TECHNOLOGY ADVANCES IN WWI

FILL IN THE STUDENT TABLE AS WE WORK THROUGH THESE SLIDES

War In the Air

- For the first time, airplanes were introduced as part of warfare.
- Initially, planes were used for spying purposes (espionage) to gain intelligence & predict enemy advancements
- As the war dragged on, airplanes were soon outfitted with guns – and the era impressive dogfights in the sky was born
- Ultimate honor of a pilot was to be an 'Ace' (5 or more kills)
- Aces became heroes on the 'homefront'
- Average life expectancy for a fighter pilot was 3 weeks! Parachutes not developed until late in the war
  - More than 50,000 pilots and crew were killed in WWI

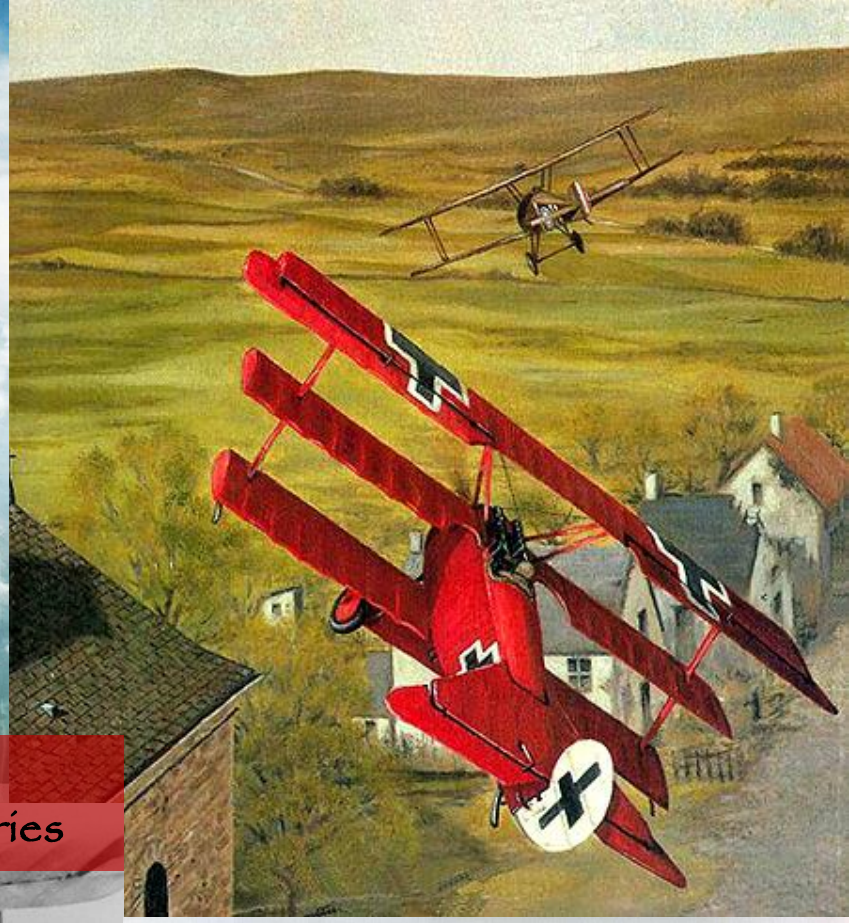
Airplanes cont.

- Canada had no air force at the time, our pilots were required to join the British Corps - by 1918 40% of British Air Force (BAF) were Canadian
- Technology improved into building larger, multi-engine planes that could carry large amounts of ammunition and have greater range.
- Airplanes brought enemy cities into the mix as they were now part of the strategy
- Innocent civilians were now getting killed when cities got bombed...not just uniformed soldiers on the front


ABONDONED GERMAN "CHASSE" PLANE.


GETTY IMAGES

MACHINE GUN ON NIEUPORT "CHASSE" PLANE.



The Red Baron (Manfred von Richthofen)

The 'ace-of-aces'. Credited with 80 combat victories

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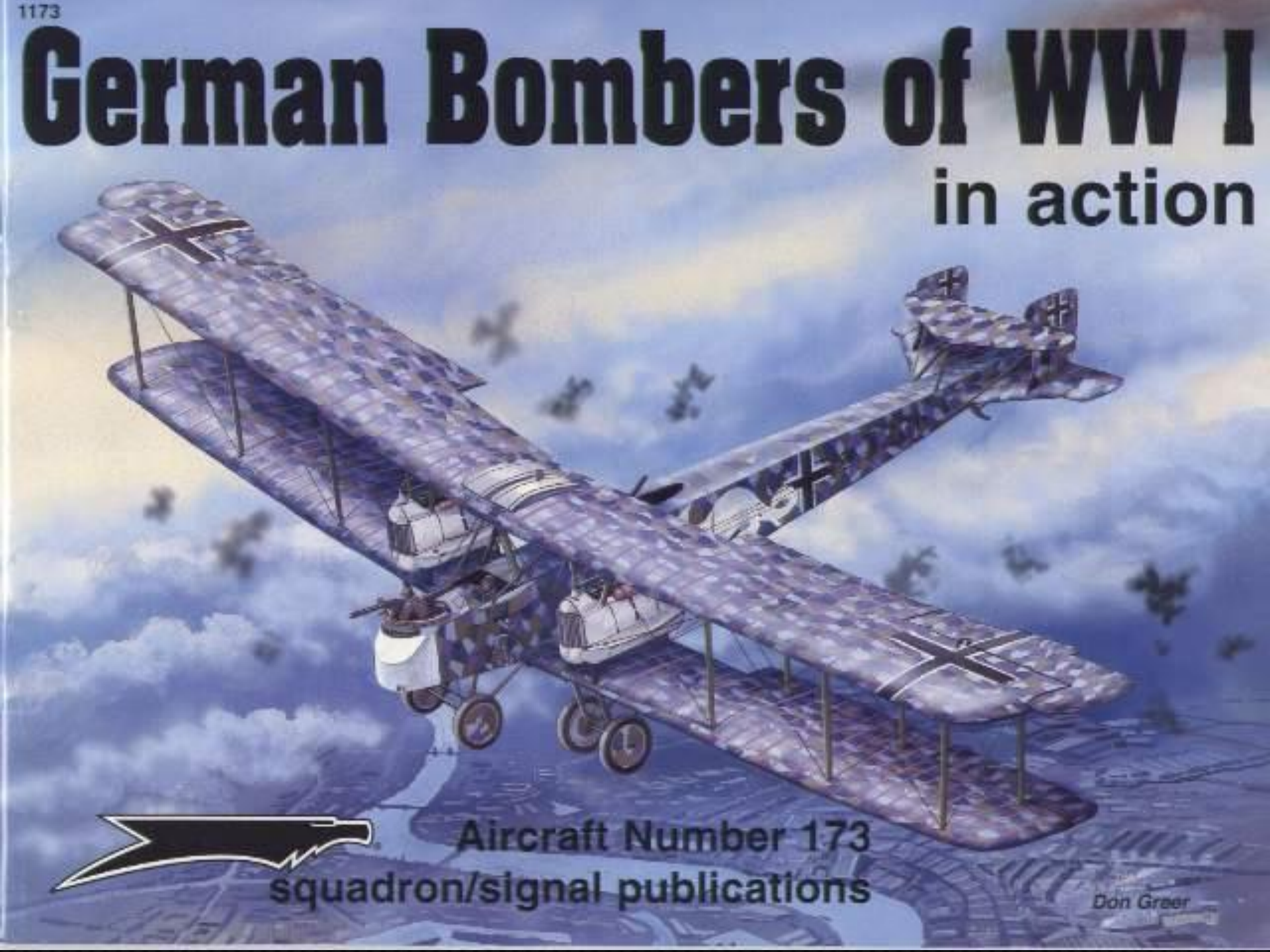
German Bombers of WW I

