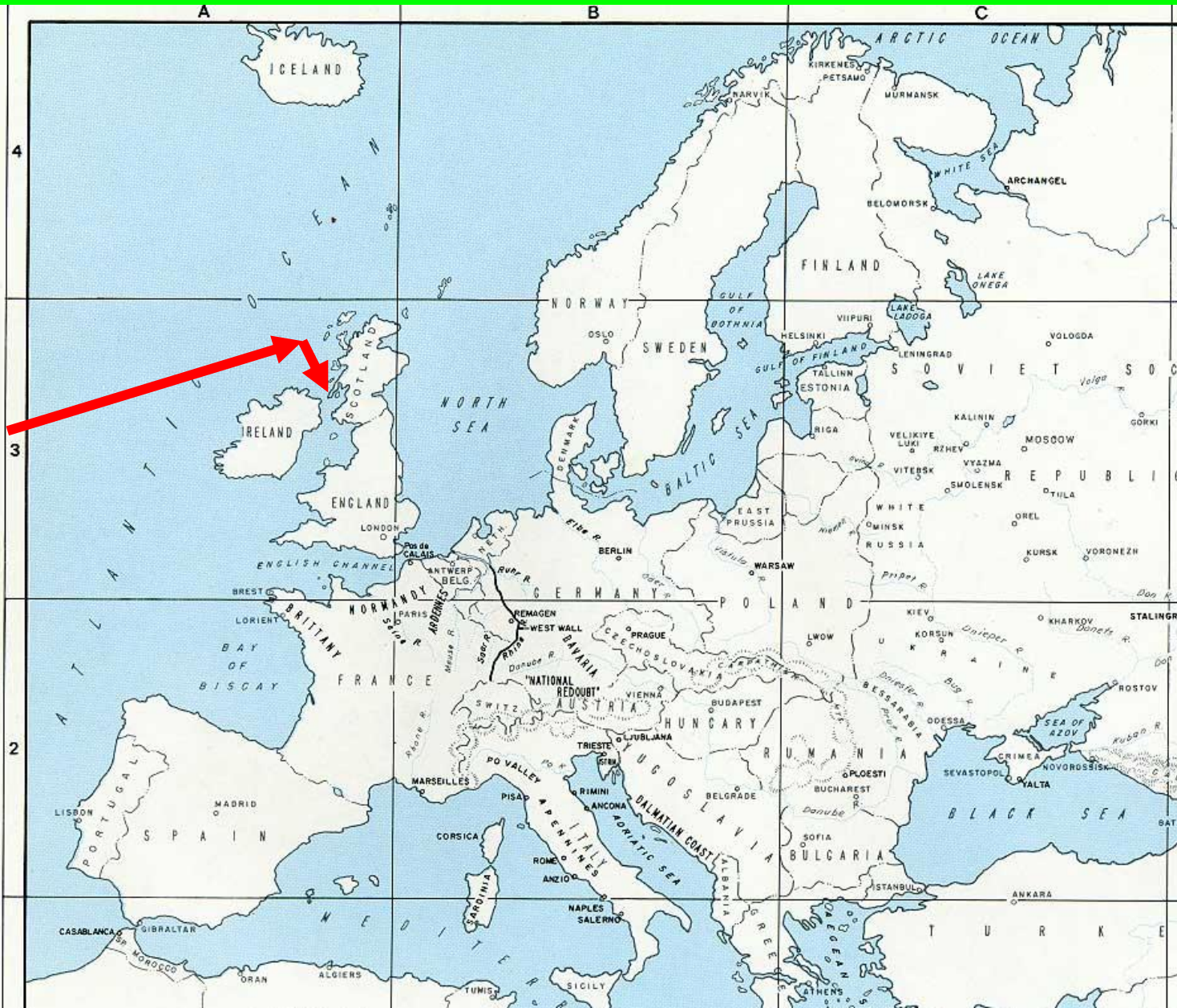
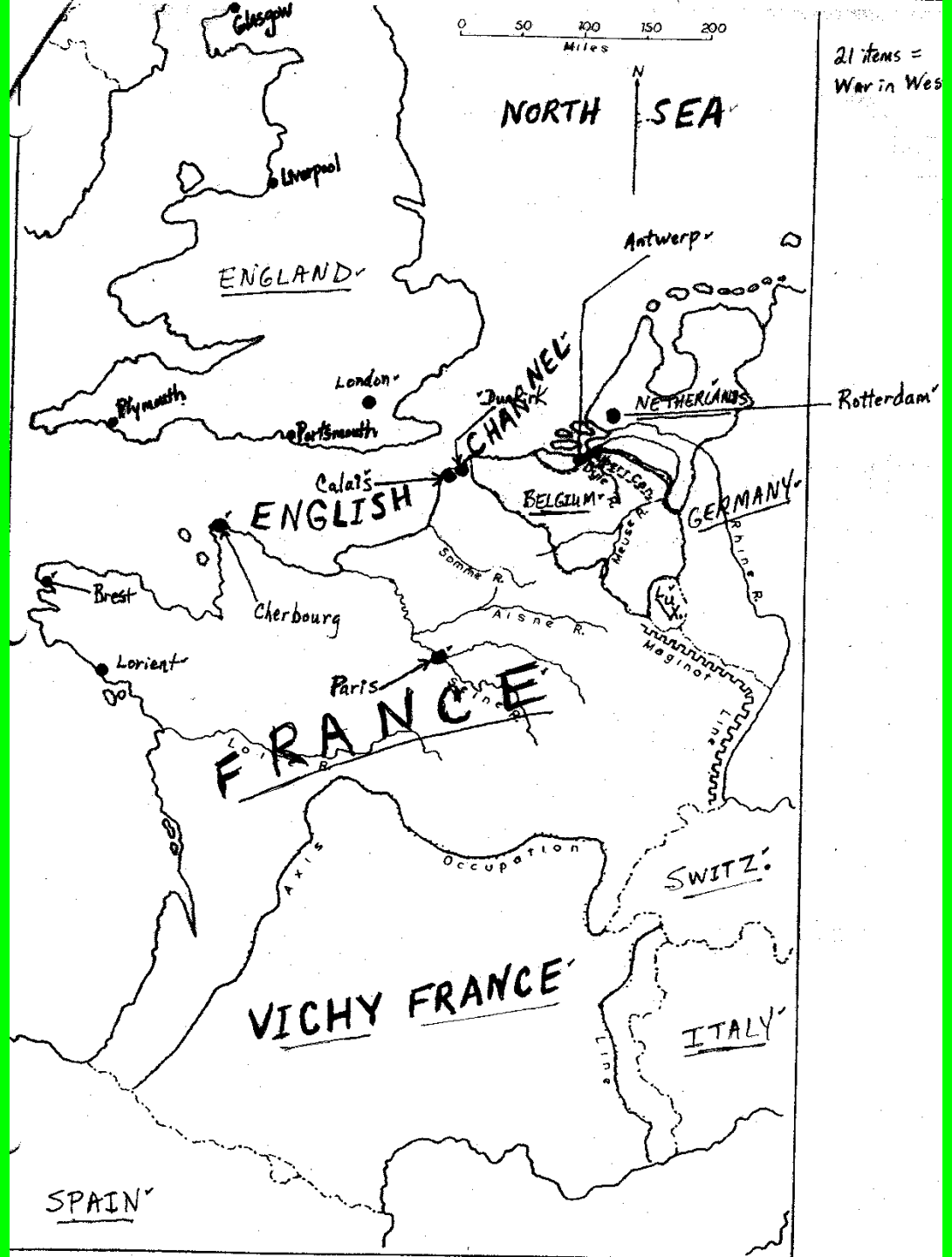


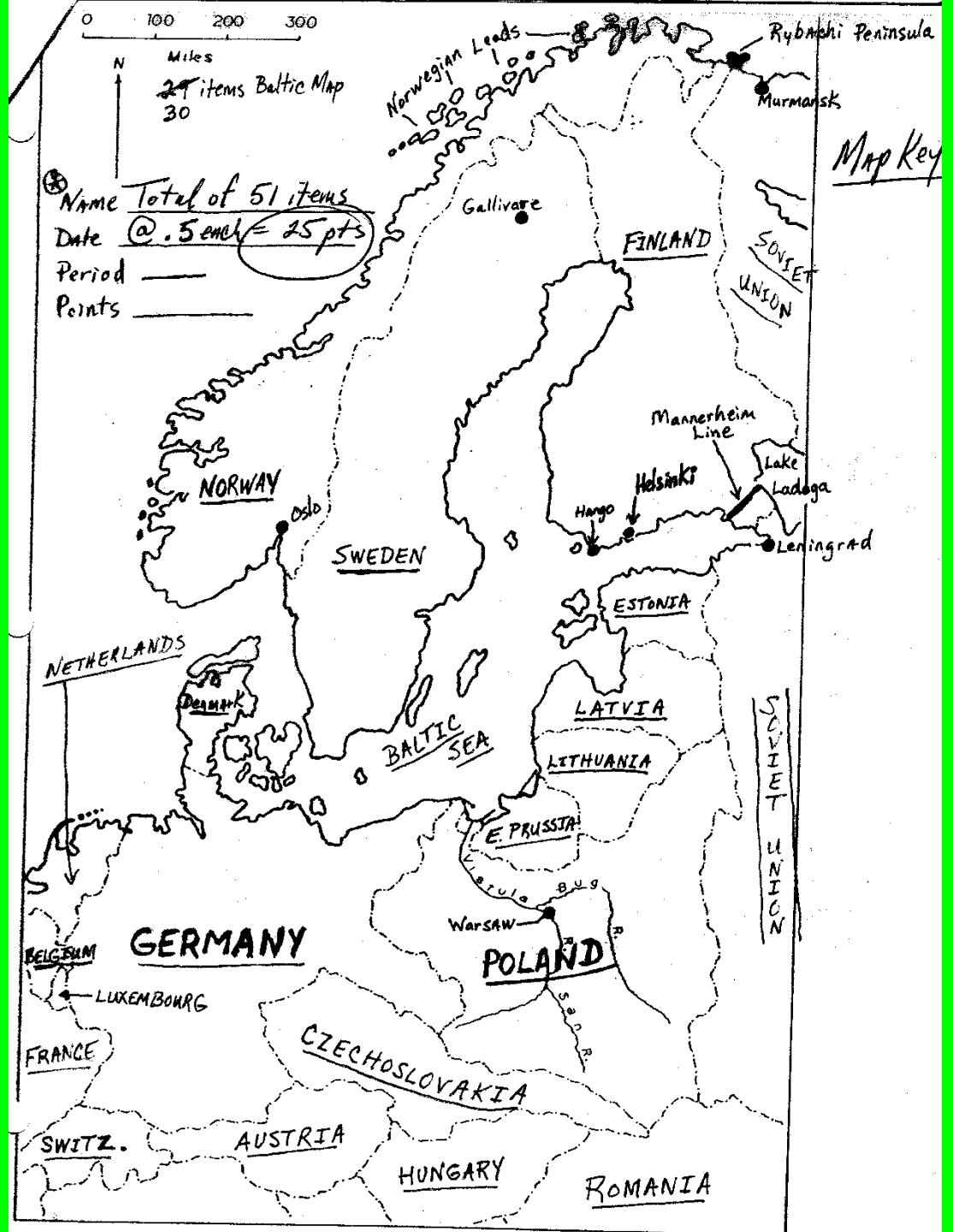
# Battle of the Atlantic 1939-1945



# Battle in the West Map



# War in the Baltic Map



# Convoy Routes Across the Atlantic



# The Battle of the Atlantic was basically a war between:

Americans trying to get supplies and  
ammunition to the Allies

**VERSUS**

German \*Sea Wolves trying to stop them

**By July of 1940, Britain was the only remaining Allied power in Western Europe!**

**Her survival depended upon imports of American food & supplies.**

**\*\*Britain needed 1 million tons of supplies per week!!**

# German Advantages in 1940:

1. Excellent sub bases along the coasts of Norway and France.

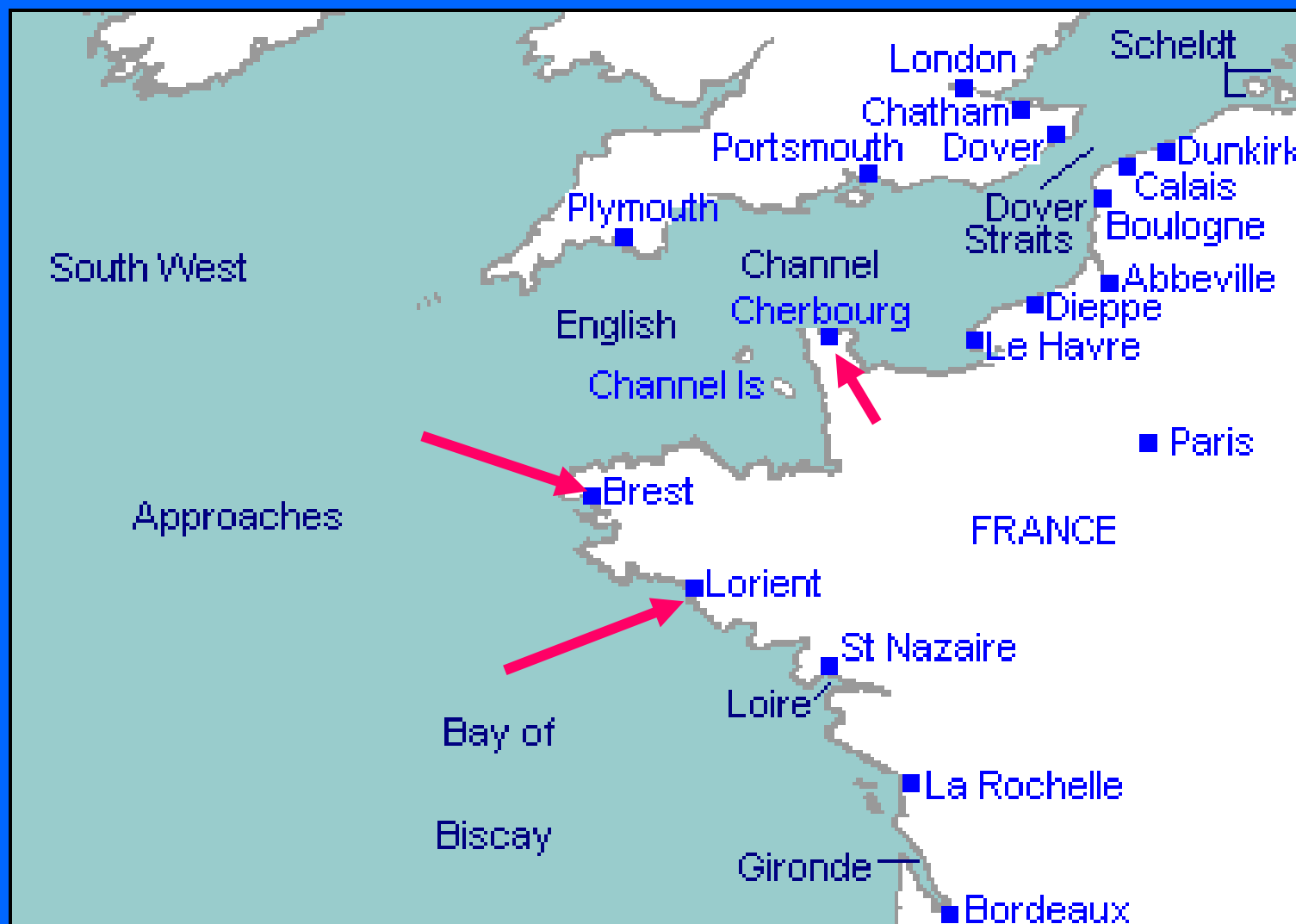
**German Sea Wolf Headquarters = Lorient, France**

Major French Sub Bases = Cherbourg & Brest

Major German Sub Bases = Hamburg,  
Wilhelmshaven, & Kiel

2. Hypothermia

# Key Sea Wolf Sub Bases on the French Coast



Map by Gordon Smith, please acknowledge [www.naval-history.net](http://www.naval-history.net)

