Artillery

- Field vs. Heavy vs. Trench
- Shrapnel vs. High Explosives vs. Gas
- Registered fire vs. Calculated fire
- Type “106” fuses
Artillery (2)

“Shell shortages”
- 1914: 3000/month
- 1915: 225,000/month
- 1916: 2.3M/month (Quality control?)

Fire plans vs. “on-call” fire
- Somme – 30 on-call fire requests
- Amiens – 1100 on-call fire requests

Artillery was the great killer
- Caused ≈80% of all casualties
Heavy Artillery

US 16 inch naval gun

French 370 cm

German 410 cm
Field Artillery
Trench Mortars
Machine Guns

- Common since 1880’s
- Heavy M/G’s
  - High rate of fire
  - Essentially immobile
  - Interlocking fields of fire
  - 2 second tap
- Light M/G’s
  - Did not exist at the beginning of the war
  - Portable
  - Became the weapon of choice for “Combined Arms” & Storm Trooper tactics
Heavy Machine Guns
Light Machine Guns
Rule Britannia
The War at Sea
Admiral Fisher

Admiral Tirpitz
Pre-War Naval Arms Race

- 1898 - Kaiser determined to challenge England at sea (Tirpitz/Mahan)
- “Fleet in being” (vice maritime strategy)
- Aug 1914: Germany has lost the arms race
  - Germany: 18 Dreadnaughts (+9 building)
  - England: 29 Dreadnaughts (+13 building)
- Was this a good use of German resources?

Probably not!
**Battleship:**
33,000 tons
24 knots
8x15” guns
13” armor

**Battlecruiser:**
25,000 tons
27 knots
10x11” guns
10” armor

**HMS Queen Elizabeth**

**SMS Seydlitz**
Four Wars inside a War

- The Cruiser War (1914)
- The Fleet Actions (1914 – 1916)
- The U-Boat War (1914 – 1917)
- The Blockade (1914 – 1919)
Cruiser War

- Germany had 17 deployed cruisers
  - Spee had 6 in East Asia
  - 2 in the Mediterranean
  - 9 others all over the globe
- “Guerre de course”
  - Independent action
- By Nov 1914, the 9 independent cruisers are sunk or interned.
Spee

- Sends Emden to Indian Ocean
  - 15 ships; Sunk in November
- Heads to Coronel (Nov 1914)
  - 4 Older British cruisers vs. 5 brand new German cruisers
  - Inflicts major defeat on British task force
Falklands

8 Dec

- Decides to attack Falklands (blunder)
- 2 British B/C’s plus 5 other cruisers vs. 5 German cruisers.
- Good weather, bad luck
Emden

Before

After

HMAS Sydney
HMS Inflexible picking up survivors from SMS Gneisenau
Goeben & Breslau

- Trapped in the Mediterranean
- Major British failure & embarrassment
- Made their way to Constantinople
- Became “Turkish” (Yavuz & Midilli)
  - Replacements for two “stolen” Dreadnaughts
  - Souchon becomes C-in-C of the Ottoman Navy
- Initiated action against Russia
- Russia declares war (Nov 1914)
“They brought more slaughter, more misery, and more ruin than has ever before been borne within the compass of a ship” - Churchill
Code Breaking

- Cable cutting
- Room 40 OB ("Blinker" Hall)
  - Magdeburg (Naval codes)
  - Hobart (Naval coordination codes)
  - Destroyer S-119 (Naval international codes)
  - Wilhelm Wassmuss (Diplomatic codes)
- General consensus is that most of the British success in code breaking was due to "solving" rather than use of code books.
Code Breaking (2)

- Decryption vs. Interpretation
- Secrecy vs. usage
- Operational issues
Kleinkriegs

- Heligoland Bight (Aug 1914)
  - 3 German cruisers & 1 destroyer sunk
- Scarborough, Whitby, & Hartlepool (592 civilian casualties) (Dec 1914)
Kleinkriegs (2)

- Dogger Bank (Jan 1915)
  - Blucher sunk
  - Kaiser: No more “risk taking”
- “Fleet in Being”
- Cdr. Ralph Seymore
Blecher Sinking at Dogger Bank
The Kleinkriegs

1 – Heligoland Bight (8/14)

2- Coastal Raids (1/15)

3- Dogger Bank (1/15)

4 – Jutland (5/16)
Jutland Plans

- Sheer – New German Fleet Commander
  - Embarrassment
  - Determined to use the fleet
  - Uses Hipper to set a trap for Beatty
  - Required complete secrecy (?)