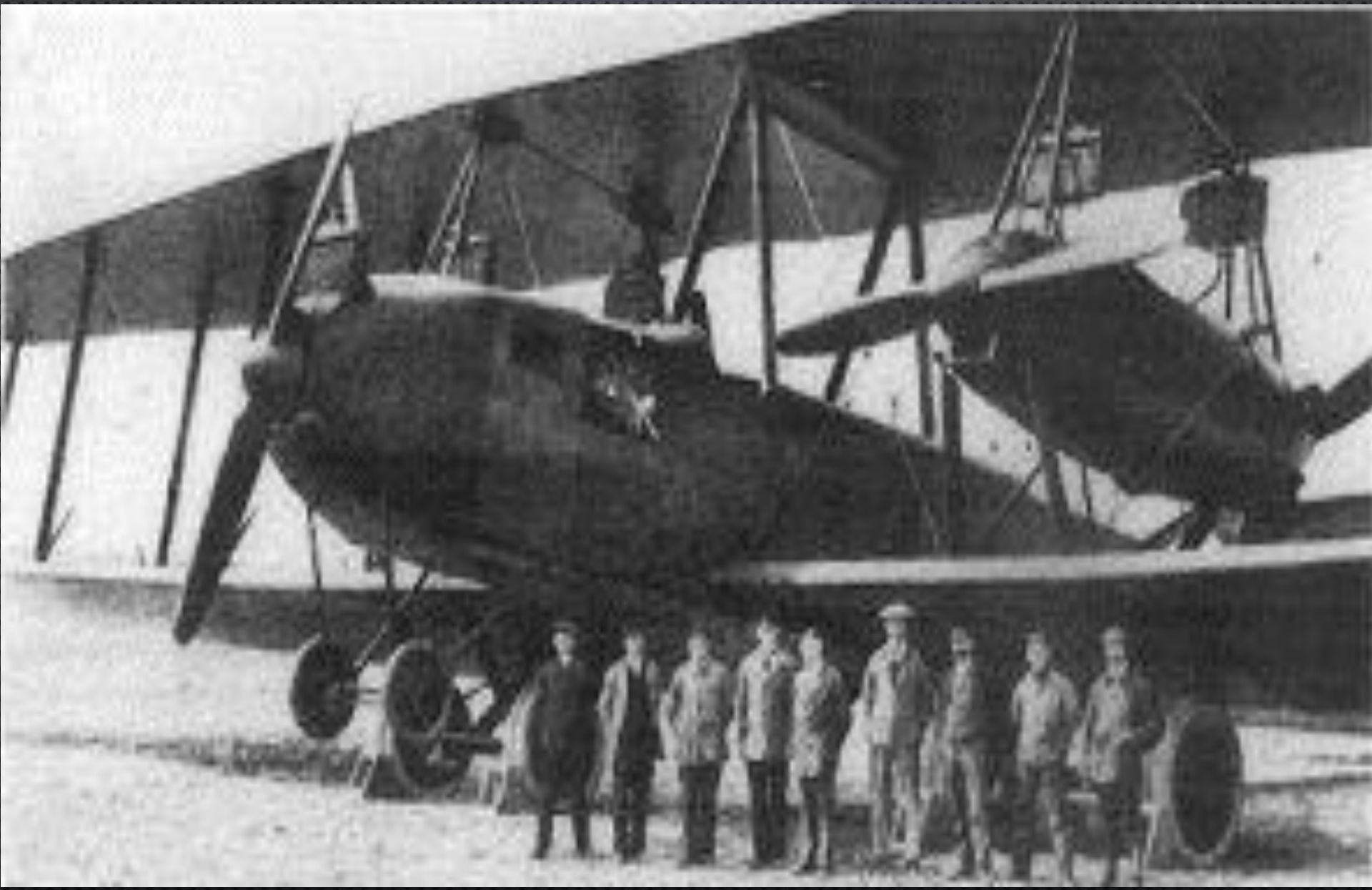
in action



Aircraft Number 173

squadron/signal publications

Don Greer



What a difference 100 years makes ☺

Canada's latest air force acquisition: the F3. Or is it? Harper vs Trudeau & the $551 million USD controversy for 62 planes

Source: Dr. F.X. O'Connor Fonds, Queen's University Archives

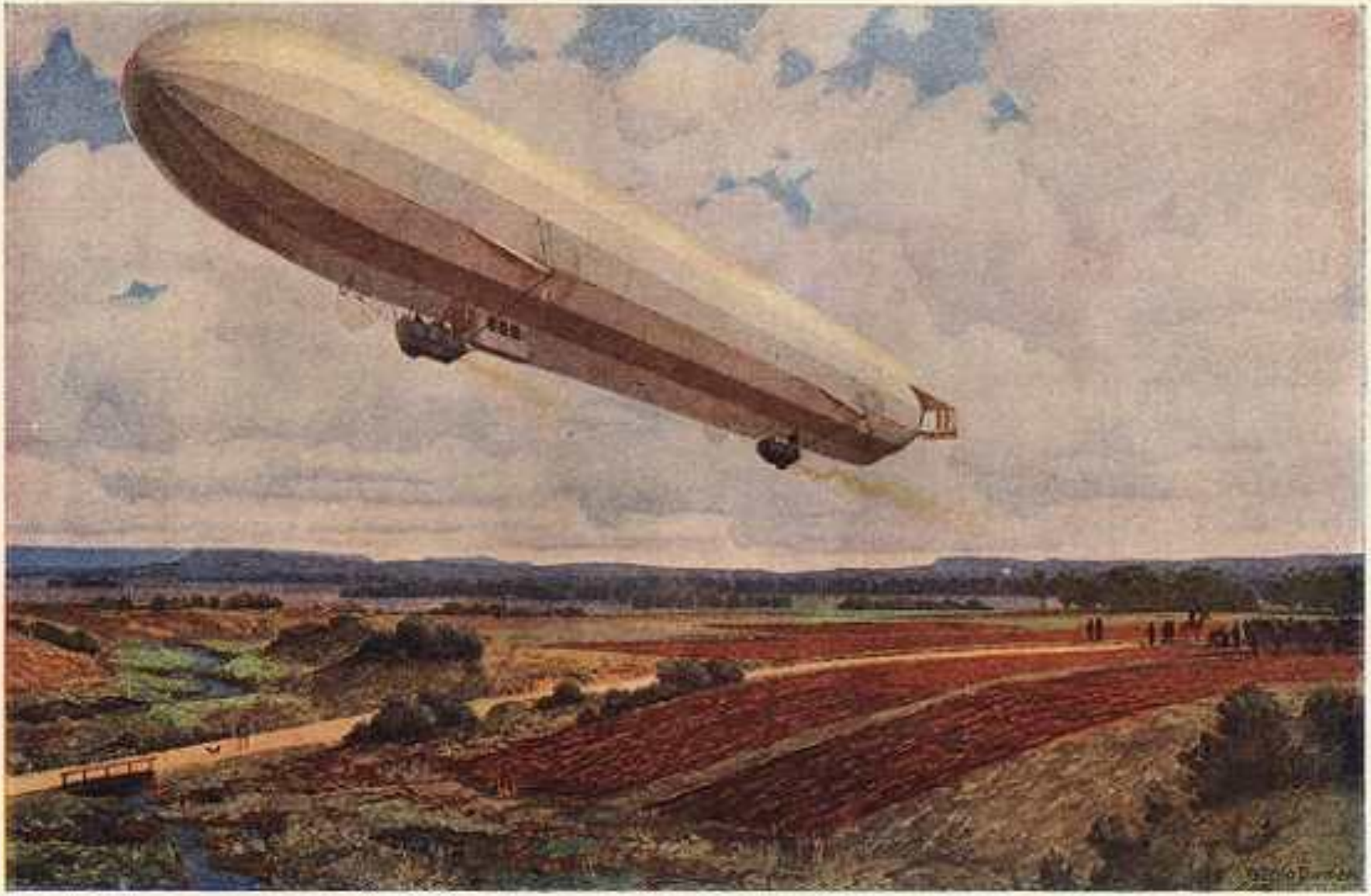
Zeppelins

- Zeppelins were first developed in Germany and used as weapons by them in WWI.