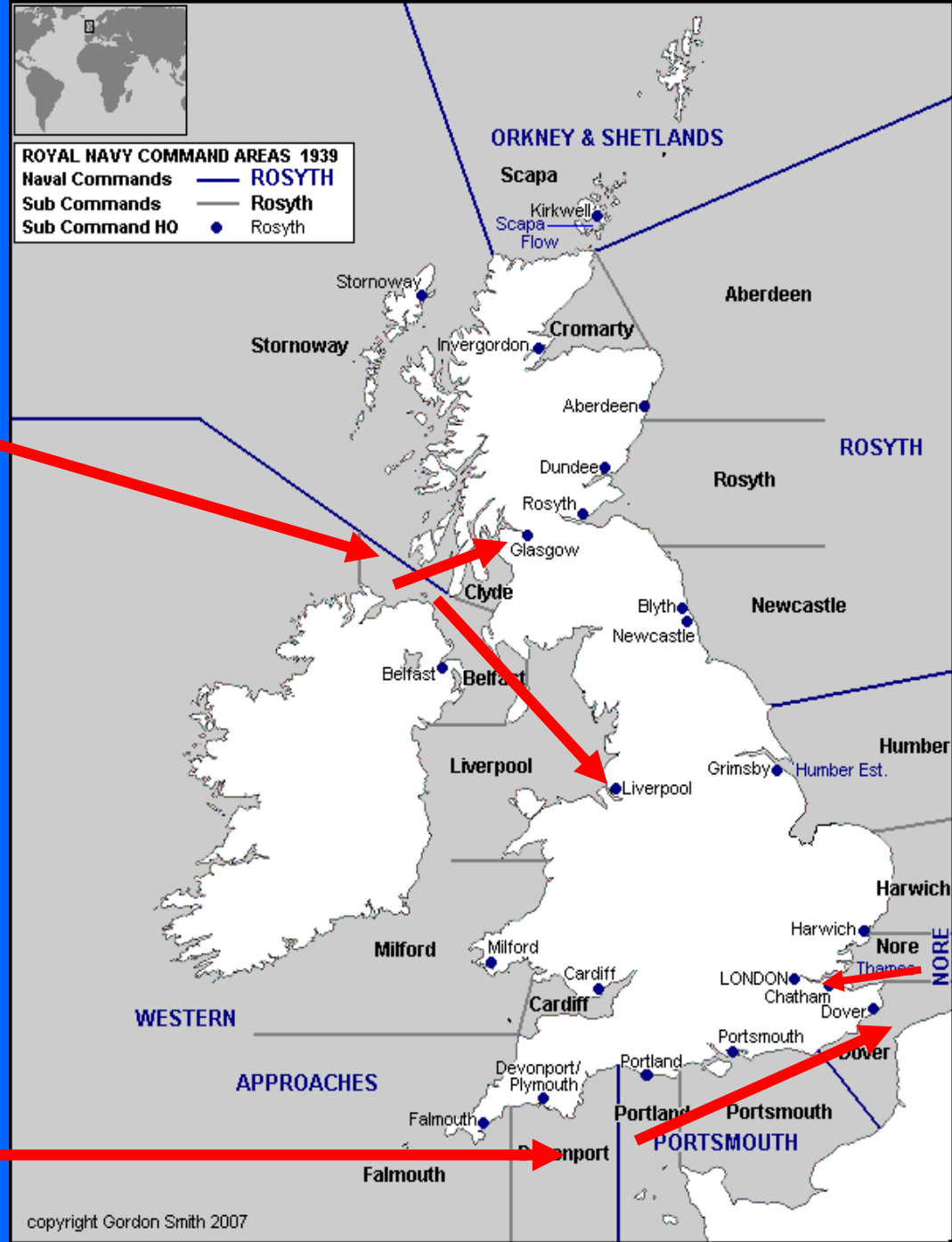




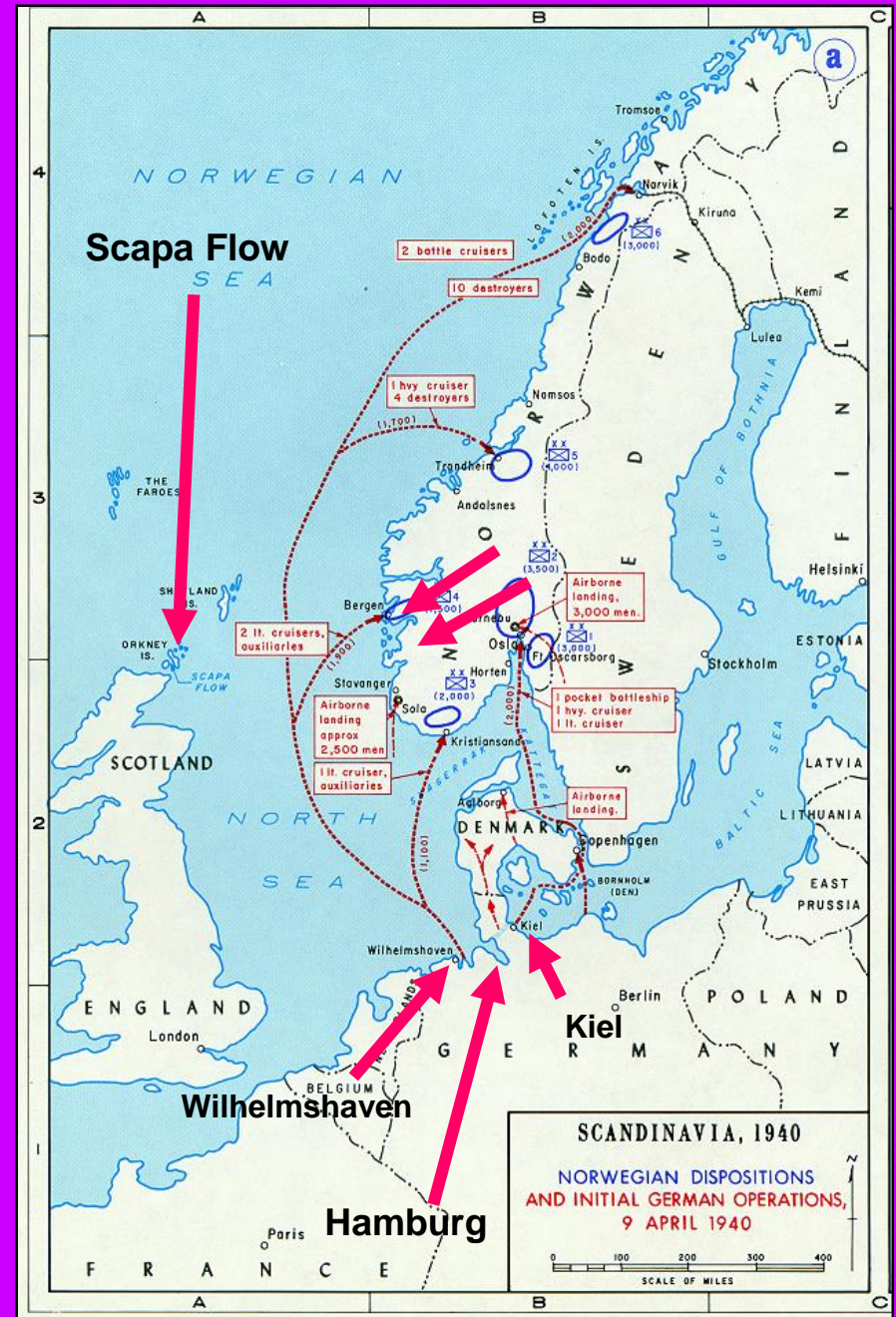
ROYAL NAVY COMMAND AREAS 1939	
Naval Commands	— ROSYTH
Sub Commands	— Rosyth
Sub Command HO	● Rosyth

New shipping lanes after WWII starts

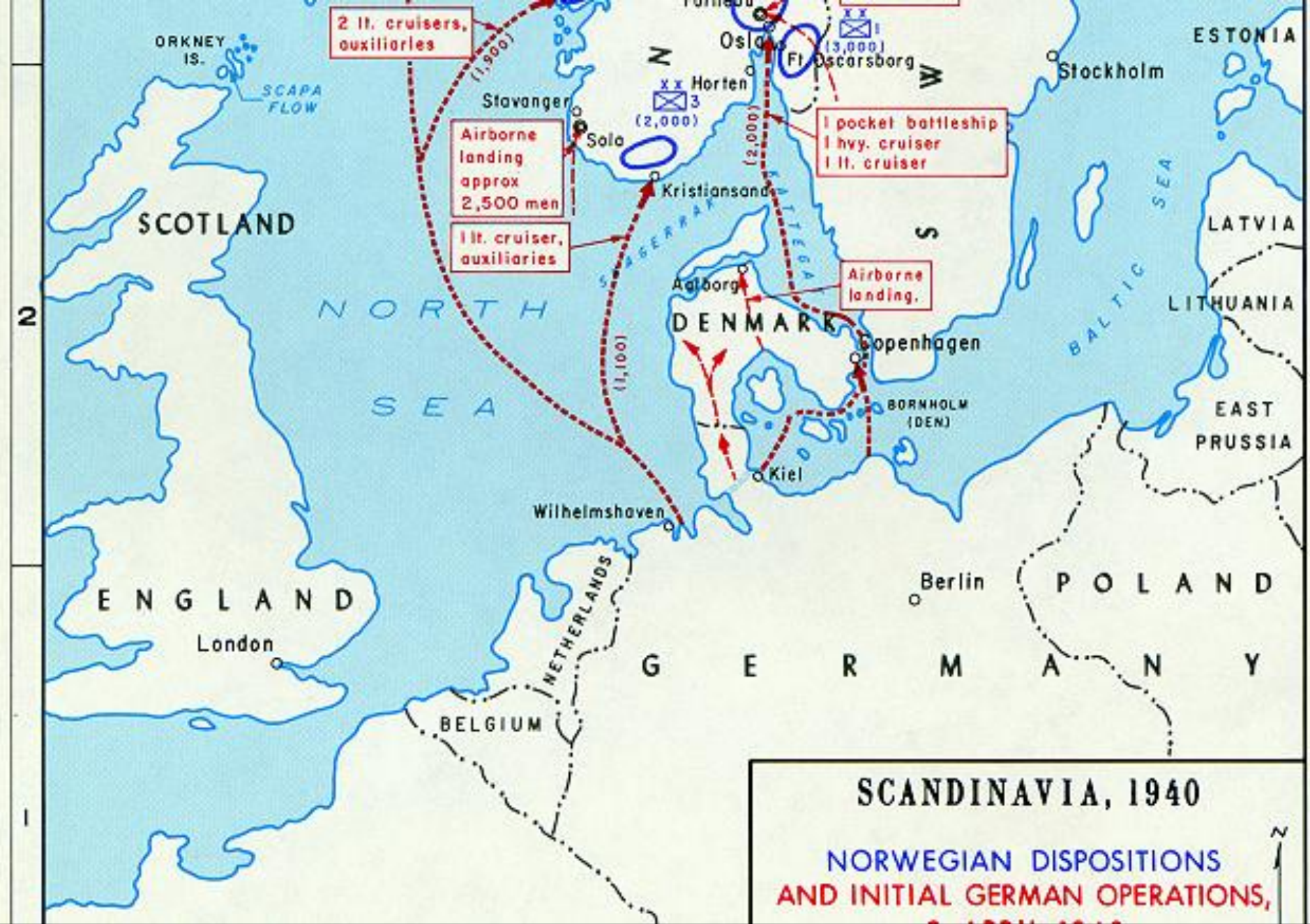
Main shipping lanes before WWII



# Key Nazi Sub Bases Along the Norwegian Coast and in Germany







# Hitler's Early Mistake

- Allowed \*Admiral Raeder to convince him to prioritize surface ships over submarines from 1934 -1935
- Beginning of war Germany had 56 U-boats
- Of those, 10 were not operational
- 46 U-boats usable



**Admiral Erich Raeder, German Chief of Navy 1939 - 1942**

# Common Submarine Fleet Schedule:

- 1/3 sub fleet in attack mode
- 1/3 sub fleet traveling to attack station
- 1/3 sub fleet in base for routine maintenance
  
- In 1939, Nazis had only **15 U-boats** to attack with at one time!



## **\*\*Admiral Karl Dönitz =**

- 1. architect of Wolf Pack sub strategy**
- 2. Chief of the German Navy, 1943-1945**



# Early Stage of WWII, German Submarines:

1. 16 – 20 torpedoes
2. Avg. submariner tour of duty = 40-60 days



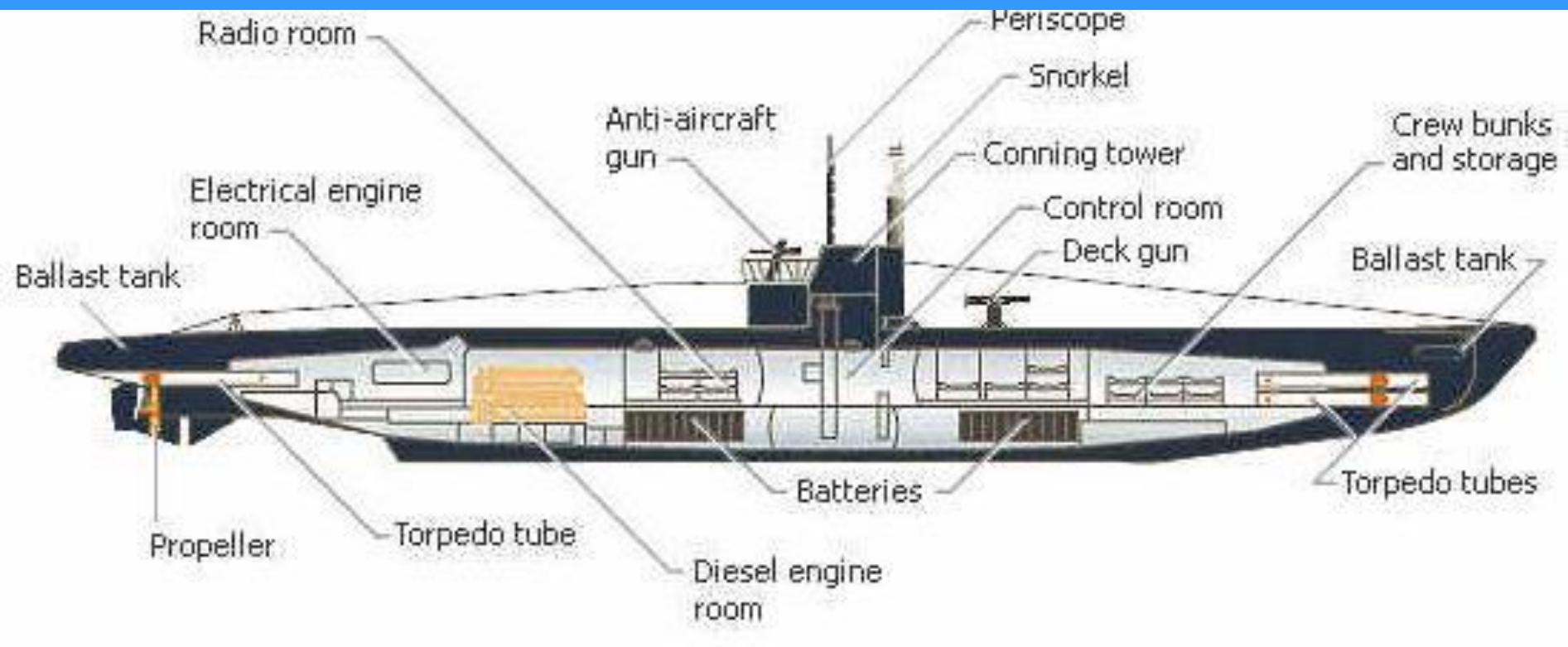
3. Maximum underwater time of 48 hours since U-boat batteries powered the boat when underwater. Batteries lasted 48 hours. Had to come to surface to use diesel engines to recharge batteries.
4. Subs traveled much faster on the surface (17-18 knots / 18.5-20.7 mph) than submerged (7-8 knots / 8-9 mph).

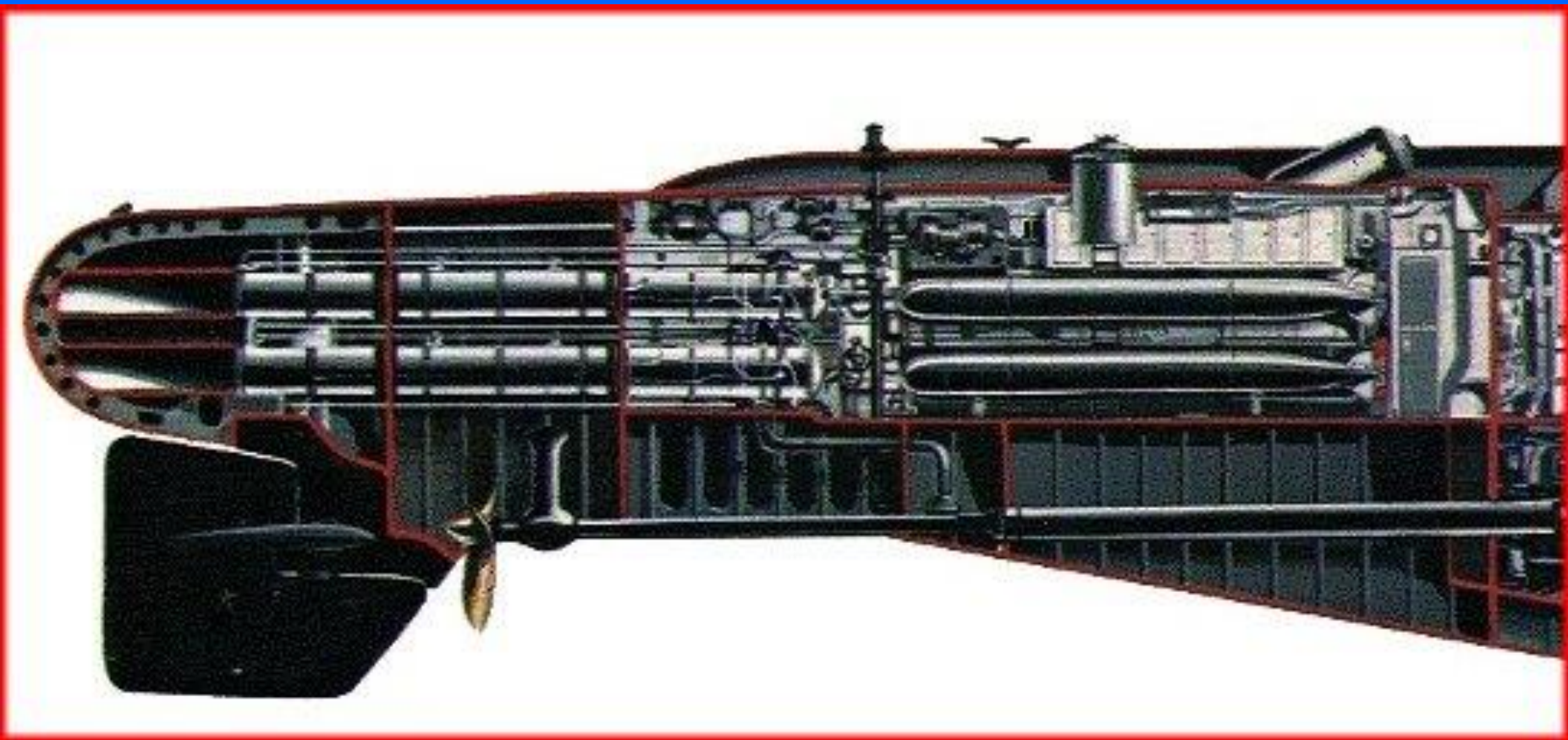


# Standard German Submarine

4 torpedo tubes in the bow (front)

1 torpedo tube in the stern (rear)