- Jellicoe – Long designated
  - “Only man who could lose the war in an afternoon”
  - Set counter-trap
  - Jellicoe’s plan worked strategically
Crossing the "T"
Gefechtskehrtwendung
Germans: 16 Dreadnaughts, 5 Battle cruisers

British: 28 Dreadnaughts, 9 Battle cruisers
A – Indefatigable blows up
B – Queen Mary blows up

Battle of Jutland
Battlecruiser action
15:30–17:30
31 May 1916
C – Invincible blows up

D – 1st Cruiser Squadron
- Defense blows up
- **Warrior sunk!!**
- Black Prince blows up

“Windy Corner”
At point 4, the Germans have their “T” crossed a 2d time and take 27 hits compared to just 2 hits on British ships. This is the deciding point of the battle!

9 pm: Sunset fortunately for the Germans
Windy Corner as photographed from a British ship at the battle’s critical moment.
Jutland Results

- German tactical victory
  - British lost 6 major ships, 6274 men, and 8 destroyers
  - Germans lost 2 major ships, 2545 men, and 4 light cruisers.

- Complete British strategic victory
  - Grand Fleet battle ready in 4 hours
  - High Seas Fleet battle ready in August 1916
    - British: Dreadnaughts 27(28), Battle cruisers 7(9)
    - German: Dreadnaughts 13(16), Battle cruisers 2(5)
  - Three further sorties; zero results
HMS Indefatigable Sinking

HMS Invincible in two parts

HMS Queen Mary Exploding

“Something’s wrong with our bloody ships today.”

Adm. Beatty
HMS Warrior
“The prisoner has assaulted his jailer but he remains a prisoner none the less.”
U-Boat War

- Aboukir, Cressy, & Hogue
  - Submarine suddenly comes of age

- Prize rules are in force however

- War Zone declared (Feb 1915)
Jutland means it’s submarines or nothing to win at sea.

Germans declare unrestricted submarine warfare in the N. Atlantic. (Feb 1917)

- Drive England out in 6 months
- America will come it but will be too little too late.
- With England & Russia out, victory on the Western Front is assured.
U-Boat Kills

Sinkings per quarter 1914 - 1916

1916 - 1917
1917

- Sinking rate takes off.
- Up to now, no convoys
  - Less efficient
  - Not enough escorts
  - Too many “eggs in one basket”
- Convoys instituted in the spring
- War in the N. Atlantic ends immediately in complete defeat of the U-Boats.
U-Boat Kills (2)
Why Convoys Work
The Costs

- Germany lost 178 U-Boats & 5000 men
  - About 1/2 of their force
  - Ended the war with 171

- Allies lost 5000 ships and 15000 men
  - 11 Million tons (1/4 the world's total)
  - Note: 3 men per ship
  - The effect of gun sinkings (>90%) & prize rules
Blockade

- Started on day one
- Eliminated all Austro-German shipping
- Only sea imports were blockade runners
- Got steadily tighter throughout the war
- Income rose 20%; COL rose 200%
- 700,000 German civilians died as a result
  - Essentially the same as died from Allied bombing in the Second World War
  - Infant mortality: - 50%
Austro-German Shipping Loses

- Total July 1914 – 6 million tons
- Destroyed, captured, impounded or blockaded in neutral ports – 4 million tons
- Blockaded in Austrian or German ports – 2 million tons
- Available for shipping - ZERO
1. The “Windpipe”
2. The Baltic: Highly successful British submarine campaign until 1918.
3. The Mediterranean: Completely successful
4. Otranto Barricade
# German Imports

<table>
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<tr>
<th>(in Ktons)</th>
<th>Butter &amp; Fats</th>
<th>Fish</th>
<th>Cattle</th>
<th>Meat</th>
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<tbody>
<tr>
<td>1916</td>
<td>175</td>
<td>420</td>
<td>356</td>
<td>120</td>
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<tr>
<td>1917</td>
<td>95</td>
<td>150</td>
<td>236</td>
<td>45</td>
</tr>
<tr>
<td>1918</td>
<td>27 (-85%)</td>
<td>80 (-80%)</td>
<td>125 (-65%)</td>
<td>8 (-94%)</td>
</tr>
</tbody>
</table>
Nitrates

- Essential for
  - Explosives
  - Fertilizers
- Blockade completely cut off supply
- Learned to get it from air BUT, just enough for the Army & Navy
- Result: much lower annual crop production
  - German: -42%
  - Austrian: -80%
- By 1917, average caloric intake was 1/3 of that of 1914
Summary

- The German surface “guerre de course” was a complete failure.
- High Seas Fleet was a strategic failure (perhaps blunder?) of major proportions.
- The U-Boat was very successful 1916 – 1917 and if a counter had not been found might very well have defeated England.
- The Royal Navy blockade was devastating and a major (perhaps THE MAJOR) contributor to Germany’s defeat.