- They were deadly because they were silent and could float over a city like London at night and drop bombs. Quite effective in the psychological war.

- As the war progressed the use of Zeppelins reduced as they were easy targets from improved aircraft – and it's a ball of gas


GRAF ZEPPELIN



A Zeppelin ascending

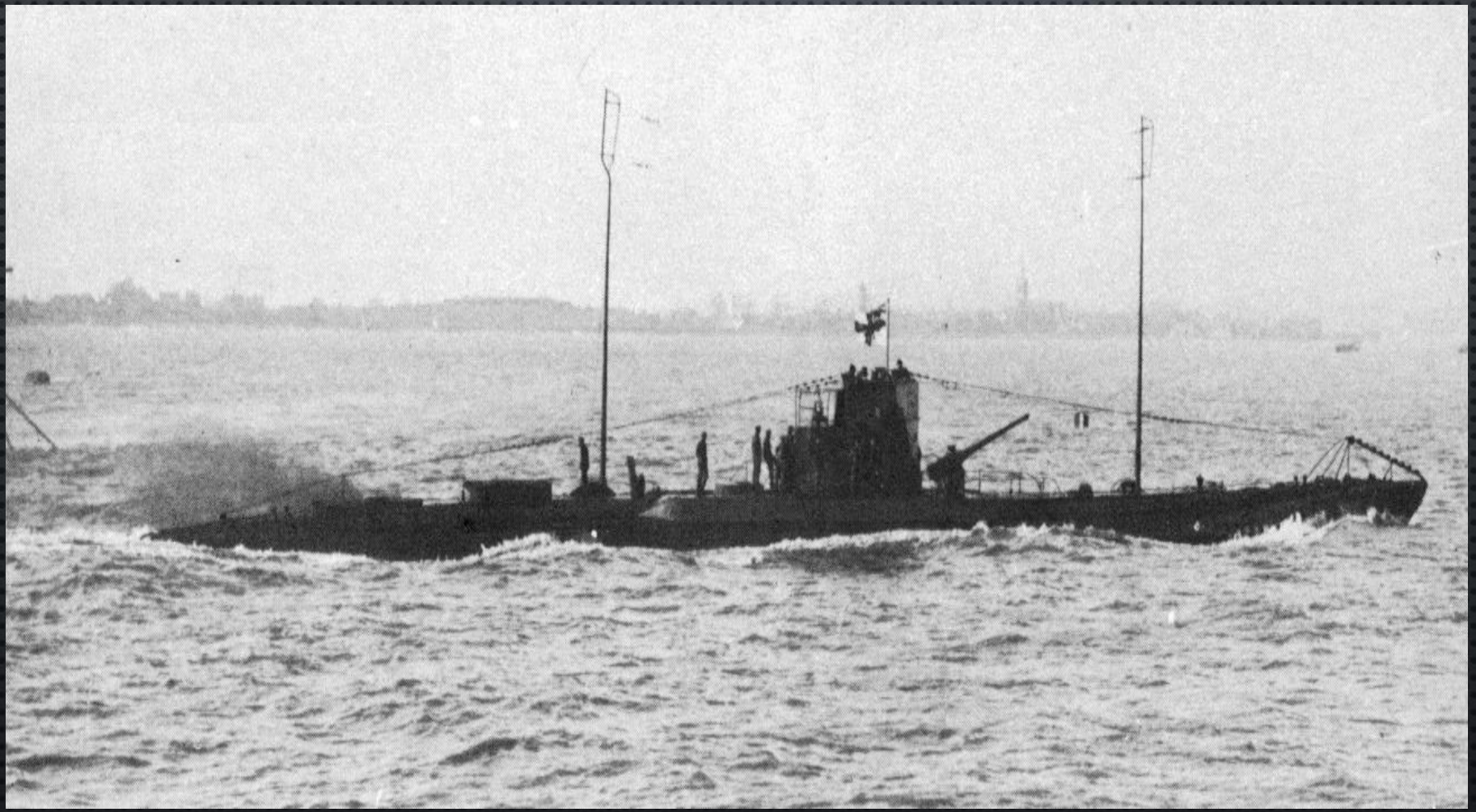
War at Sea

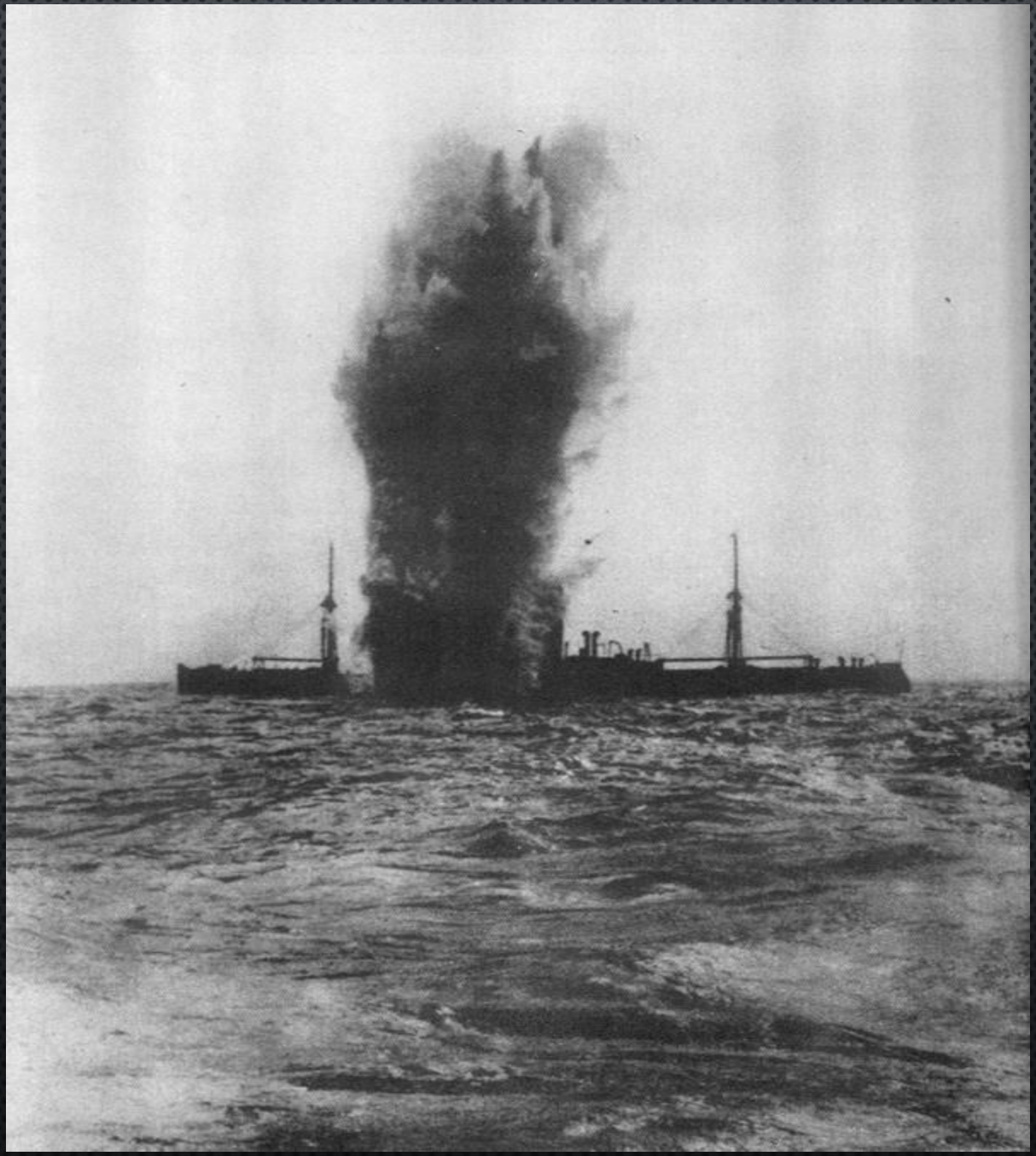
- Allied forces were being supplied from the various colonies with items required for the war effort
  - Troops
  - Munitions
  - Food
  - Soldier supplies...
- Halifax became our major departure point
- Supplies sent over in merchant ships