**Aft Torpedo Room (2 torpedo tubes in this case)**

# Type VII German U-boat

**Speed: Surfaced 17.7 knots (20.3 mph), submerged 7.6 knots (8.7 mph) **\*\* (1 knot = 1.15 mile per hour)****

**Test depth: 230 m (754 ft). **Calculated crush depth = 250-295 meters (820-967 ft)****

**Range: Surfaced 15170 km (8200 miles) at 10 knots (19 km/h), submerged 150 km (80 miles) at 4 knots (7 km/h)**

**Complement: 44-52 officers & crew**

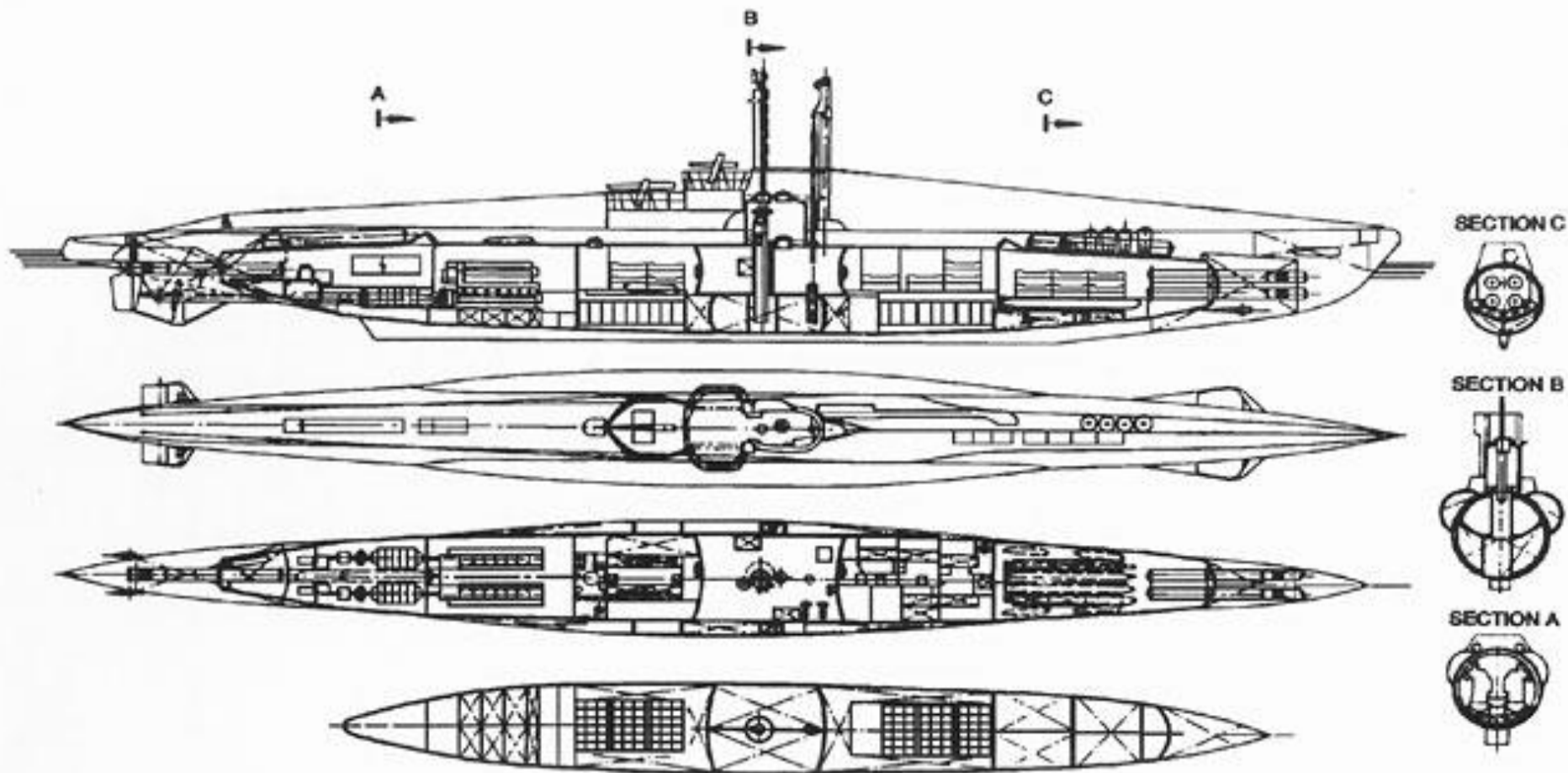
**Armament: 5 Torpedo tubes: 4 bow (front), 1 stern (rear) (14 torpedoes carried)**

1 - C35 88mm gun/ 1 - L45 deck gun with 220 rounds



**Type VII U-boat, the workhorse of WW II**





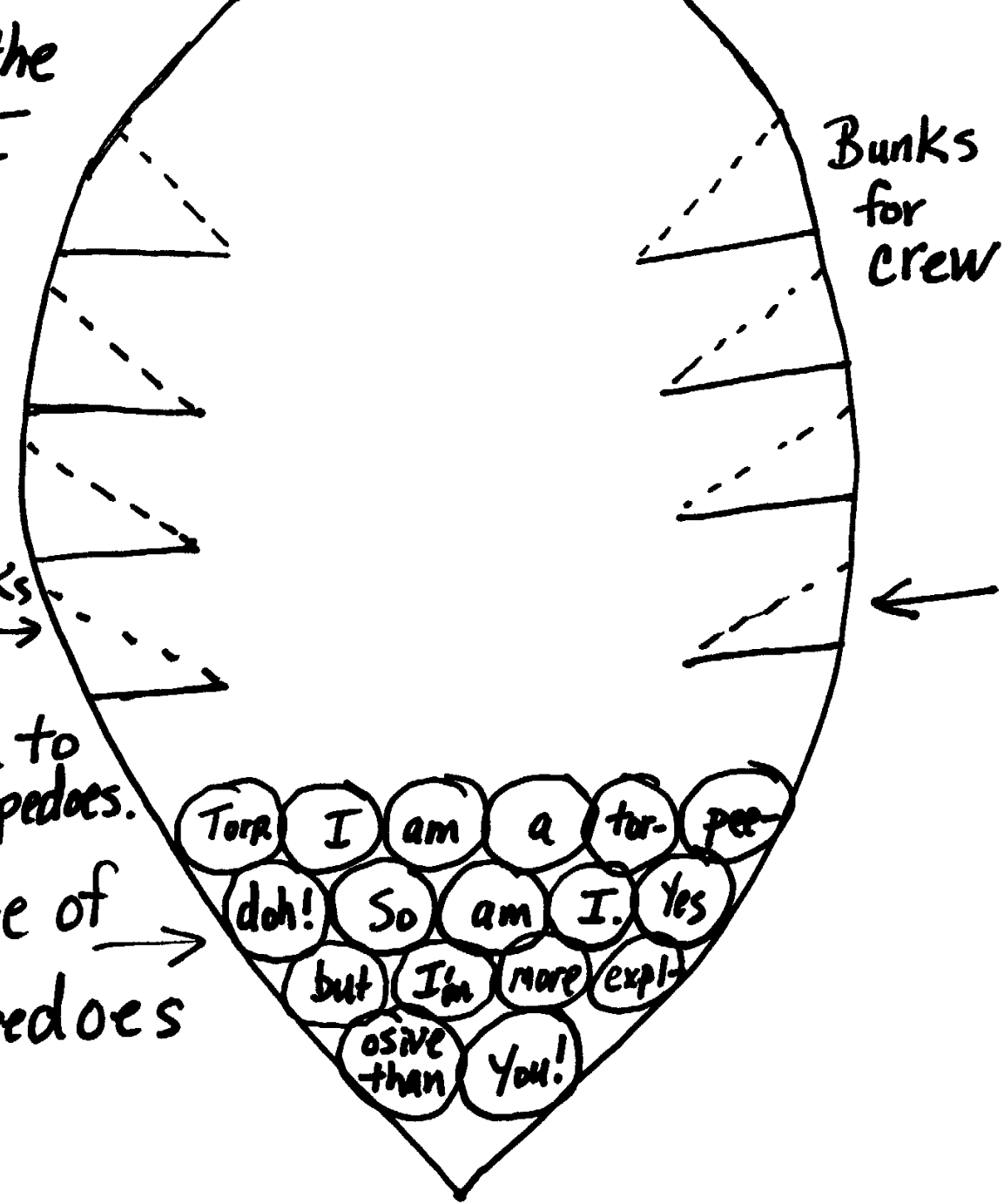
Type VIIc U-boat

\* View looking at the front of a WWII submarine.

Bottom bunks folded up to allow room to store extra torpedoes.

Storage of extra torpedoes

Bunks for crew



Torr I am a tor-pee  
doh! So am I. Yes  
but I'm more expl-  
osive than You!

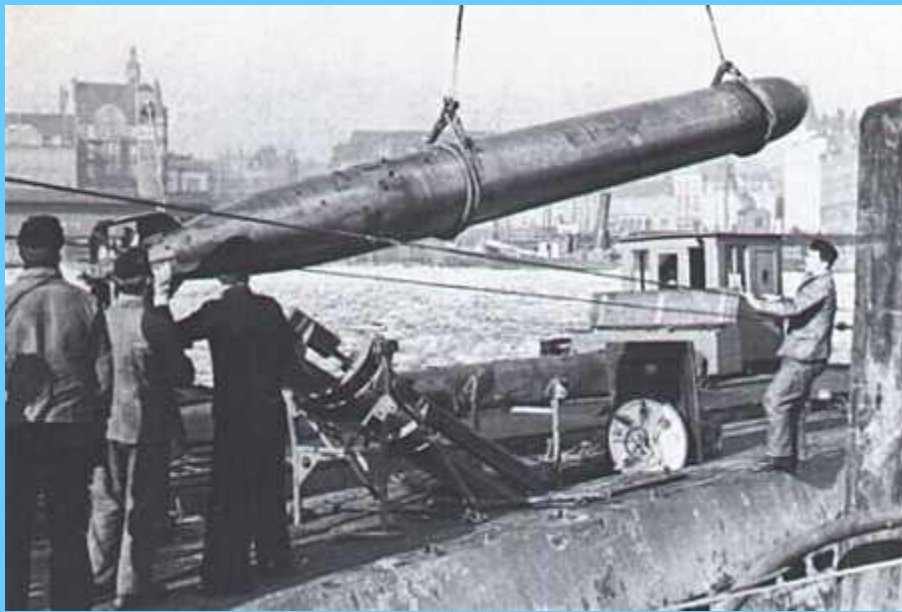




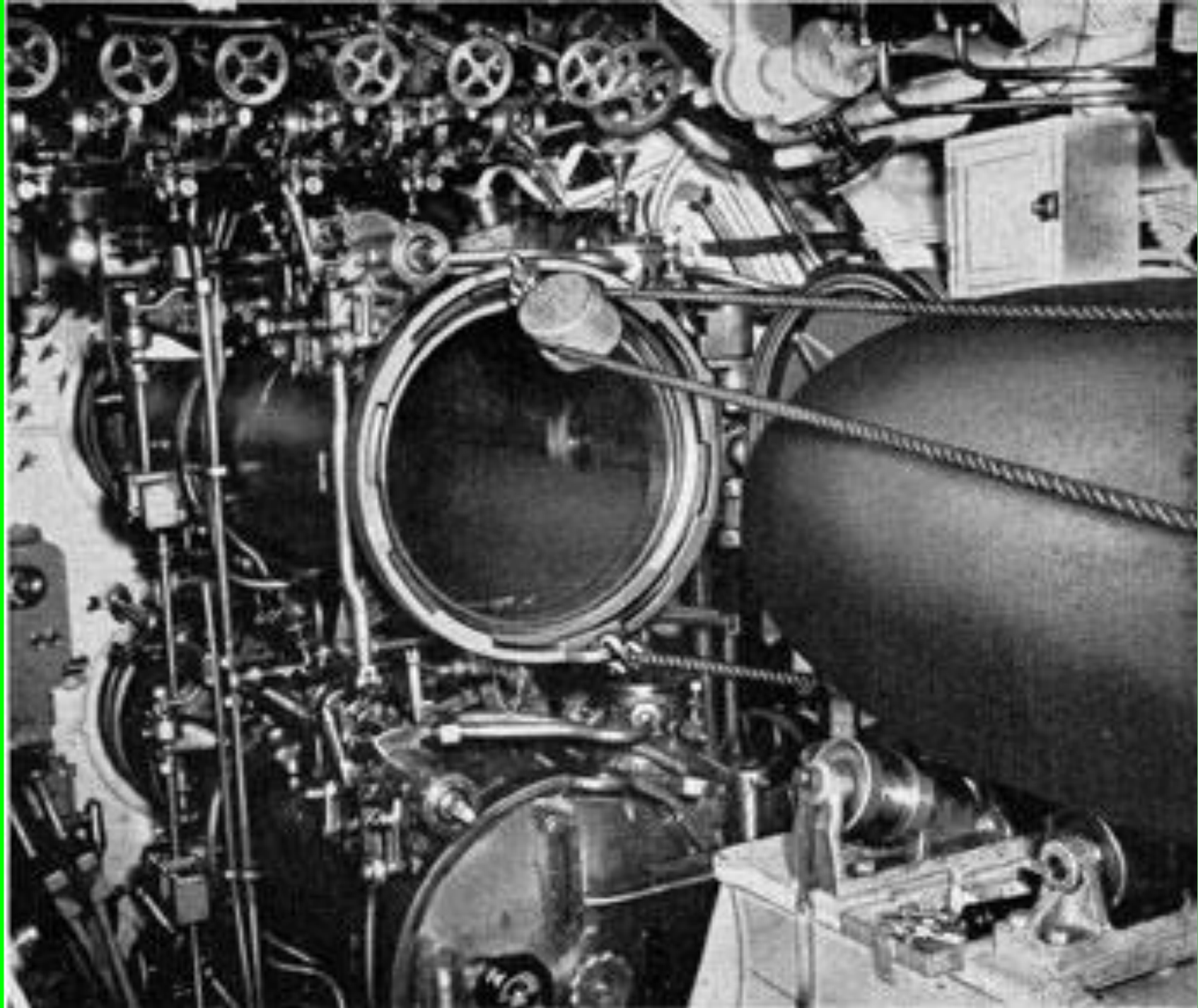
**U-47 U-boat captained by the famous Gunther Prien**



