carriers](#)
 - Techniques: Concentration, navigation, escort

The Two World Wars

- General fear of air force
 - [“The bombers will always get through”](#)
 - Proponents of independent air force
 - [Guernica, 1937; China, 1937](#)
 - Countermeasures: [Radar](#), [fast fighters](#), [tactical control](#), [Air Raid Precaution](#)

The Two World Wars

- Naval Arms Race after WWI
- Naval limitation treaties
 - Washington Treaty, 1922
 - London Naval Treaty, 1930
 - Naval holiday?
- Refits and reforms
 - [Aircraft Carriers and “Treaty Cruisers”](#)
 - Refits: [Battleships](#) during the interwar period
 - Reforms: [Tactical and operational changes](#)

The Two World Wars

- Rapid technological change
- Different ideas on:
 - What are the lessons of the First World War?
 - What are the best way of fighting?
 - How to accommodate new technology (particularly air) in existing military structure?
 - Who is the next enemy?
 - What are the best way to fight a particular enemy?

The Two World Wars

- The Second World War
 - Continuation of the interwar changes
 - Application of technology as much important
 - Example:
 - [Hitting a protected shore](#)
 - [Using technology to overcome distance](#)

Part V:
Conclusion

Conclusion

- Problem of “technological triumphalism”
- Myth of “decisive weapon”
- Relationship between men and machine
- Always about perception, adaptation, and choice - and [strategy, operational art, and tactics](#)

The End

Thank You