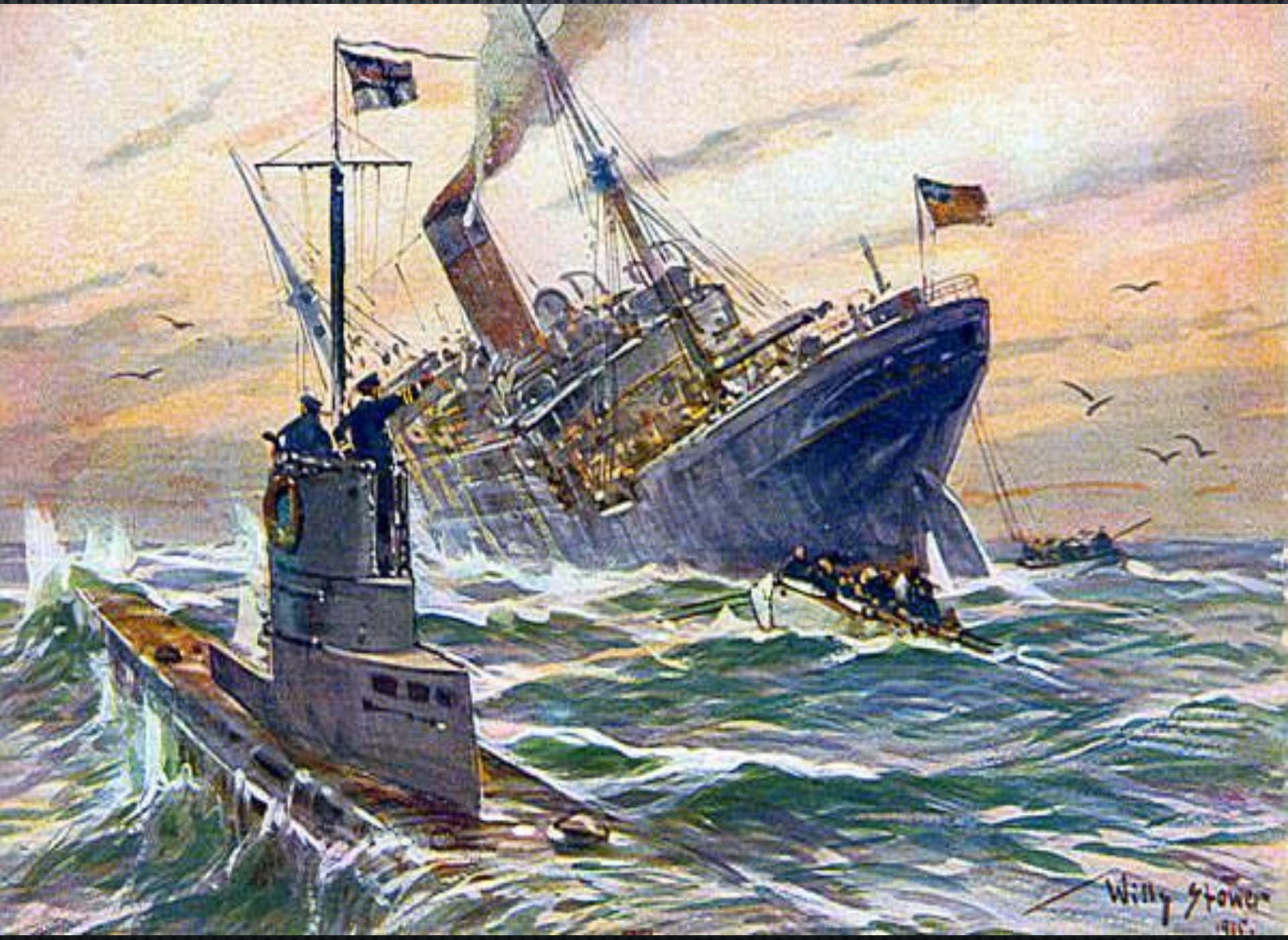
- The Central Powers developed methods to stop this flow of goods...

U-Boats

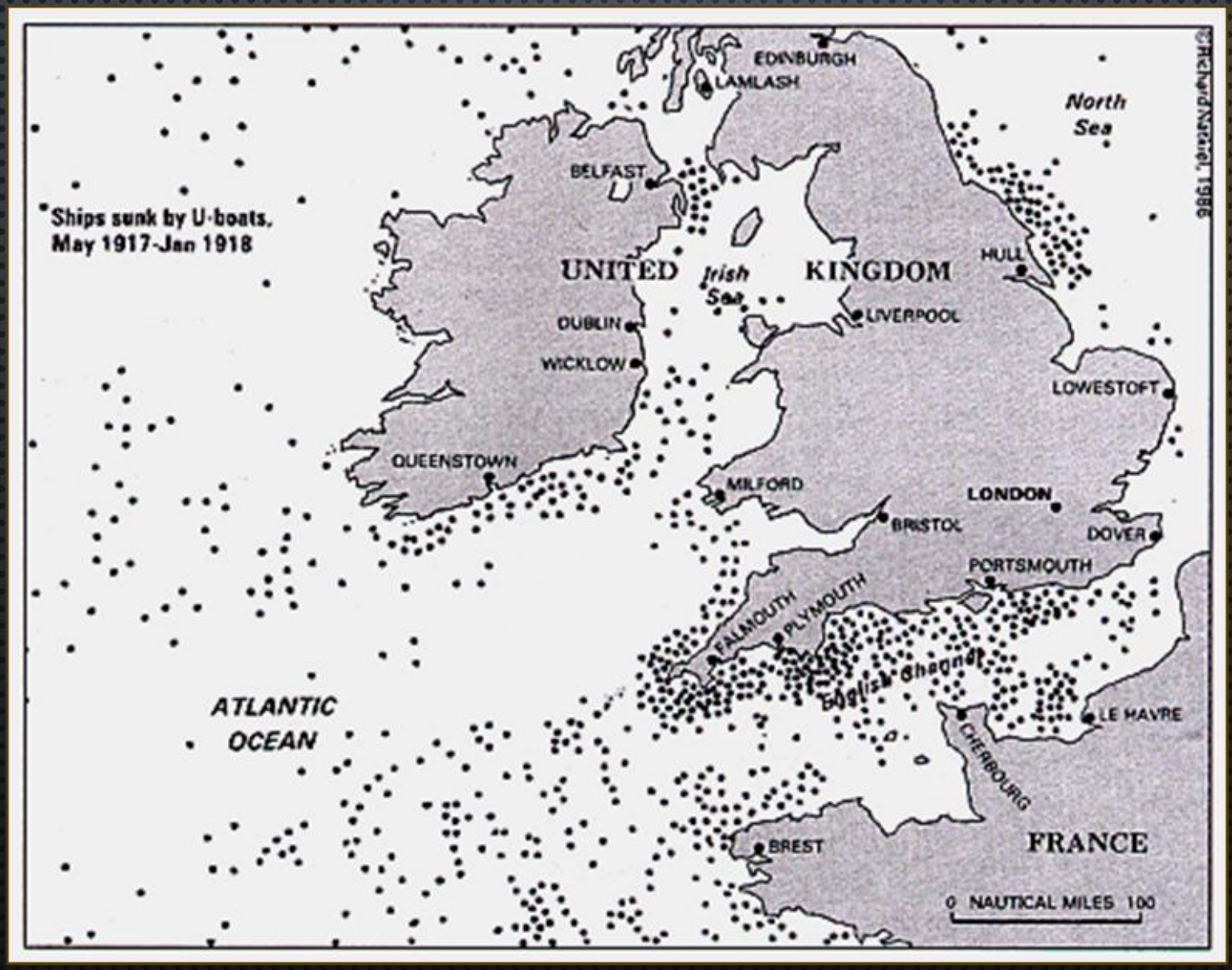
- The Germans were the first to perfect the deadly U-boats.
- They were effective because they were hidden under the water.
- Supply boats were sunk...very damaging.
- 1917, Germany declared it would sink any ship within the war zone around Britain
  - In four months, U-boats sank over 1000 ships
- British supply became very low from Canada & beyond
- Developed the convoy system to escort supply ships from Halifax with armed destroyers and a newly developed listening device to locate & destroy U-boats