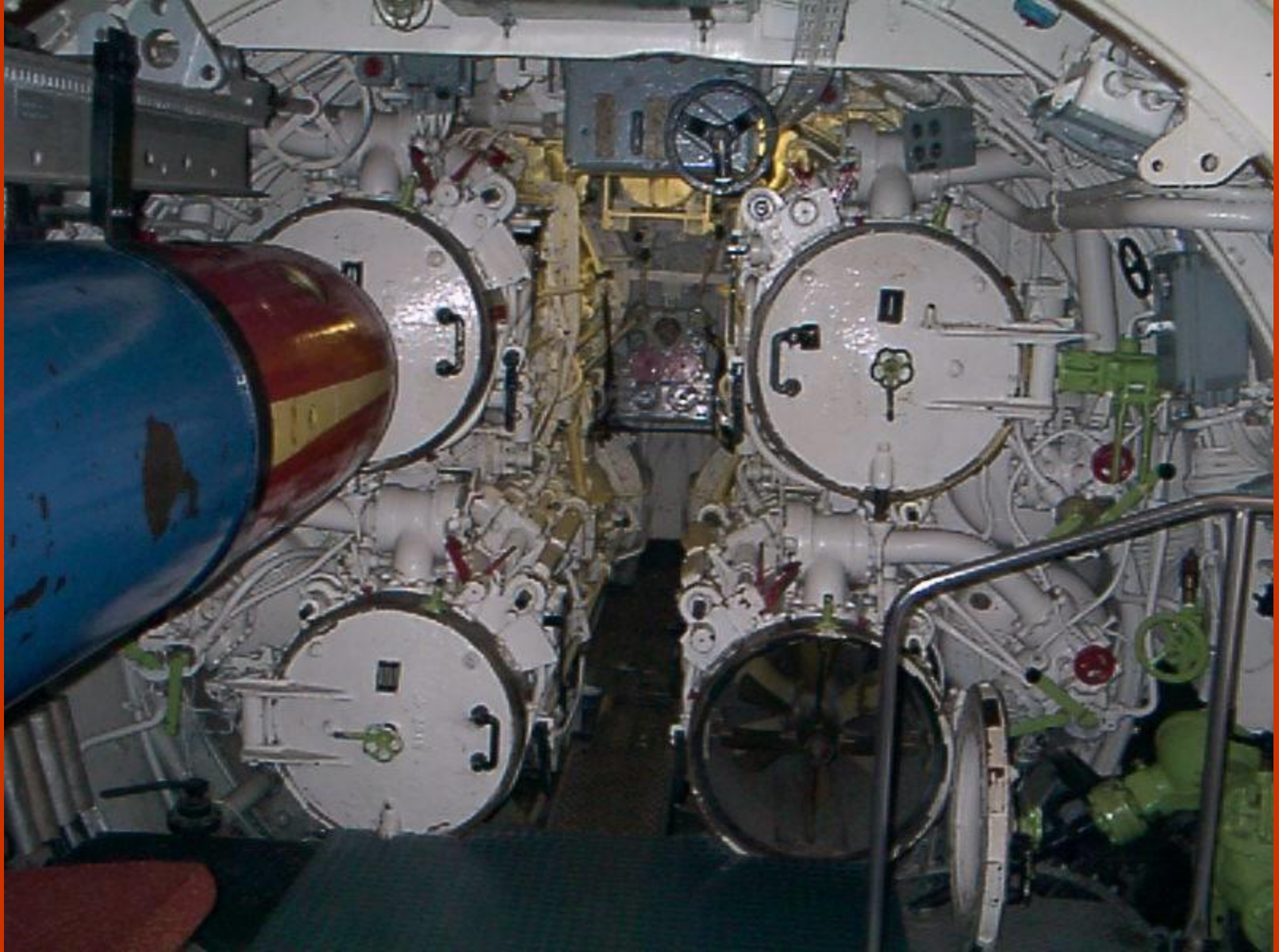




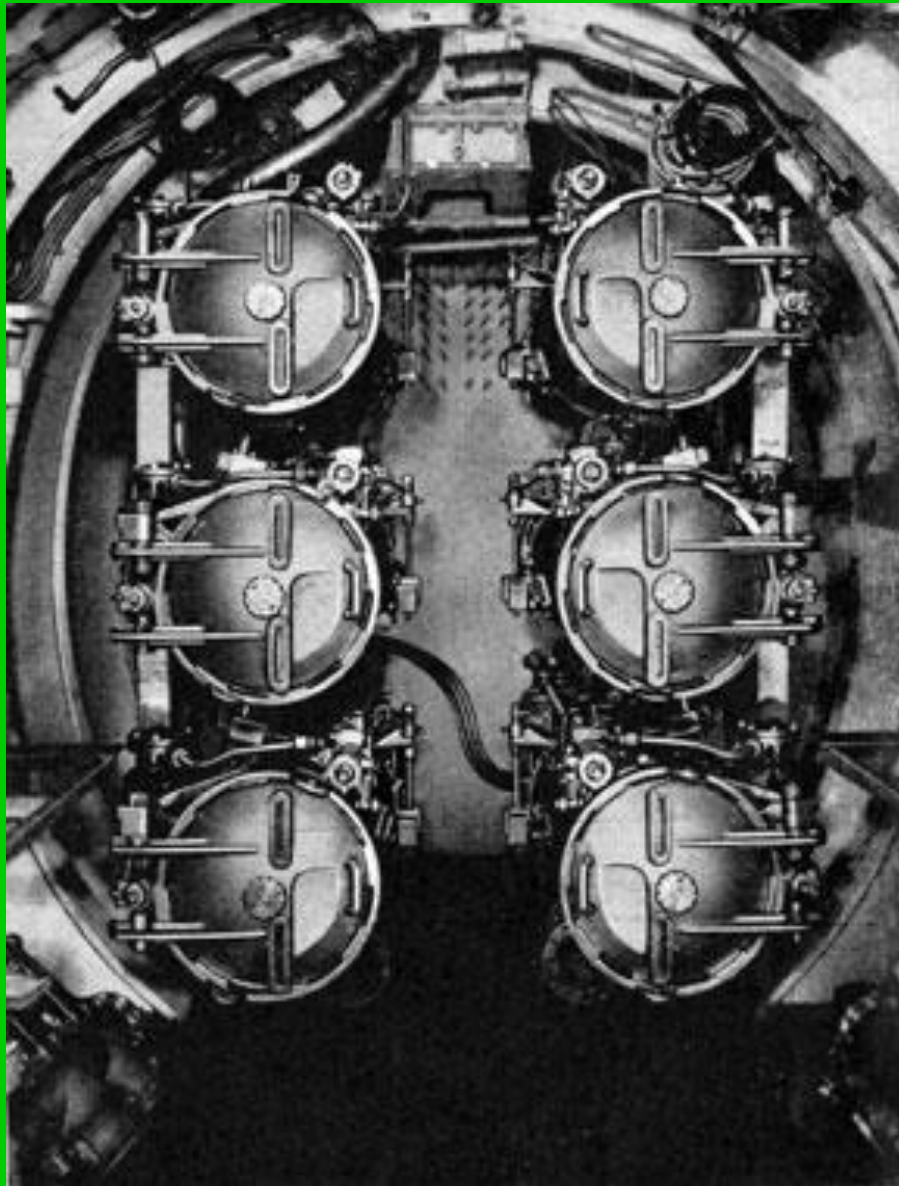
## Loading Torpedoes





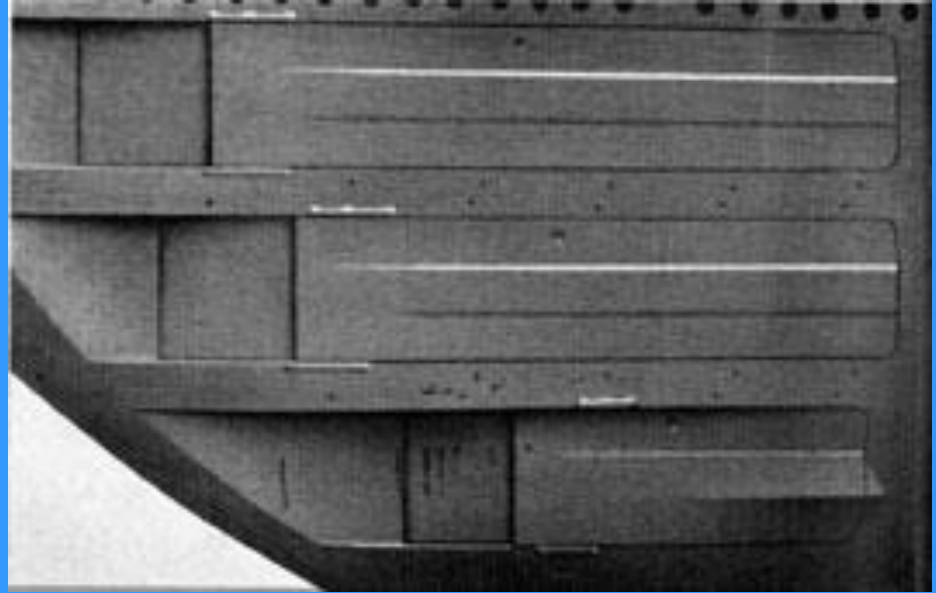


**Bow Torpedo Tubes in German Type VII C U-boat**

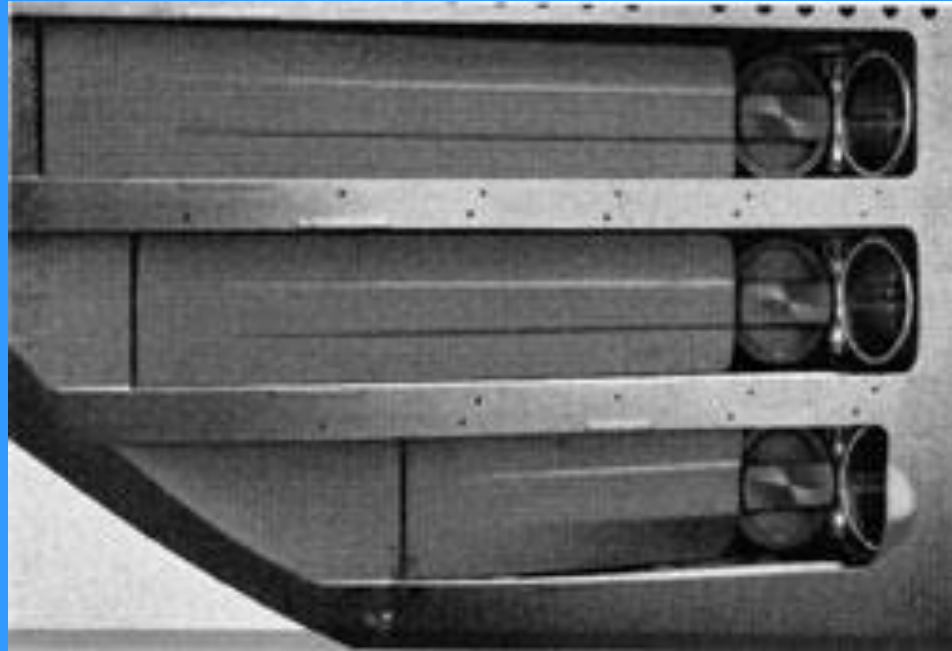


Forward  
torpedo tubes  
for the USS  
Pampanito (on  
display in San  
Francisco Bay /  
Fisherman's  
Wharf)

**Torpedo Bays  
Closed**



**Torpedo Bays  
Opened**

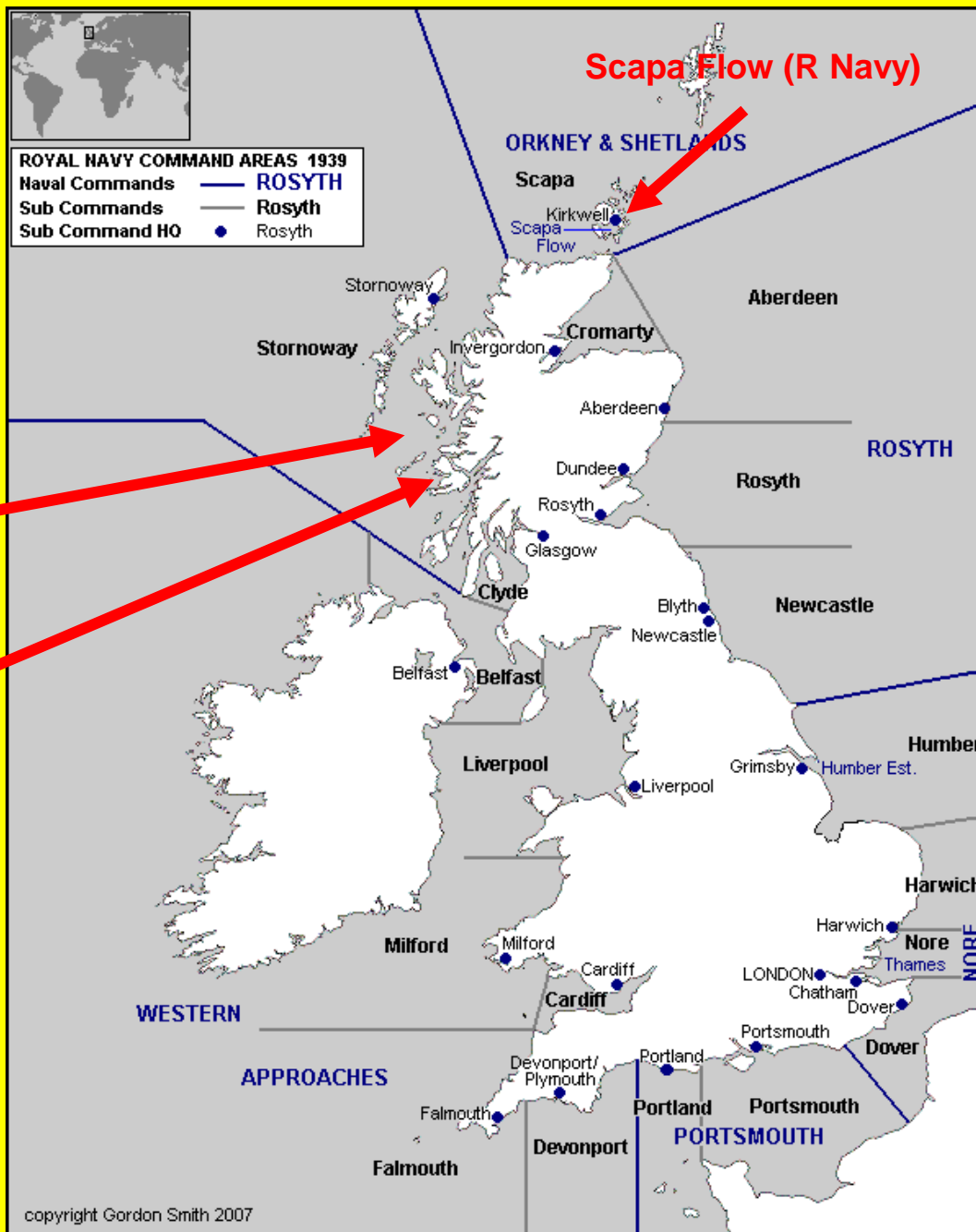




# Royal Navy Headquarters = \*Scapa Flow (Orkney Islands)

Hebrides Islands

Location of HMS  
Western Isles naval  
escort training base - -  
on island of MULL

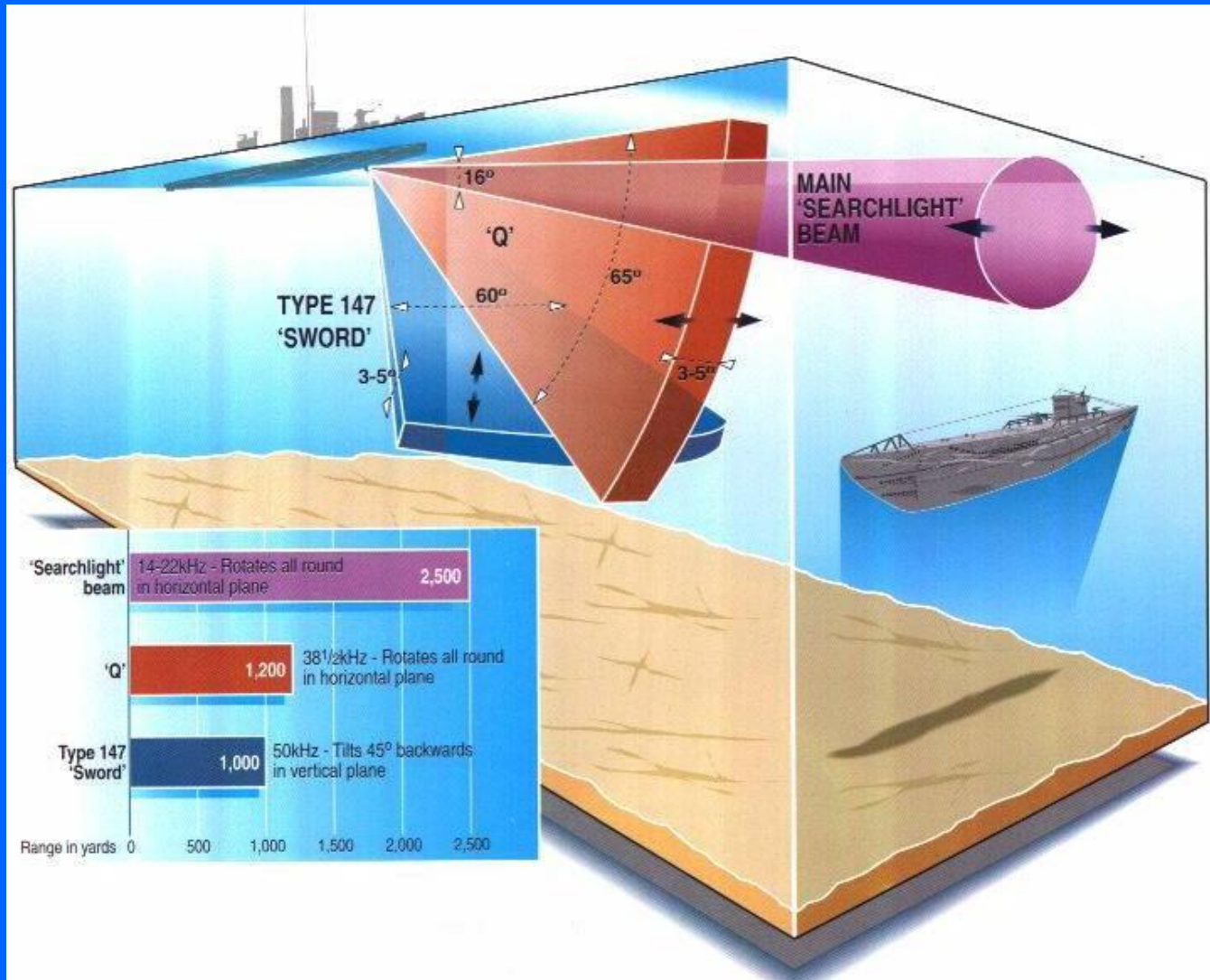




**“The only thing that ever really frightened me was the U-boat peril.”**

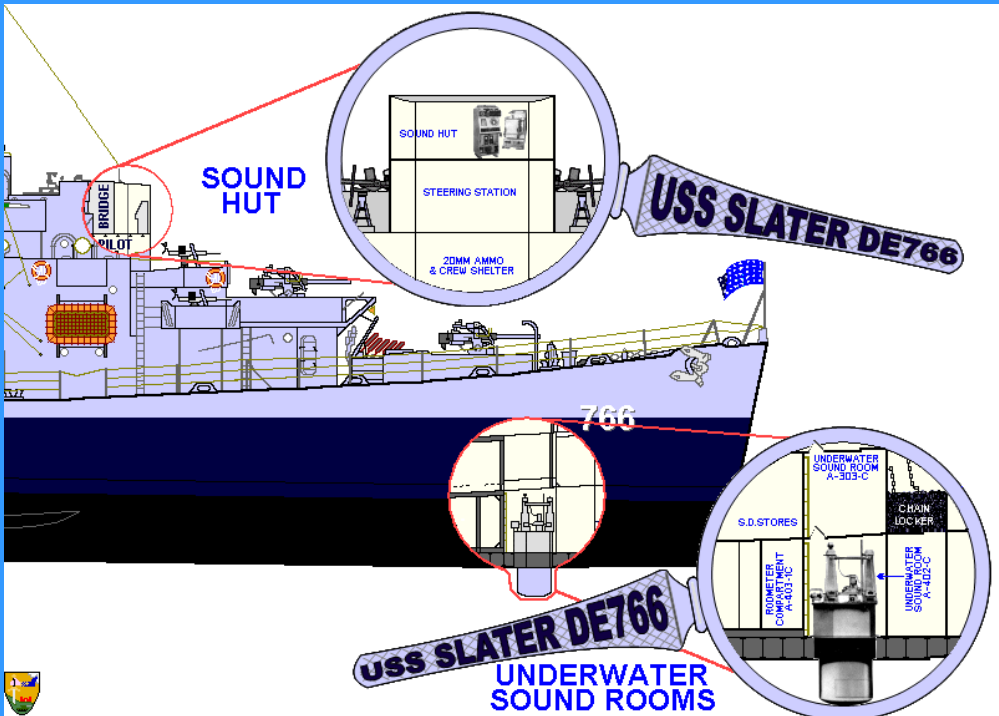
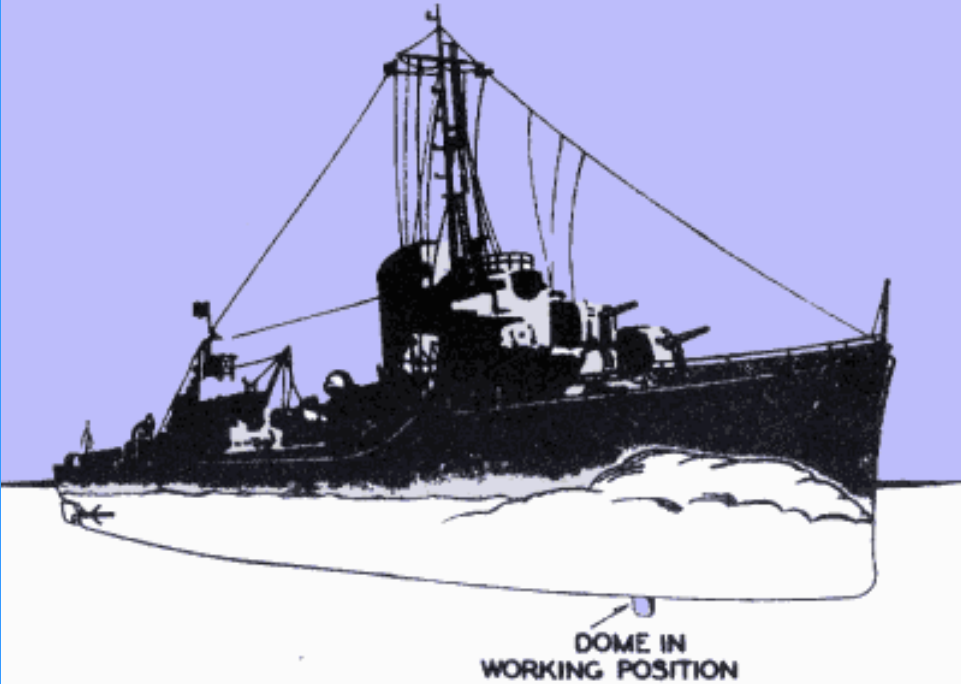
**Winston Churchill, Br. Prime Minister**