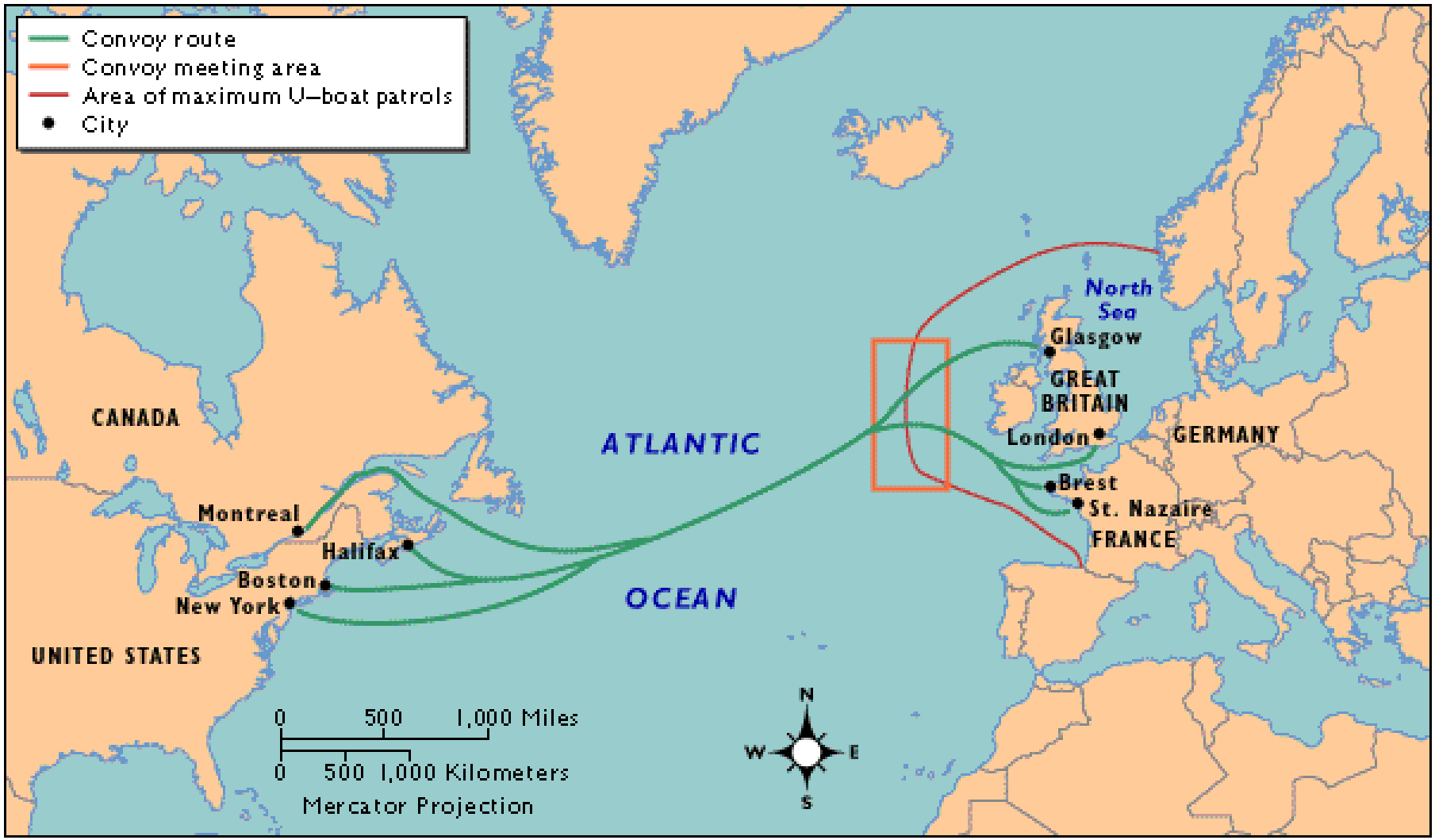


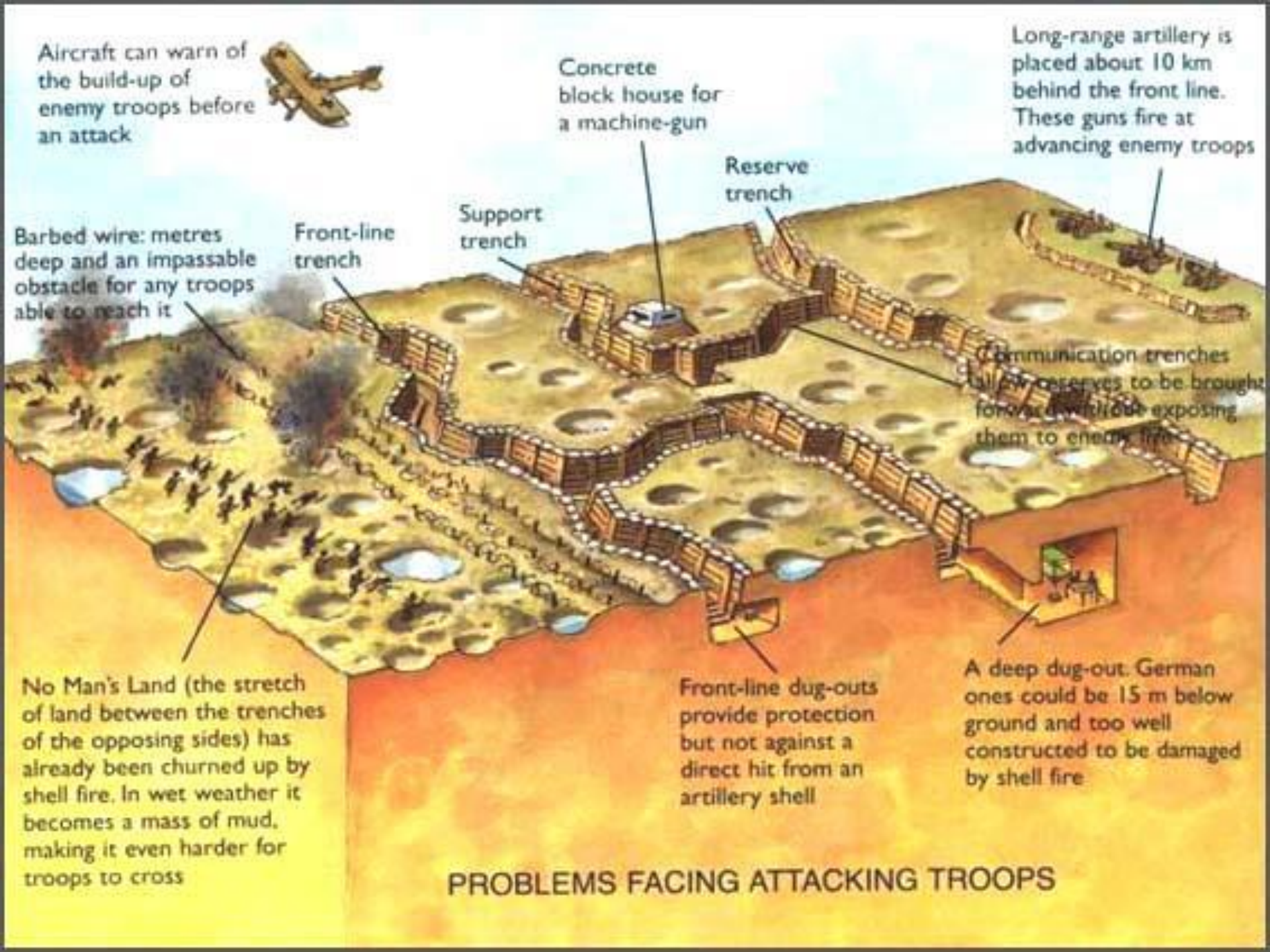

Willy Stower

Ships sunk by U-Boats 1917 - 1918



Convoy System

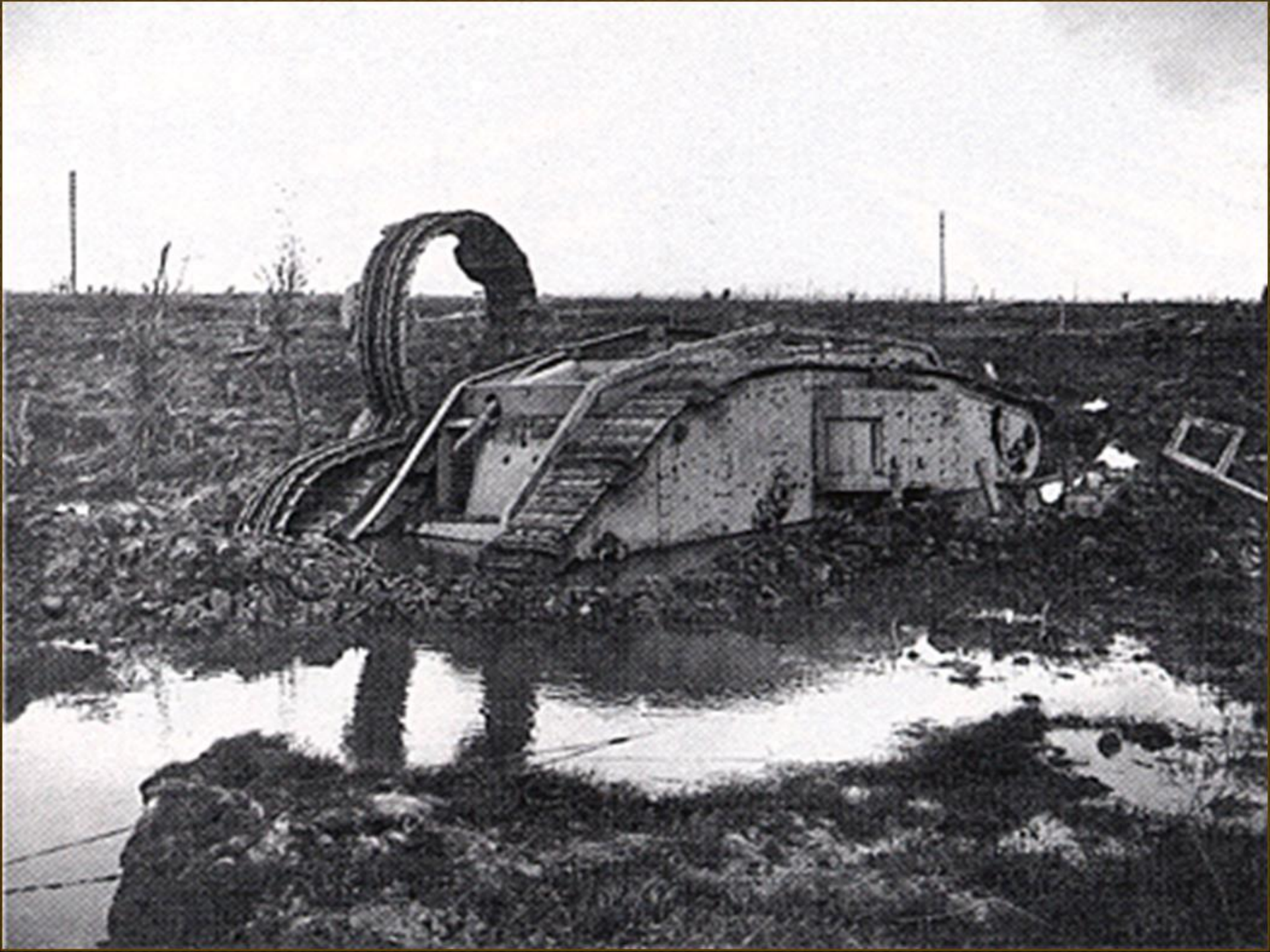



Aircraft can warn of the build-up of enemy troops before an attack
Concrete block house for a machine-gun
Long-range artillery is placed about 10 km behind the front line. These guns fire at advancing enemy troops
Reserve trench
Support trench
Front-line trench
Barbed wire: metres deep and an impassable obstacle for any troops able to reach it
Communication trenches allow reserves to be brought forward without exposing them to enemy fire
No Man's Land (the stretch of land between the trenches of the opposing sides) has already been churned up by shell fire. In wet weather it becomes a mass of mud, making it even harder for troops to cross
Front-line dug-outs provide protection but not against a direct hit from an artillery shell
A deep dug-out. German ones could be 15 m below ground and too well constructed to be damaged by shell fire
PROBLEMS FACING ATTACKING TROOPS

Tank Warfare

- Designed for the purpose of breaking the stalemate of trench warfare in WW1
- Could withstand machine gun and small-arms fire crossing No Man's Land
- Could generally travel over difficult terrain, crush barbed wired and cross enemy trenches to assault fortified enemy positions
- Carried supplies and/or troops
- Tanks will be used to change the nature of the destructive "over the top" combat tactics that were so deadly to soldiers.


LUSITANIA



Machine Guns

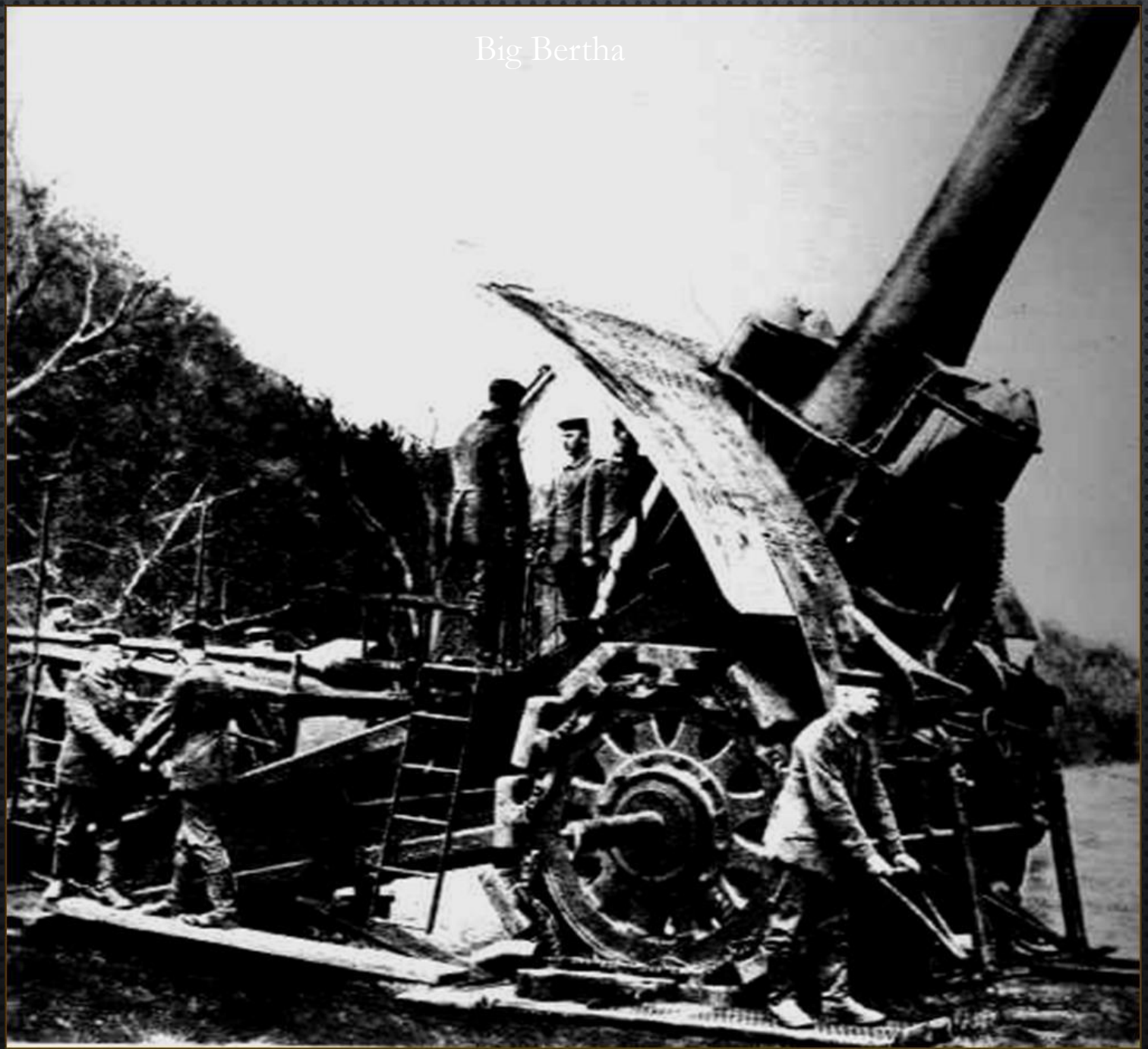
- Machine guns were by far the deadliest new weapon used in WWI.
- Tore up soldiers by the thousands running across "no-man's land"
- Early guns in 1914 required 4-6 people to operate and were heavy. Fired 400 – 600 small caliber rounds per minute and often overheated
- By 1918, much lighter, fired more than double the rounds and more efficient
- Machine guns dragged this war out much longer than thought