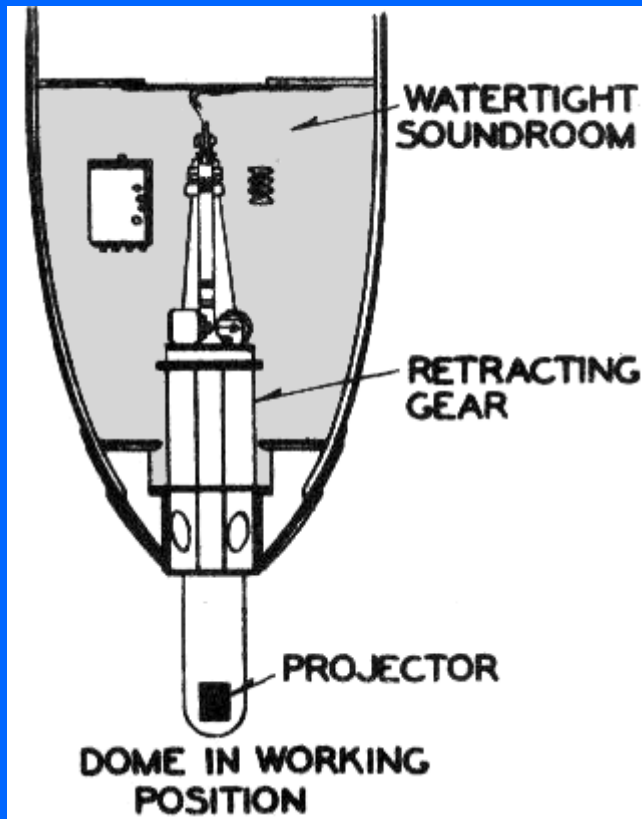
# British Develop \*ASDIC (Allied Submarine Detection Investigation Committee) between the World Wars (aka Sonar)



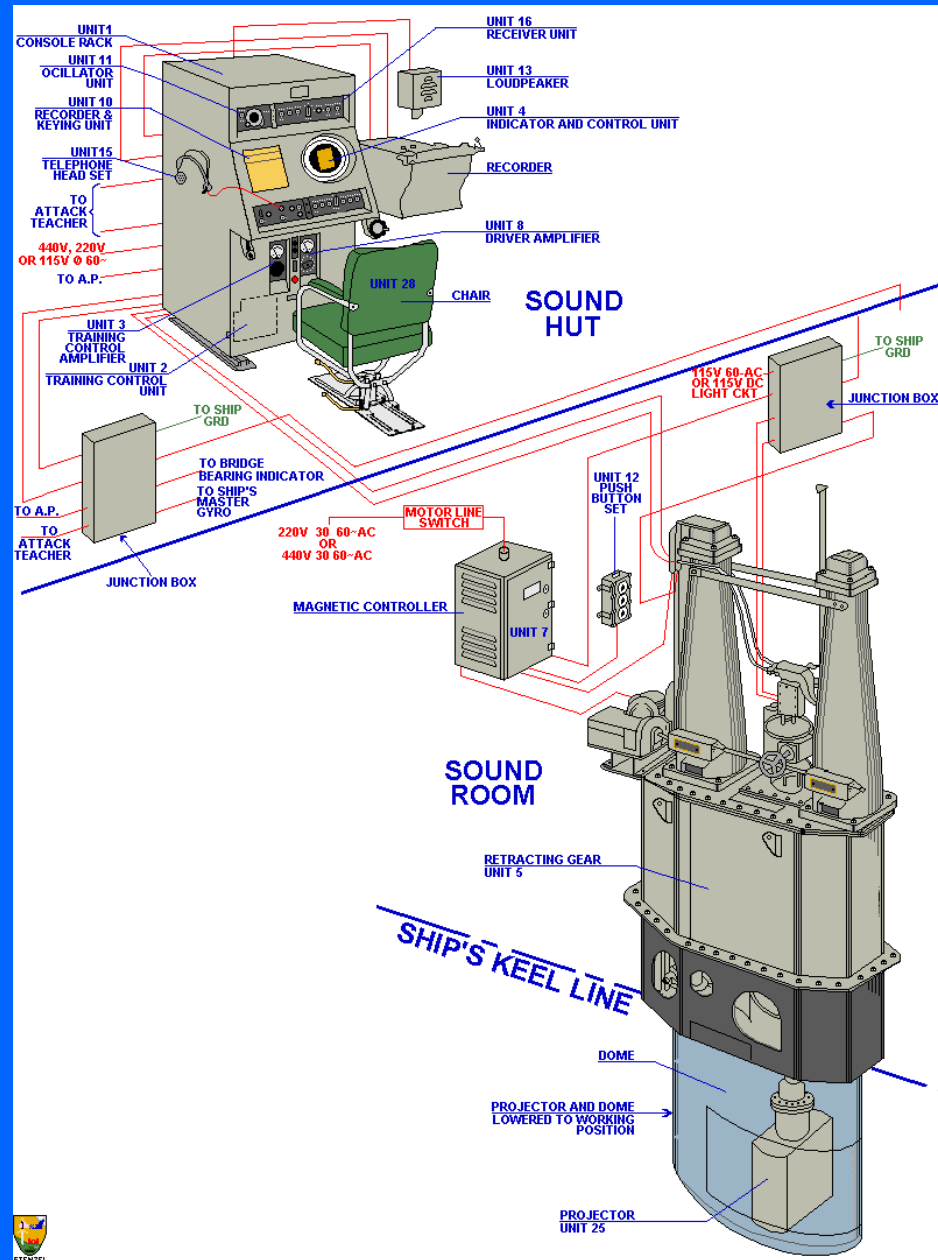


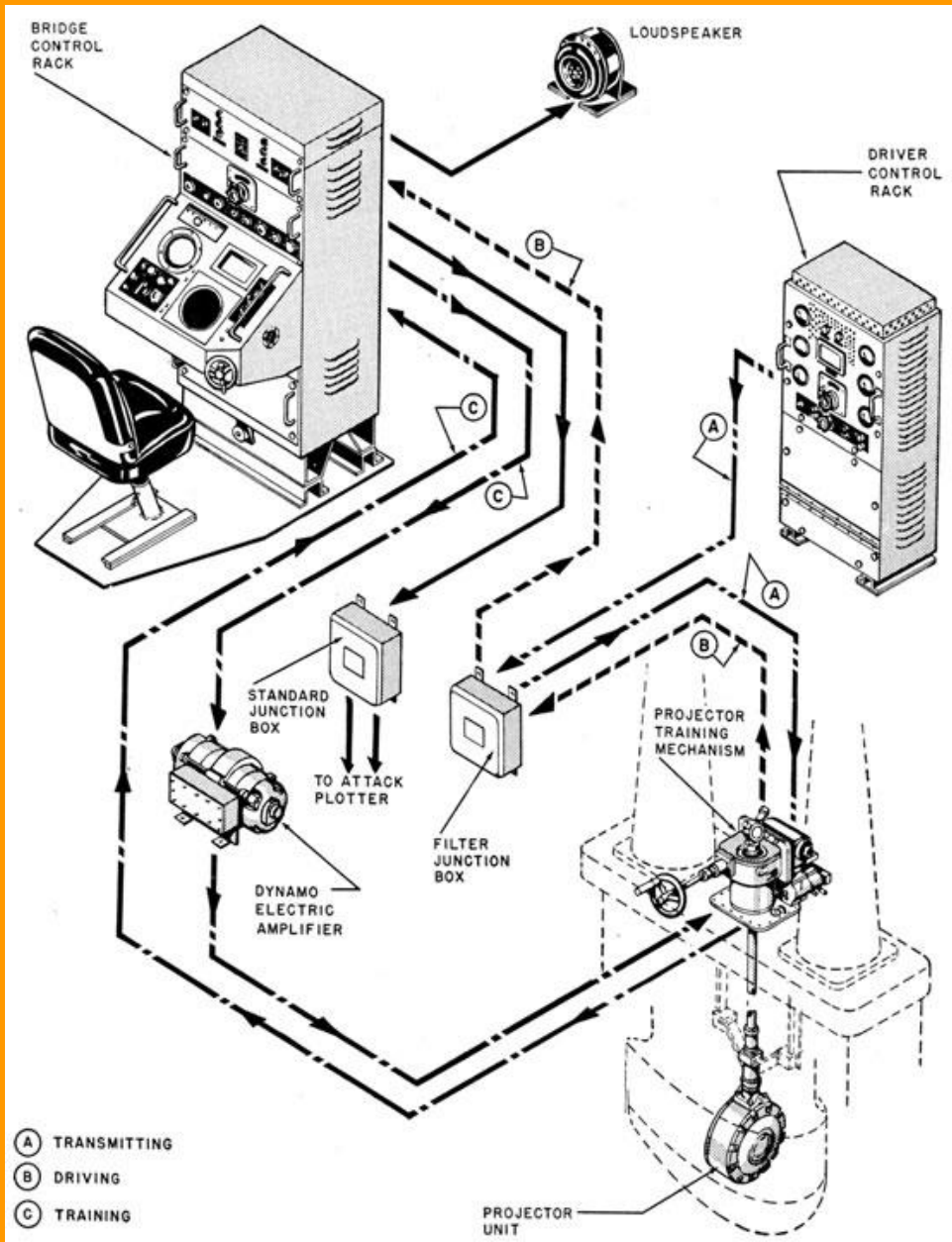
# ASDIC (sonar) device on the hull of a destroyer





**View of the ship's hold from the front.**



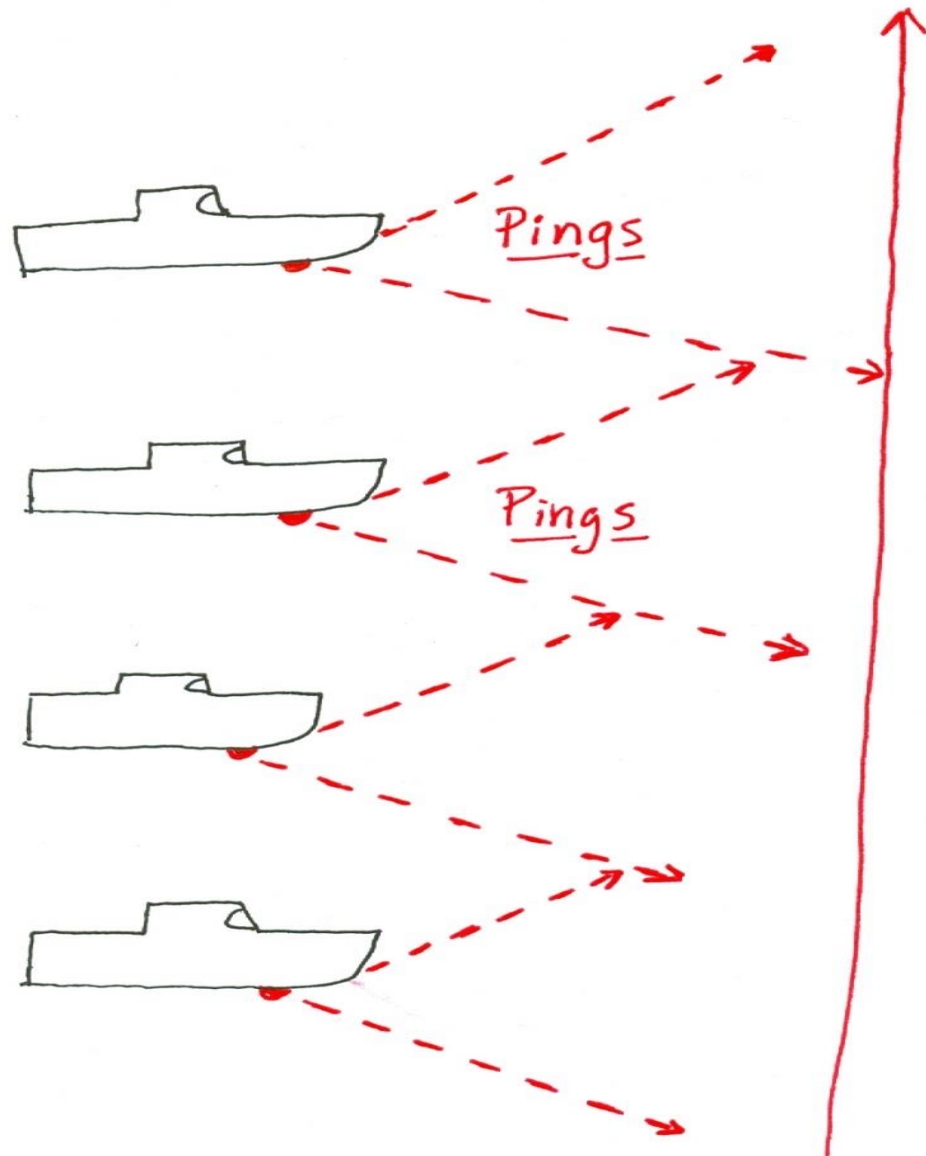




## **Sonar Operators on a Destroyer**



Use of \*sonar to sweep large areas of the ocean for Nazi submarines (U-boats).



\* Putting several ships side by side allows a wide stretch of the ocean to be searched.

# Battle of the Atlantic, 1939 - 1945



# **Wolf Pack Attack (created by Admiral Karl Dönitz, late 1940)**

- 1. Locate convoy**
- 2. Surface & radio sub headquarters with the location.**
- 3. Hdqtrs sends all subs in the area**
- 4. Attack at night, from the surface, from the side of the convoy. Sonar cannot locate subs on the surface. Organize on the side of convoy & charge straight at it. This gave best torpedo shots.**
- 5. Regroup behind the convoy. Next day, sail on surface to get beside the convoy again.**
- 6. At night, attack the convoy again.**

# Convoy Routes Across the Atlantic



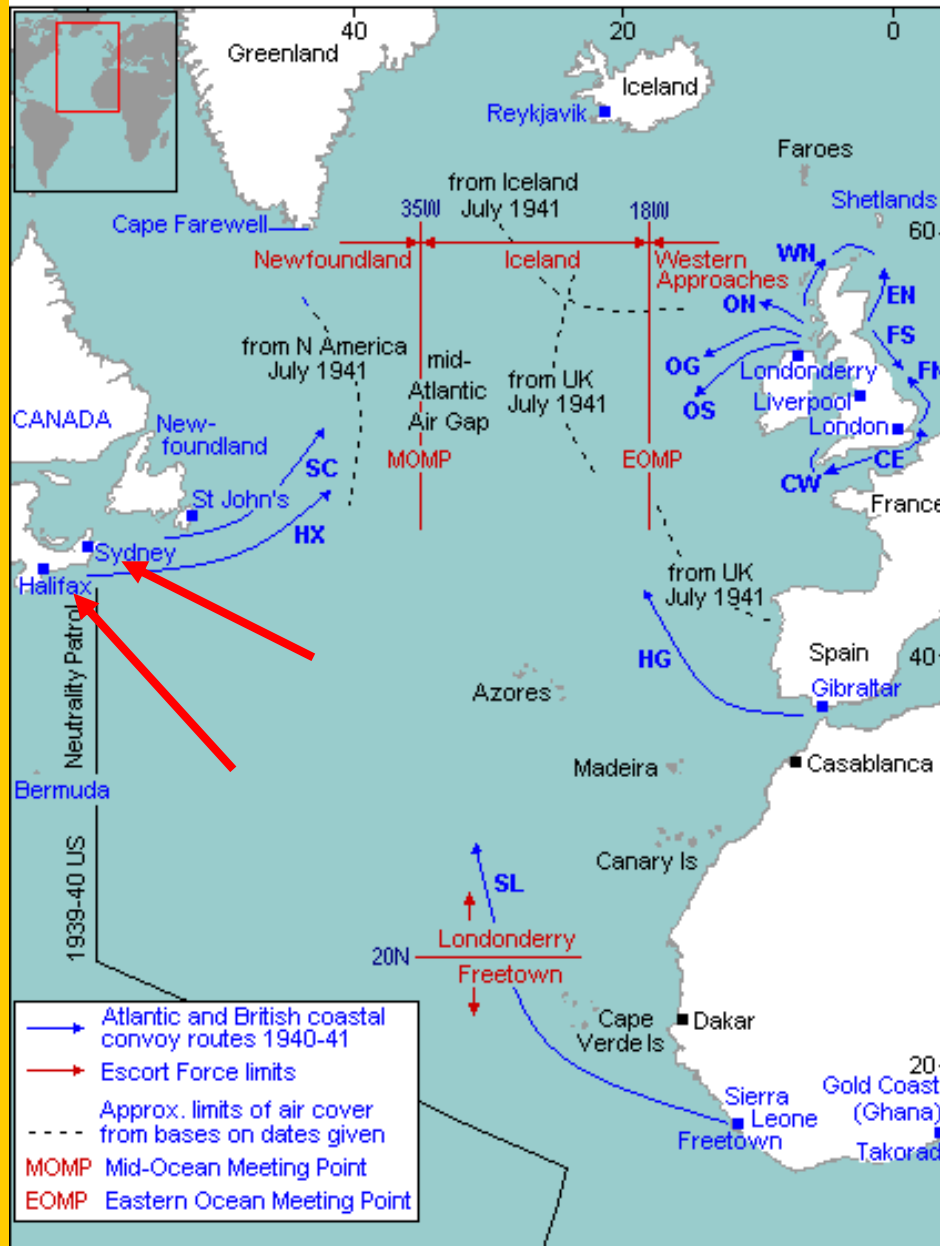


# Convoy Assembling

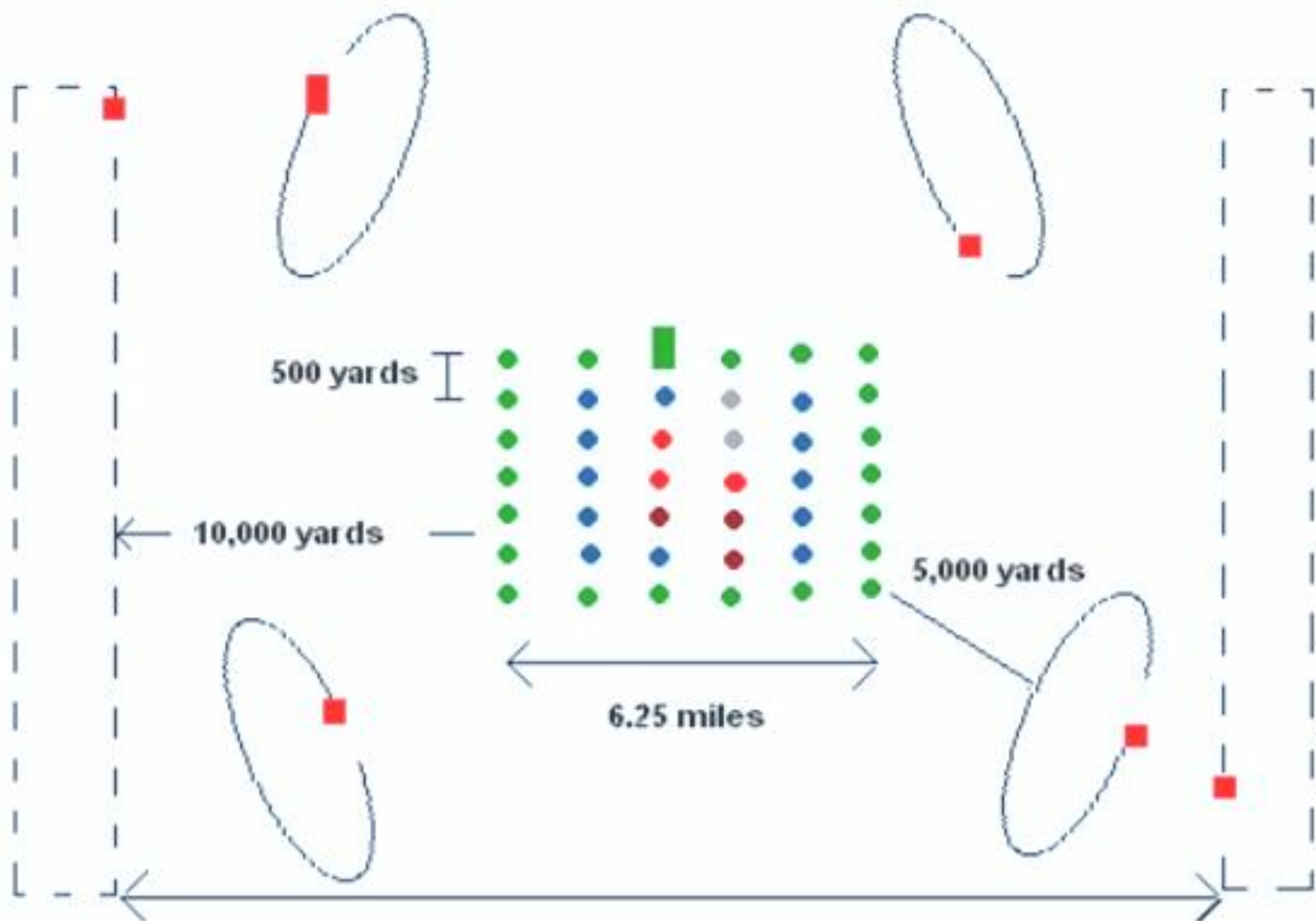
{from Sydney & Halifax, Nova Scotia until U.S. declared war}



## British Atlantic and Coastal Convoy Routes



Map by Gordon Smith, please acknowledge [www.naval-history.net](http://www.naval-history.net)  
 Details from Roskill's "The War at Sea"



- Convoy Commodore
- Convoy Commander
- Convoy Escorts

- Ammunition Cargo Ship
- Raw Material Cargo Ship
- Tankers
- Troop Transports
- Cargo Ships (Tanks, Planes etc)

Short Sunderland. In service with Coastal Command, the Sunderland had a long range and carried many anti-submarine weapons

1941 {British Plane}

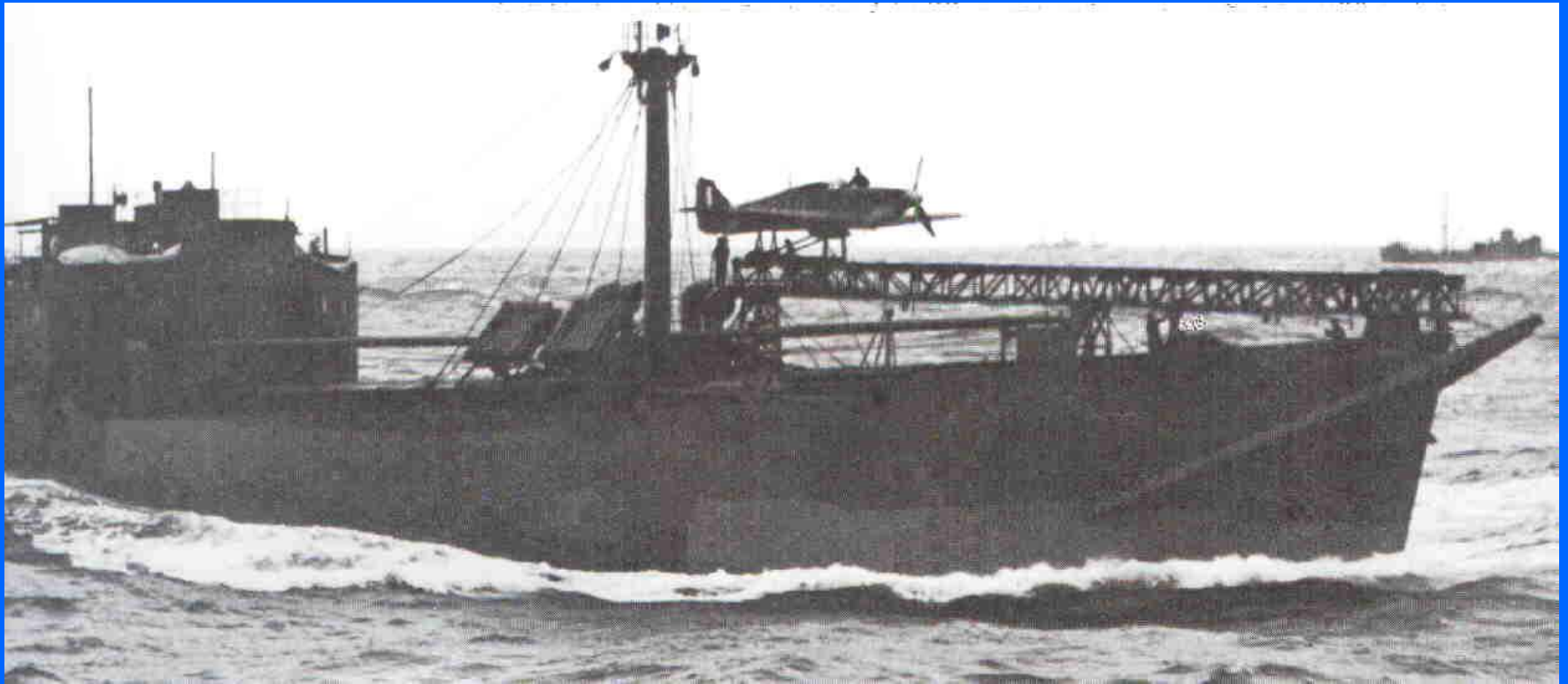




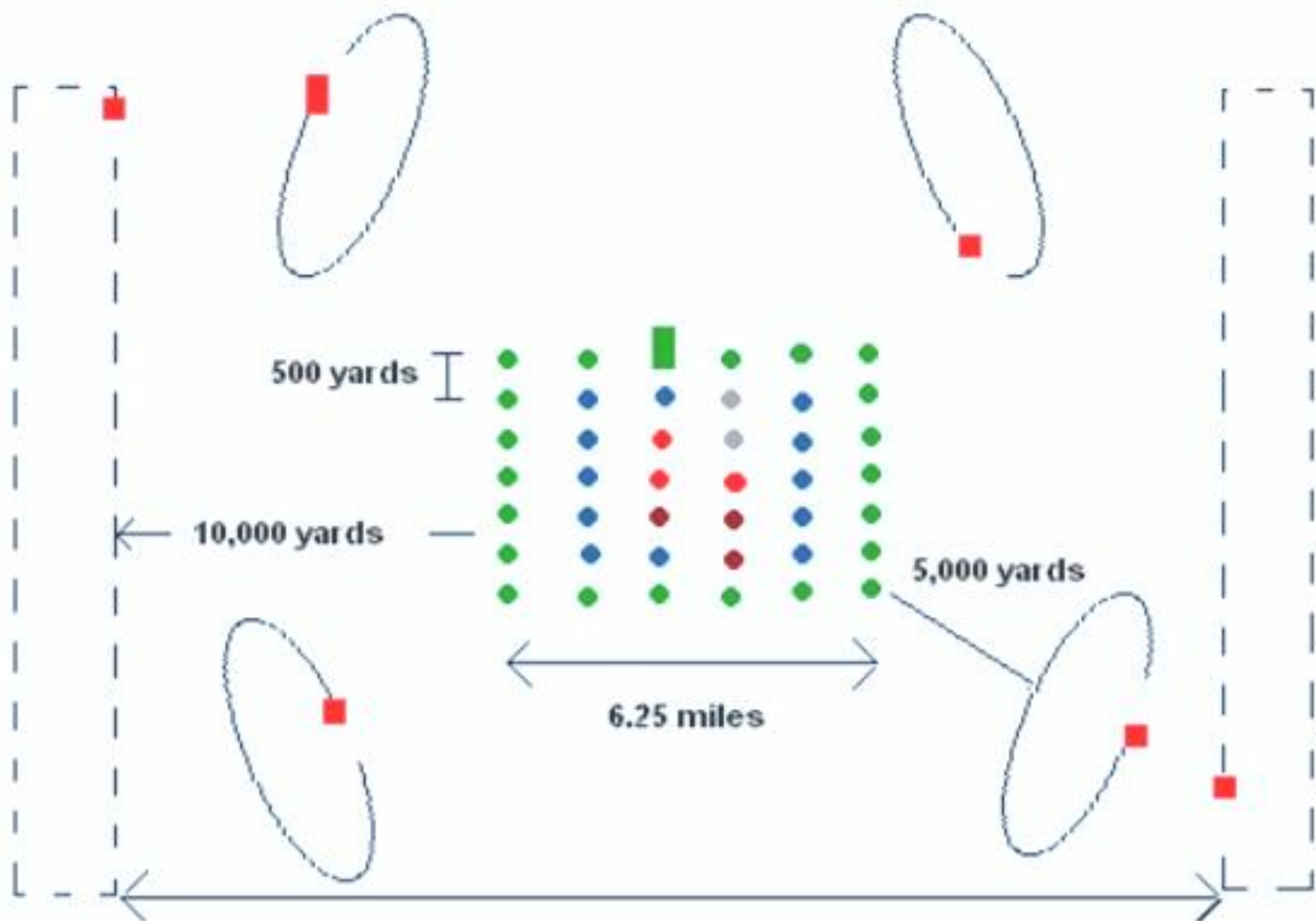
## **PBY 4 Catalina Flying Boat Seaplane**







**Catapult Merchant Ship (predecessor to aircraft carrier)**



- Convoy Commodore
- Convoy Commander
- Convoy Escorts

- Ammunition Cargo Ship
- Raw Material Cargo Ship
- Tankers
- Troop Transports
- Cargo Ships (Tanks, Planes etc)

# USS Slater – DE766

The Only Destroyer Escort Remaining Afloat In The United States



**Built in 1943 / Commissioned in 1944**





A corvette, the most common type of convoy escort ship. Very buoyant, cheap to manufacture, rough to work in.





**Firing Mechanism:**  
contains Hydrostatic  
pressure firing device  
primer & detonator.

**Depth  
Adjustment**

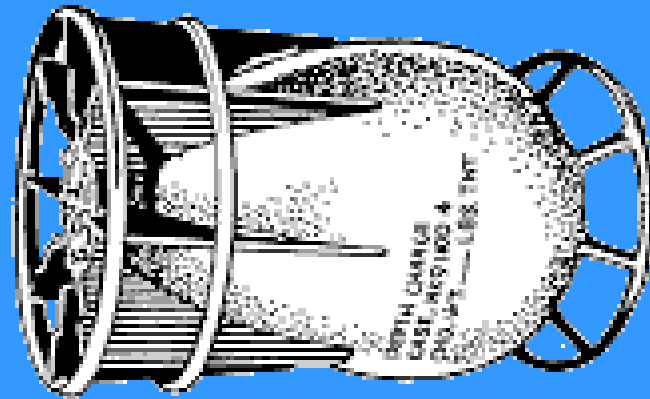
## **Mark 6 Depth Charge**

**Mark 6:** An older depth charge that was cylindrical in shape, about 28 inches long and 18 inches in diameter. They contained 300 pounds of TNT. These were primarily used in racks but could also be fired from K-Guns.

**Weight:** 338 kg /745lbs

**Charge:** 272 kg /600lbs TNT

**Depth:** 9 - 91m /30 - 300ft later mods (mid-1942) up to 183m / 600ft



## Mark 9 & 14 Depth Charge

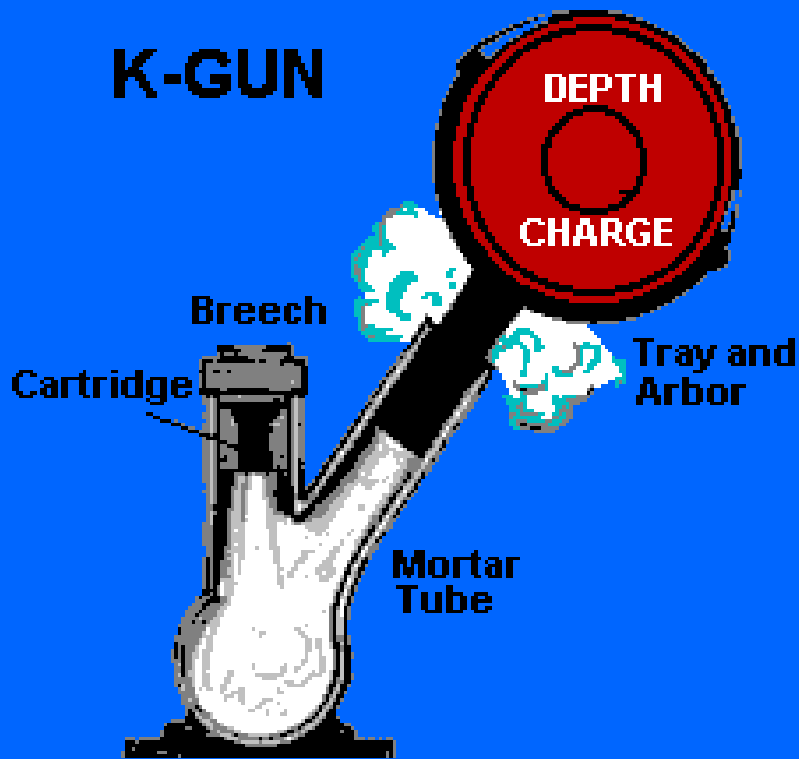
Mark 9 and 14: Later type of depth charge in teardrop shape, with a weighted nose to increase the sinking rate and improve underwater trajectory. They contained about 200 pounds of TNT. These were primarily used in K-Guns but could be used in racks with minor modifications to the tracks.