Front français. — Mitrailleuse française en position.

Flame Throwers

Grenade Launchers

Big Bertha



Chemical Warfare

- Gas was a grim reality of WW1, breaking a long standing international agreement.
- Mustard & Chlorine gas were unknown in this scale of warfare
- First used in 1915 at the Batlle of Ypres.
- Heavier than air, so would sink into the enemy trenches
- Canadians get on the recognition map by holding the advanced enemy until reinforcements could arrive by urinating in rags and covering mouths - neutralized the gas
- Gas warfare requires ideal conditions or it's catastrophic.

LEARN TO ADJUST YOUR RESPIRATOR

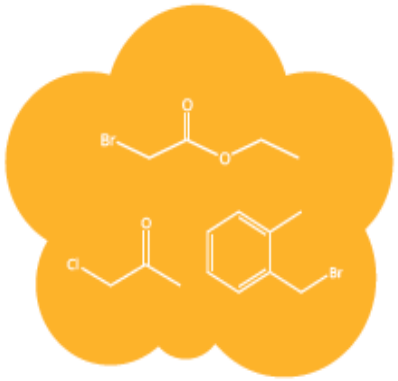
CORRECT and QUICK

Don't breathe while doing it, and this won't happen to you.

Issued by the Chemical Warfare Service

CHEMICAL WARFARE WORLD WAR 1

WORLD WAR ONE IS SEEN AS THE DAWN OF MODERN CHEMICAL WARFARE, WITH A VARIETY OF DIFFERENT CHEMICAL AGENTS BEING EMPLOYED ON A LARGE SCALE, RESULTING IN APPROXIMATELY 1,240,000 NON-FATAL CASUALTIES, AND 91,000 FATALITIES. A VARIETY OF POISONOUS GASES WERE USED THROUGHOUT THE CONFLICT, WITH EACH HAVING DIFFERING EFFECTS UPON VICTIMS.



TEAR GASES

(ethyl bromoacetate, chloroacetone & xylyl bromide)

SMELL & APPEARANCE

Both ethyl bromoacetate and chloroacetone are colourless to light yellow liquids with fruity, pungent odours. Xylyl bromide is a colourless liquid with a pleasant, aromatic odour.

EFFECTS

Tear gases are what is known as 'lachrymatory agents' - they irritate mucous membranes in the eyes, mouth, throat & lungs, leading to crying, coughing, breathing difficulties, and temporary blindness.

FIRST USED

1914 In August 1914, the French forces used tear gas grenades against the German army, to little effect.

ESTIMATED CASUALTIES

0 fatal These gases were used to incapacitate enemies rather than to kill; symptoms commonly resolved within 30 minutes of leaving the affected area.

CHLORINE

SMELL & APPEARANCE

Chlorine is a yellow-green gas with a strong, bleach-like odour. Soldiers described its smell as 'a distinct mix of pepper and pineapple'.

EFFECTS

Chlorine reacts with water in the lungs, forming hydrochloric acid. It can cause coughing, vomiting, and irritation to the eyes at low concentrations, and rapid death at concentrations of 1000 parts per million.

FIRST USED

1915 Used by German forces at Ypres in April 1915. British forces used it for the first time at Loos in September.

ESTIMATED CASUALTIES

5,000 number of fatalities in first use of chlorine at Ypres Chlorine was devastating as troops were initially unequipped to deal with it. Later, gas masks limited its effectiveness.

PHOSGENE

(carbonyl dichloride)

SMELL & APPEARANCE

Phosgene is a colourless gas with a musty odour comparable to that of newly mown hay or grass. If the odour is detectable, it indicates a hazardous level of phosgene. Its density is four times that of air.

EFFECTS

Reacts with proteins in lung alveoli, causing suffocation. Causes coughing, difficulty breathing and irritation to the throat & eyes. Can cause delayed effects, not evident for 48hrs, including fluid in the lungs & death.

FIRST USED

1915 In December 1915, the German forces used phosgene against the British at Ypres.

ESTIMATED CASUALTIES

85% of all gas-related fatalities It's estimated 85% of all gas-related fatalities in World War 1 resulted from phosgene. It was often used in combination with chlorine.

MUSTARD GAS

(bis(2-chloroethyl) sulfide)

SMELL & APPEARANCE

When pure, mustard gas is a colourless and odourless liquid, but it's used as a chemical agent in impure form. These are yellow-brown in colour and have an odour resembling garlic or horseradish.

EFFECTS

Powerful irritant and vesicant (blistering agent) that can damage the eyes, skin, & respiratory tract. Causes chemical burns on contact with skin. Forms intermediates that react with DNA leading to cell death.

FIRST USED

1917 On 12th July 1917, German forces used mustard gas against the British at Ypres.

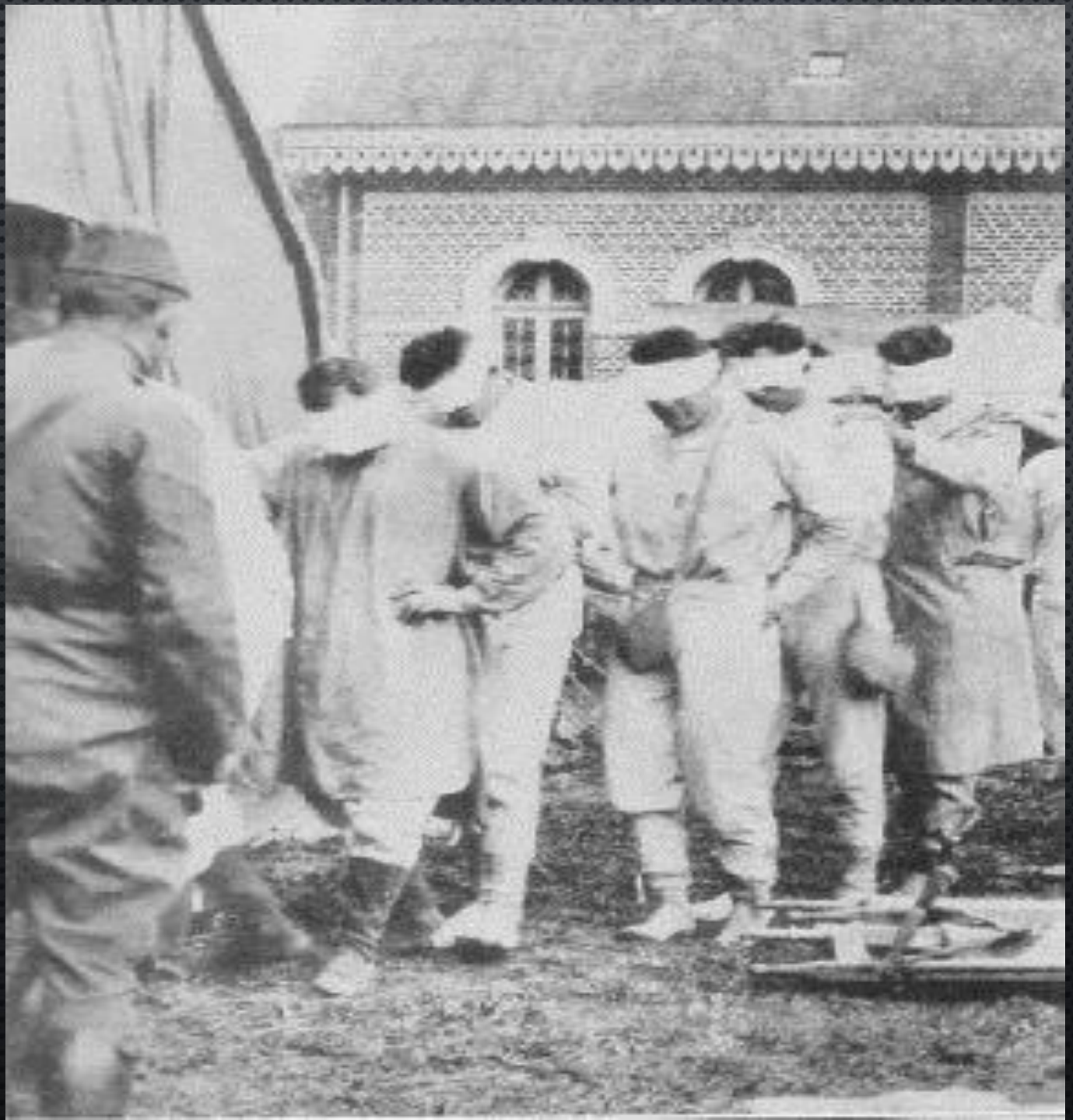
ESTIMATED CASUALTIES

2-3% mortality rate of mustard gas casualties The mortality rate of mustard gas casualties was low - but its effects were debilitating, and patients required elaborate care.


WAR

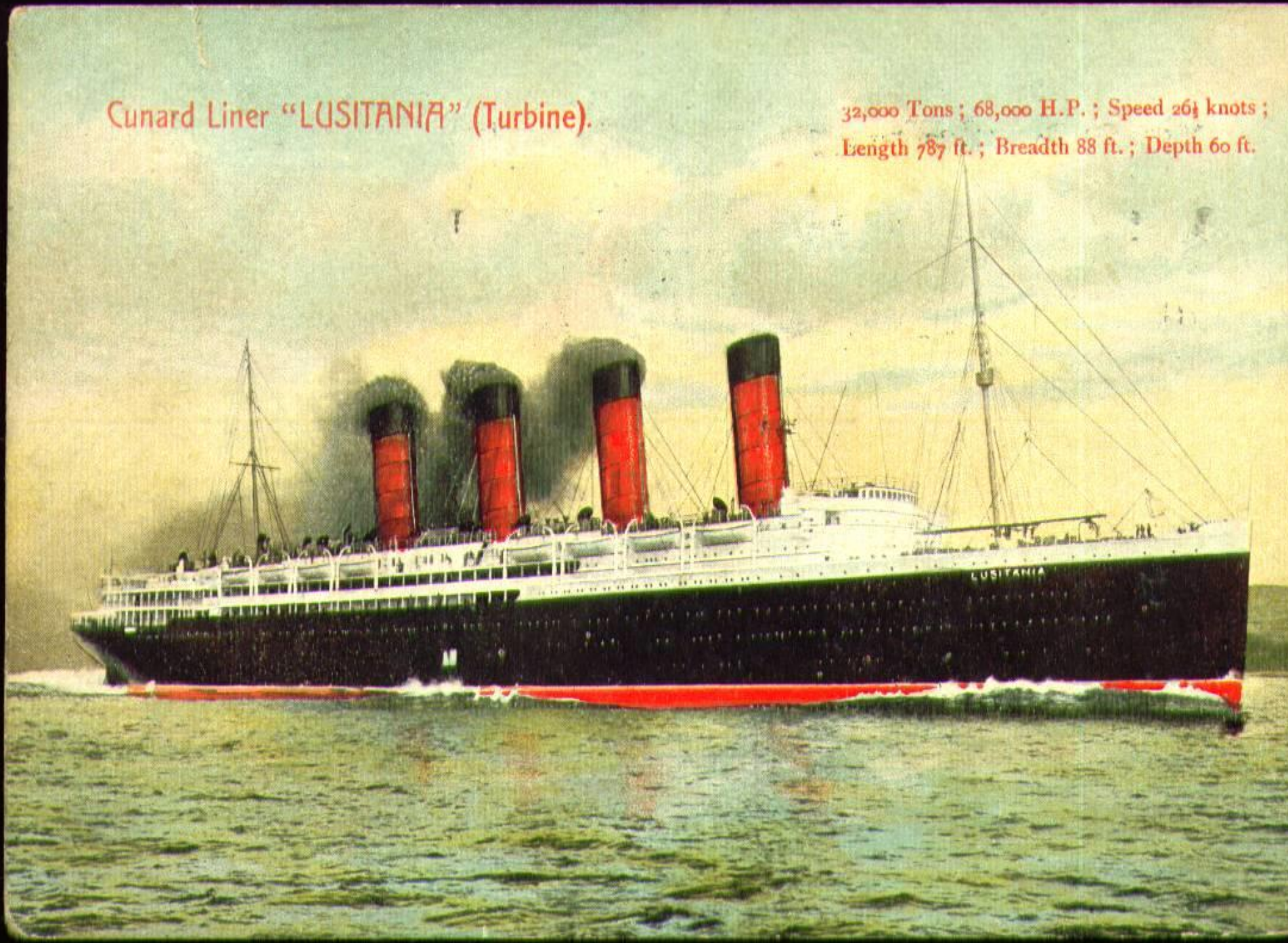
Chemical Warfare cont.

- Mustard gas was the most deadly biological weapon that was used in the trenches.
- It was odourless and could take up to 12 hours to take effect!
- Very powerful at small doses. Could be added to shells and remained active in the soil for potentially weeks after detonated
- The nastiest thing about mustard gas is that it made the skin blister, the eyes burn and victims would soon start to vomit.
- Caused internal and external bleeding, and targeted the lungs.
- It could take up to 5 weeks to die!



The Lusitania Incident

- The Germans had warned all enemy nations that all the ships that flied an enemy flag was a legitimate war target.
- The British passenger liner the Lusitania, left on a journey from New York to London in 1915.
- A German U-boat torpedoed the great ship and she sunk within 15 minutes.
- 1,195 passengers died in the frigid Atlantic water.
- 123 dead were American, prompting the US to join the Triple Entente against Germany.
- American public opinion of Germany was strained!
- The German U-boat commander wrote that a huge second explosion ripped the ship apart after the torpedo.
- Was the Lusitania carrying illegal explosives for use in the war? Would that make her a legitimate war target?


Cunard Liner "LUSITANIA" (Turbine).
32,000 Tons ; 68,000 H.P. ; Speed 26¼ knots ;
Length 787 ft. ; Breadth 88 ft. ; Depth 60 ft.
LUSITANIA

Queenstown, 7. Mai 1915.
Der Cunarddampfer „Lusitania" ist torpediert worden und gesunken.