Charge: 91 kg / 200lbs TNT

Depth: 9 - 183m /30 - 600ft

# K-Gun Depth Charge Deployer

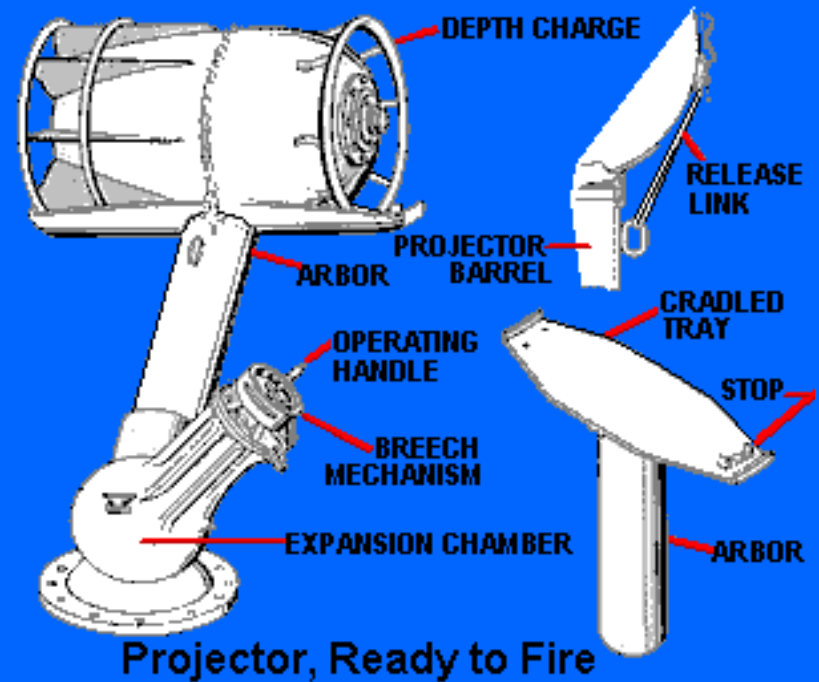
(Aboard Destroyer USS Slater / Albany, New York)



# K-Gun Depth Charge Deployer

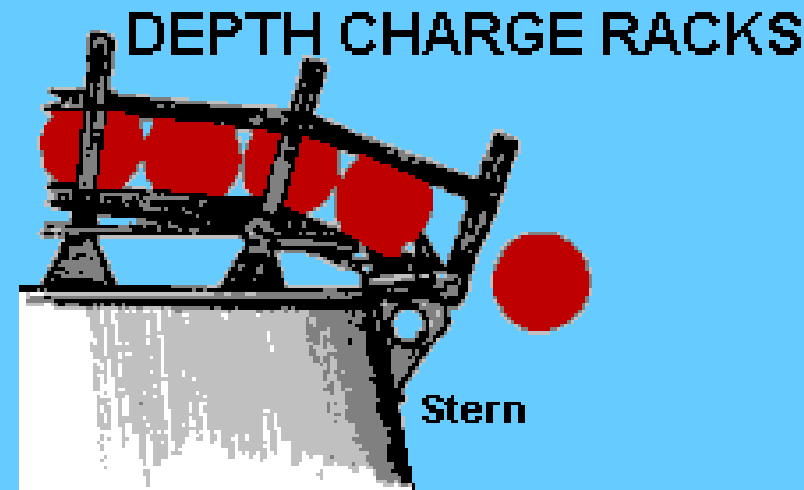
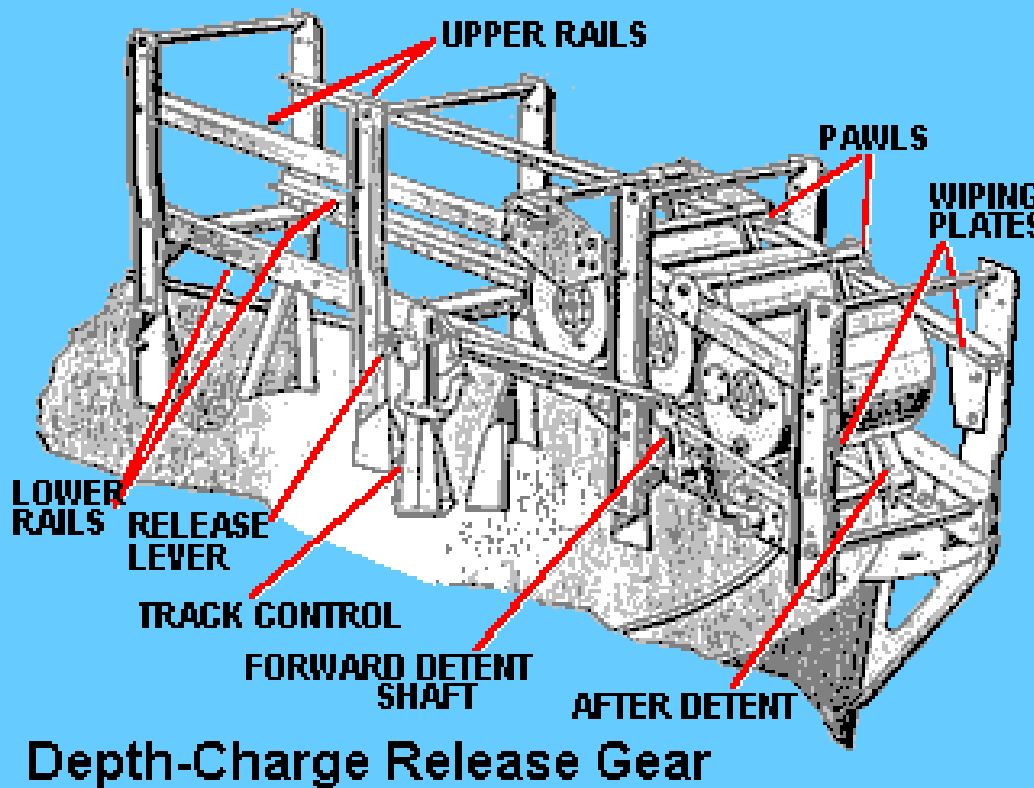


Early British K-Gun without stowage and Loading Racks.





# Depth Charge Racks – Delivers a series of depth charges at increasing explosion depths.



# Depth Charge Racks on the back of a Corvette – part of an Atlantic Convoy







# Depth Charge Explosion



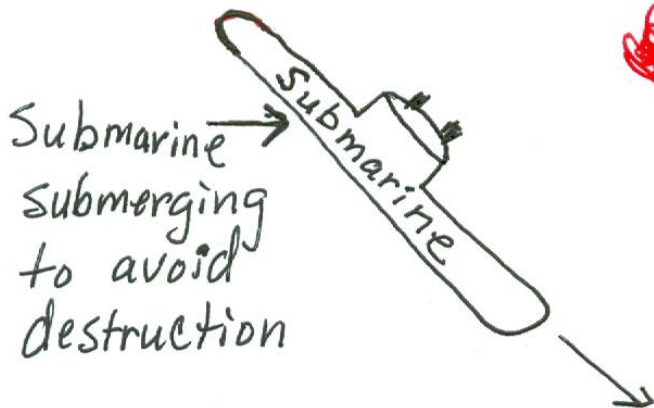


50 ft

100 ft.

150 ft.

200 ft.



\* Depth Charges - set to explode at increasing depths because the submarine will be going deeper and deeper to avoid destruction.



# Hedgehog = Anti-submarine weapon



**Ahead Thrown Missiles:** The Mark 10 projector, known as the Hedgehog, launches 24 - 7.2 inch missiles with contact fuses.

**Usual Range:** 250 - 280 Yards/ 230-260 Meters

**Rate of Fire:** 1 Salvo per 3 minutes



**Hedgehog** anti-submarine weapon, on the deck of a British destroyer (24 missiles)



## Projector Mark 10

GUN TRAIN INDICATOR  
MARK 52

ROLL CORRECTION  
GEAR ASSEMBLY  
JUNCTION BOX  
FIRING PANEL

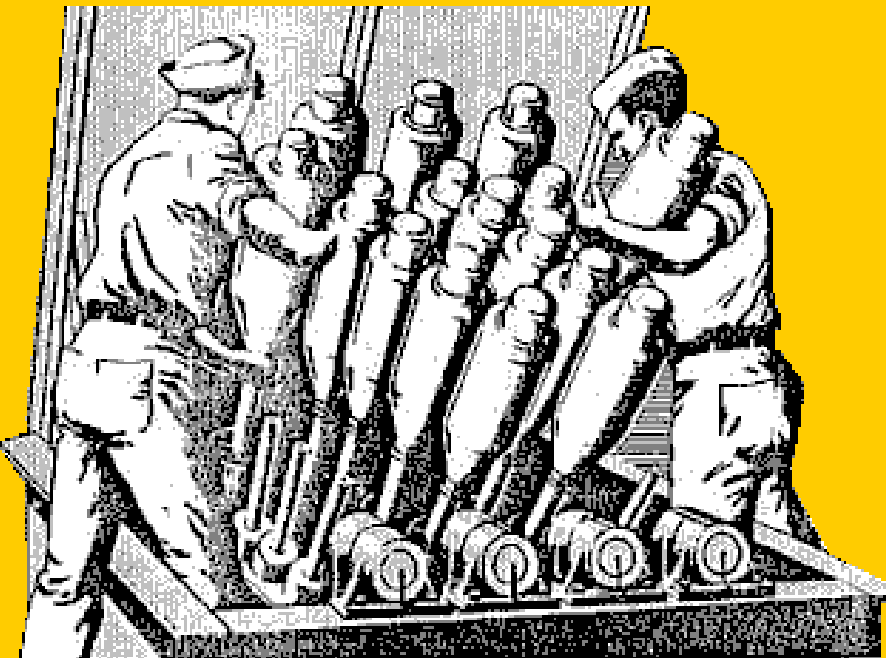
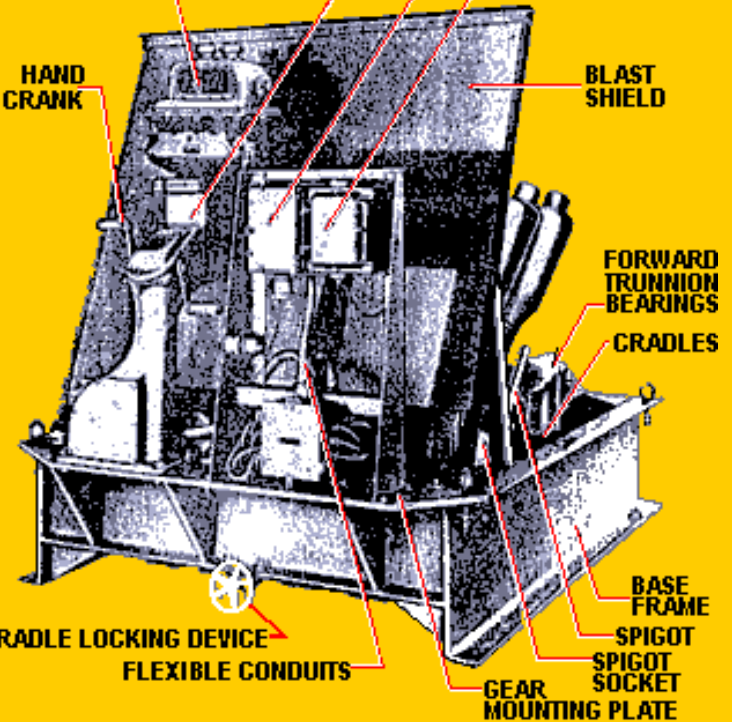
HAND  
CRANK

BLAST  
SHIELD

FORWARD  
TRUNNION  
BEARINGS  
CRADLES

CRADLE LOCKING DEVICE  
FLEXIBLE CONDUITS

BASE  
FRAME  
SPIGOT  
SOCKET  
MOUNTING PLATE  
GEAR  
MOUNTING PLATE



## Loading Outboard Spigots

# Deployment of Hedgehog – 24 missiles in an oval pattern.





# Mid War Years Essay Exam

**Describe the convoy system which was used to reduce the effectiveness of German u-boats in the Battle of the Atlantic. Also include an explanation of three anti-submarine weapons and how they worked.**

# Anti-Ship Weapons

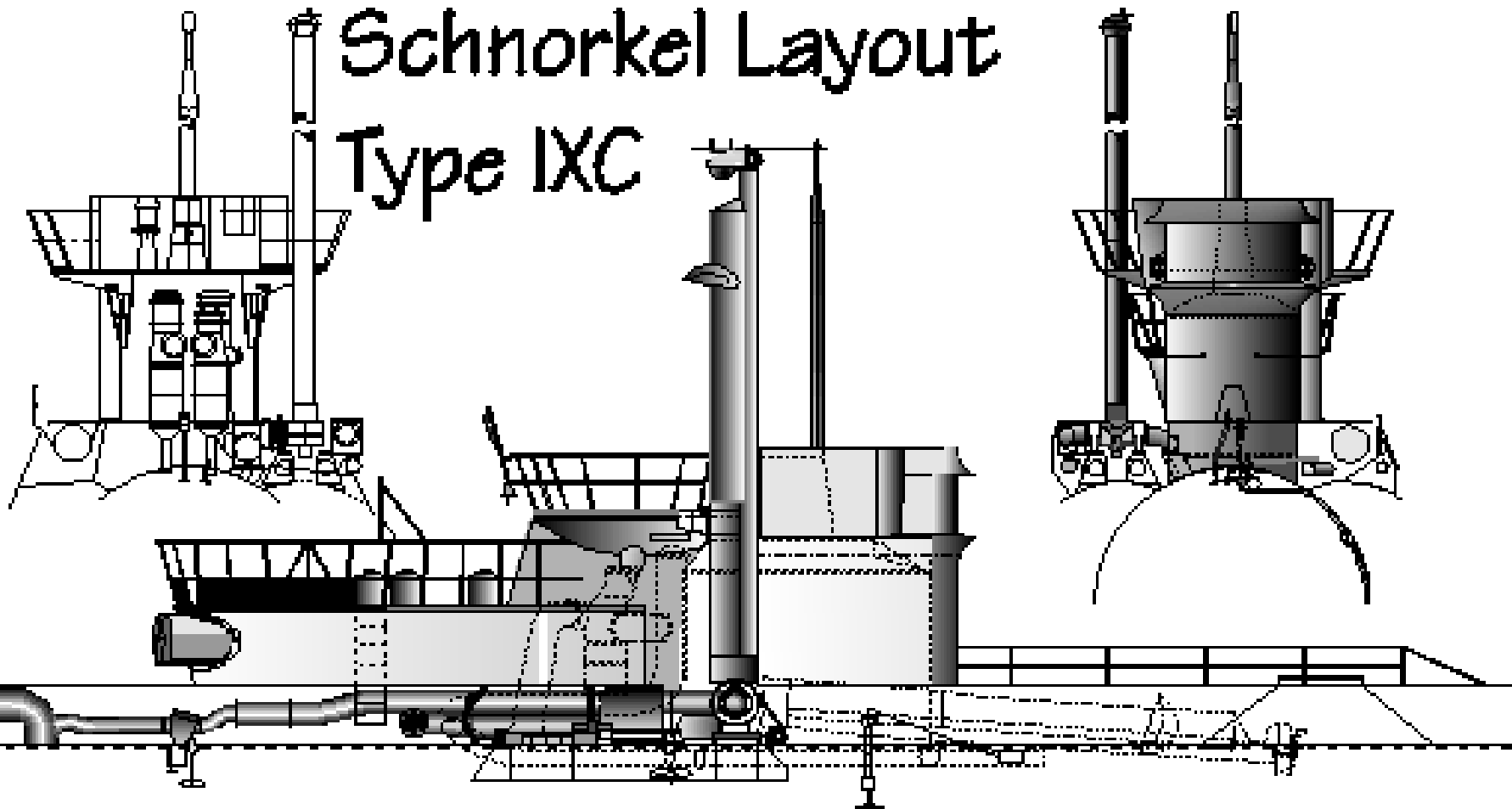
## Contact or Porcupine Mine





**Magnetic Mine**

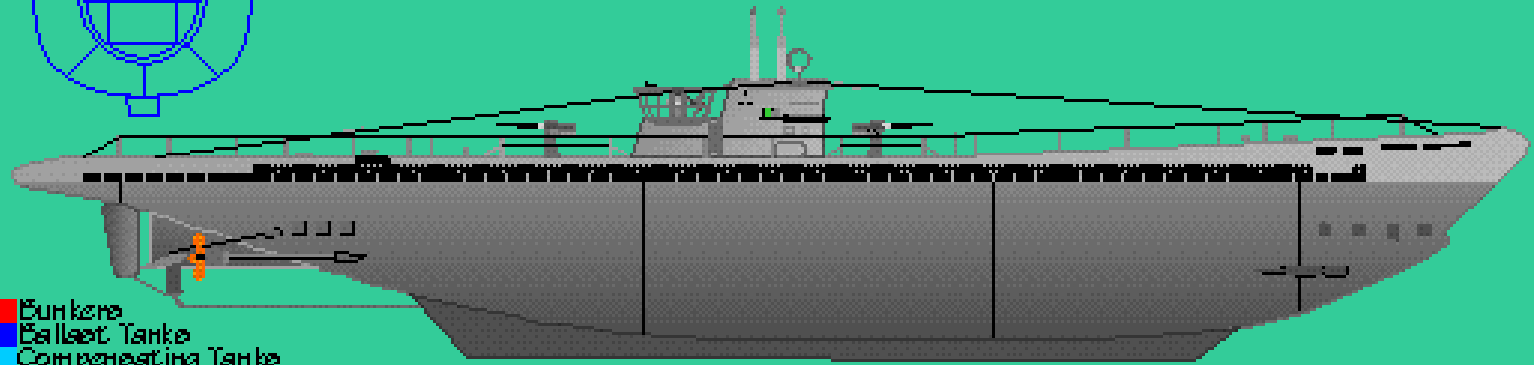
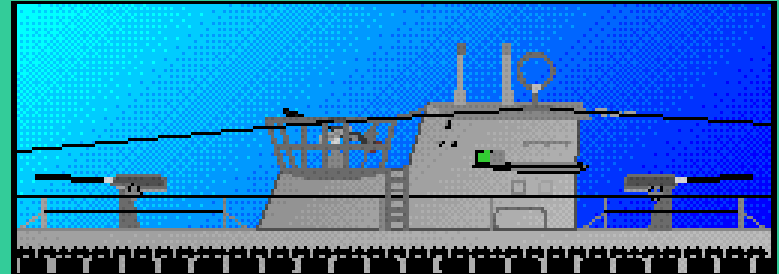
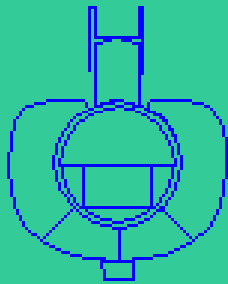
# Schnorkel Layout Type IXC



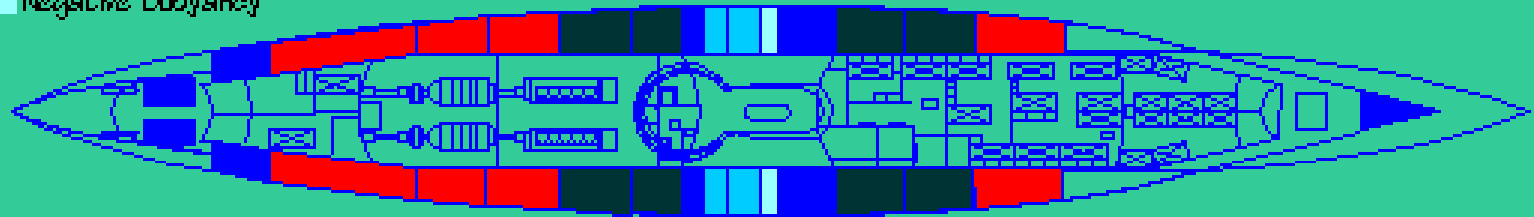
R. James Erant © 1995



# Milchkuh



- Bunkers
- Ballast Tanks
- Compensating Tanks
- Fuel-Oil Bunkers
- Negative Buoyancy



**\*\*Henry J. Kaiser** –  
**founder of Kaiser  
Shipyards**

**Built ships in separate  
pieces in various factories  
and shipped them to ports  
for more rapid assembly.  
Known as Liberty Ships.**



# Kaiser Shipyards - Portland





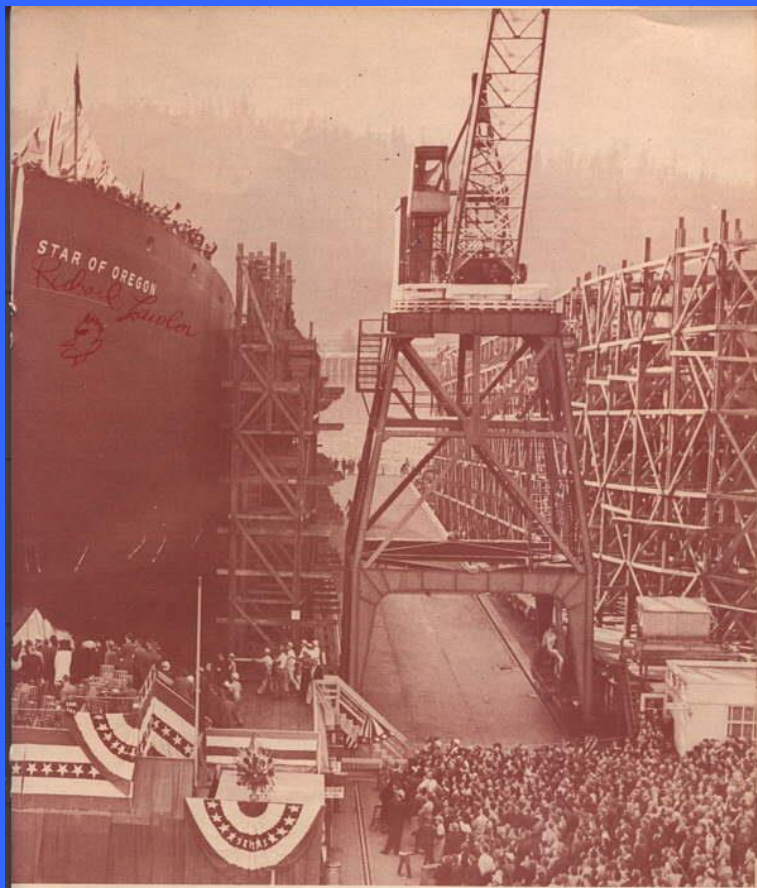
# Oregon Shipbuilding Corporation – Kaiser Shipyards



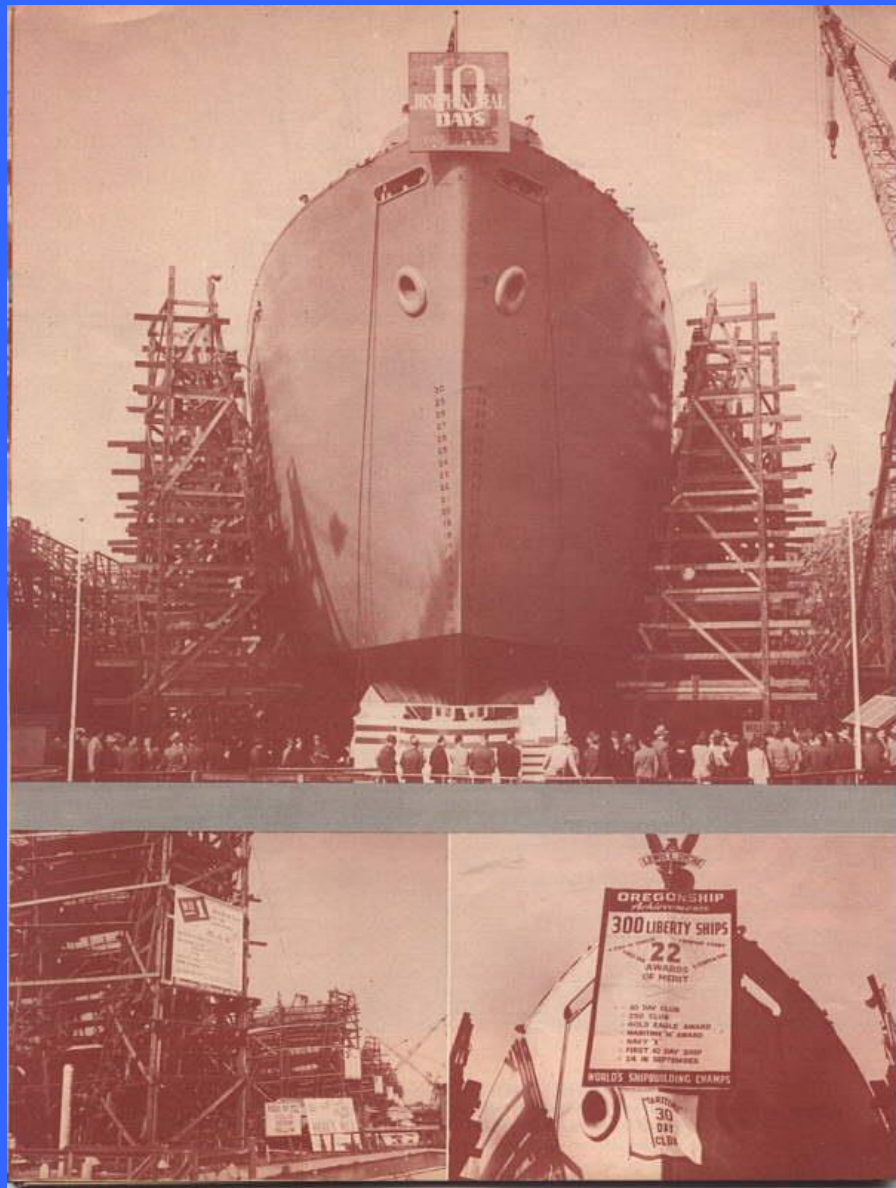


# Night shift change at the Portland Shipyards





In that brief 11 months, however, the vessel traveled thousands of miles for the United Nations. On its last voyage it had carried a cargo of lumber from Portland to Eritrea on the Red Sea in Western Africa and was homeward bound to the east coast when sunk. The "Star" was named after the first vessel ever built in the Northwest launched at the present Swan Island site just 100 years before.



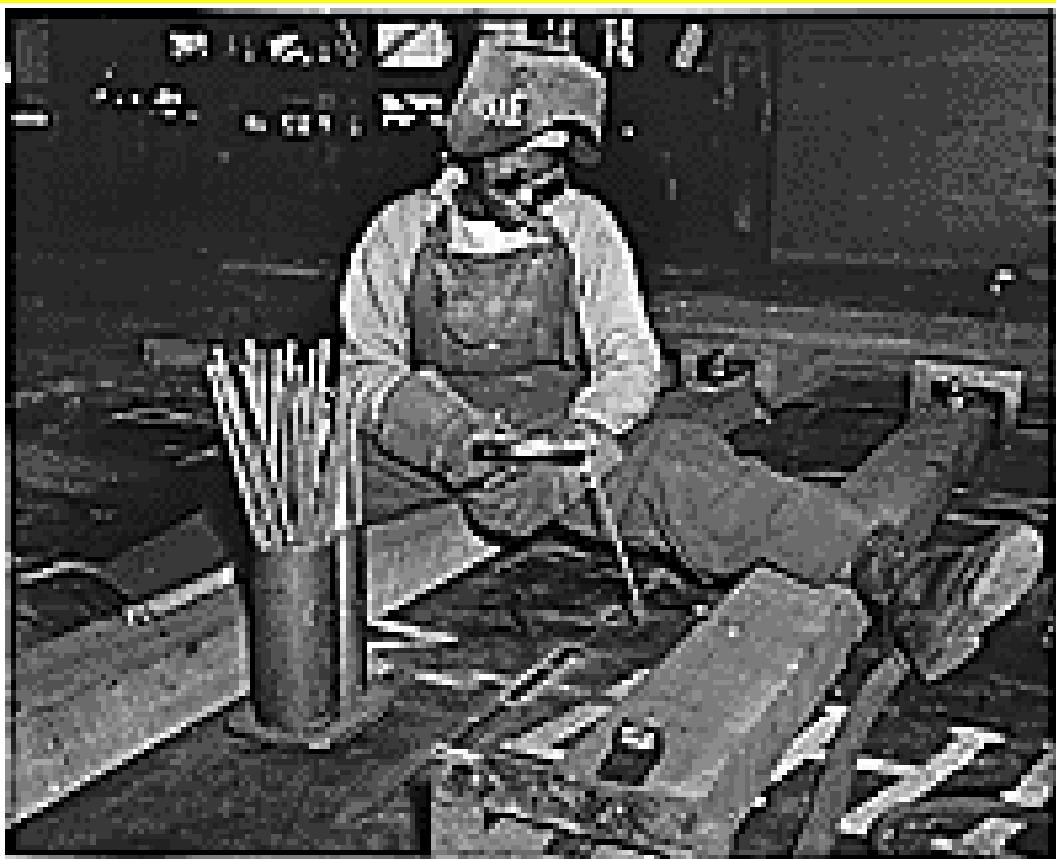


**Vanport**, a housing development in North Portland, built for Kaiser Shipyard workers (Black population went from 2,000 to 22,000!)



“Rosie the Riveter” – a symbol of the importance of women in World War II.









# Headquarters of the Nazi Sea Wolves = Lorient, France

Shown above is a submarine pen.

# U-110 Incident / May 1941

- While attacking an Allied convoy, the U-110 (Capt. Julius Lemp) was spotted and attacked by **HMS Aubretia**.
- Depth charges made U-110 dead in water. Had to surface & then 3 Royal Navy escorts destroyed it with deck guns.
- HMS Bulldog (destroyer) began a course to ram the U-110.
- **Capt. Lemp** & submariners jumped in sea & many were shot. Lemp set **scuttling charges** prior to leaving, but they did not detonate.

## U-110 Incident / May 1941

- **HMS Bulldog** decided not to ram.
- Most think Julius Lemp swam back to sub to reset scuttling charges & was shot.
- British boarded U-110 and removed an enigma machine, cipher documents, and the codebook. (Tense environment – scuttling charges set and depth charges all around them)
- \***Enigma &** codebooks sent to **Bletchley Park** immediately for code breaking.

## U-110 Incident / May 1941

- To keep Germans from finding out, the British reported the U-110 as being sunk.
- 400 men witnessed the capture & all sworn not to talk about it for duration of war.
- **\*\*Enigma code was broken in a week.**
- **Allies gained Enigma codes for the next 90 days!! (until end of June)**
- **In the next 7 months, Allied shipping losses dropped from 200,000 tons per month to 50,000!**
- **31 U-boats were sunk in this time period!!**
- **February 1, 1942 - - German code changed.**





**Enigma  
Encryption  
Machine**

**Rotor #1** →

**Light Board**

**The operator types a “Z” on the keyboard causing an electrical pulse to randomly turn “rotor # 1” to a different letter.**

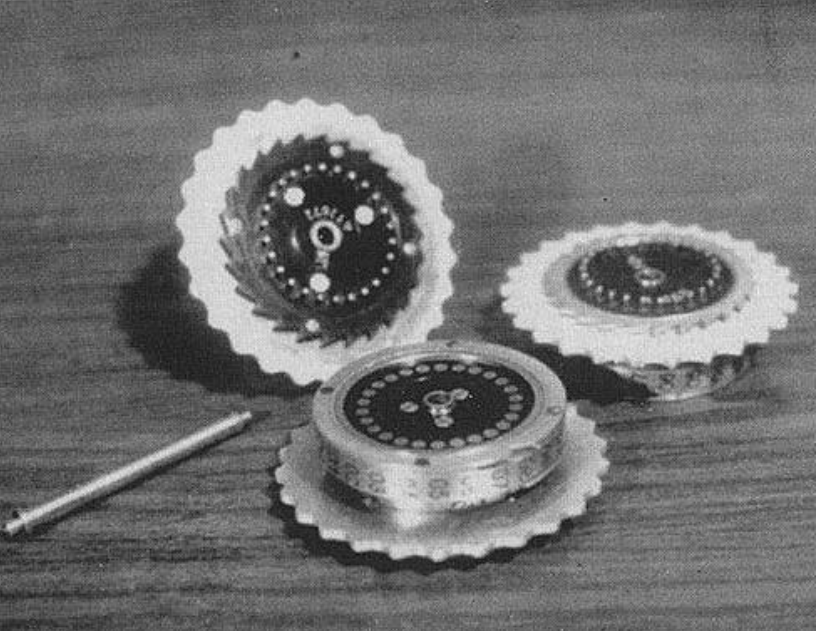
**So a “Z” is typed and it randomly becomes an “O”. The “O” lights up on the light board and it is written on a piece of paper.**



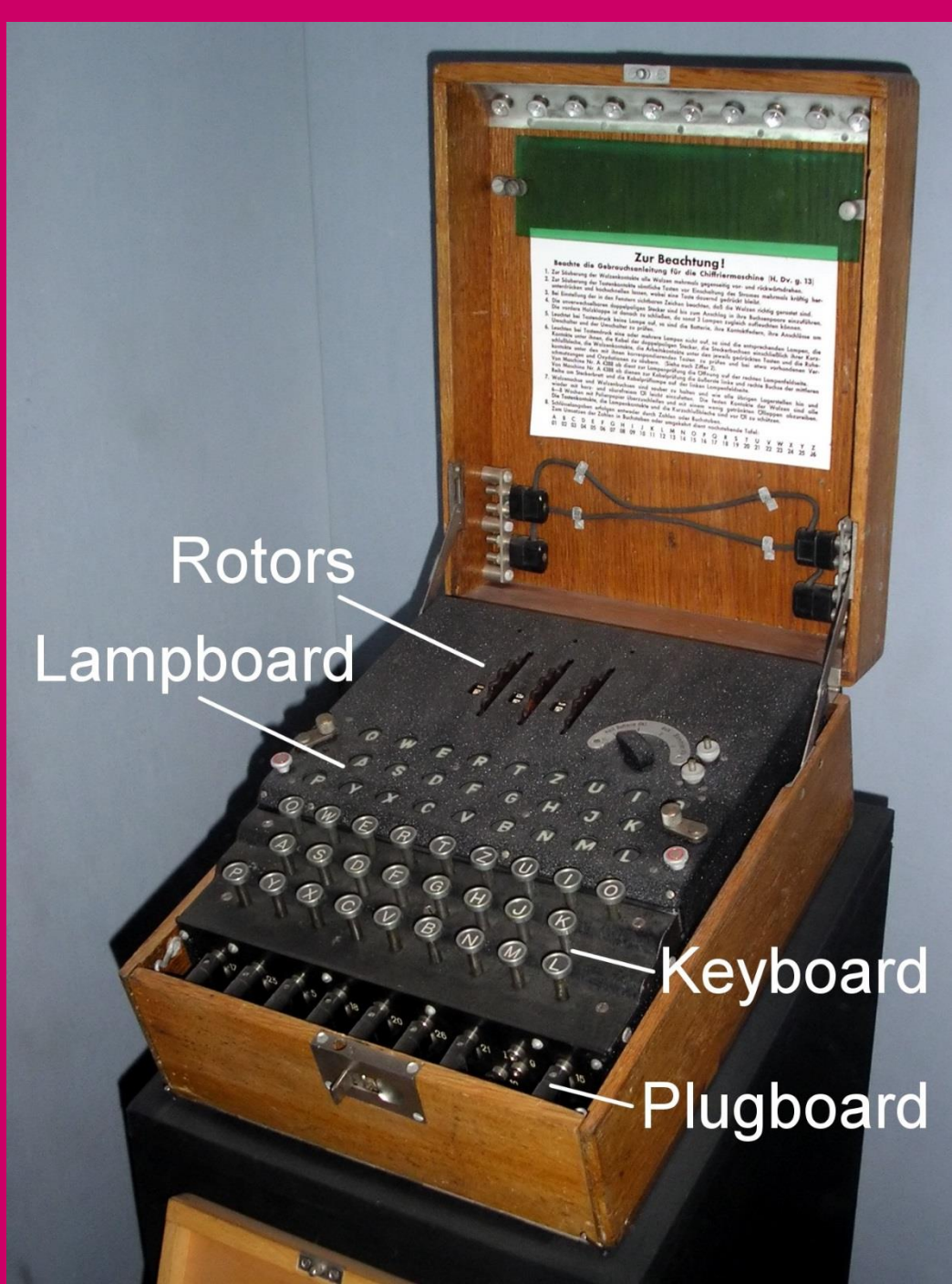
As each letter is typed, another **random** letter shows up on the light board. For example, the word **“attack”** randomly becomes **“pzdrqa.”**

Once the entire random message is written down on paper, it may appear as: **“Pzdrqs dmuio nsebtr jybvq.”** These random letter words are then sent by telegram, radio, or morse code to the **\*Enigma** operator on a u-boat. The operator on the u-boat has an Enigma machine and he just types the random letters back into the machine and writes down the letters that light up. This changes the message from random letters back to the original message.

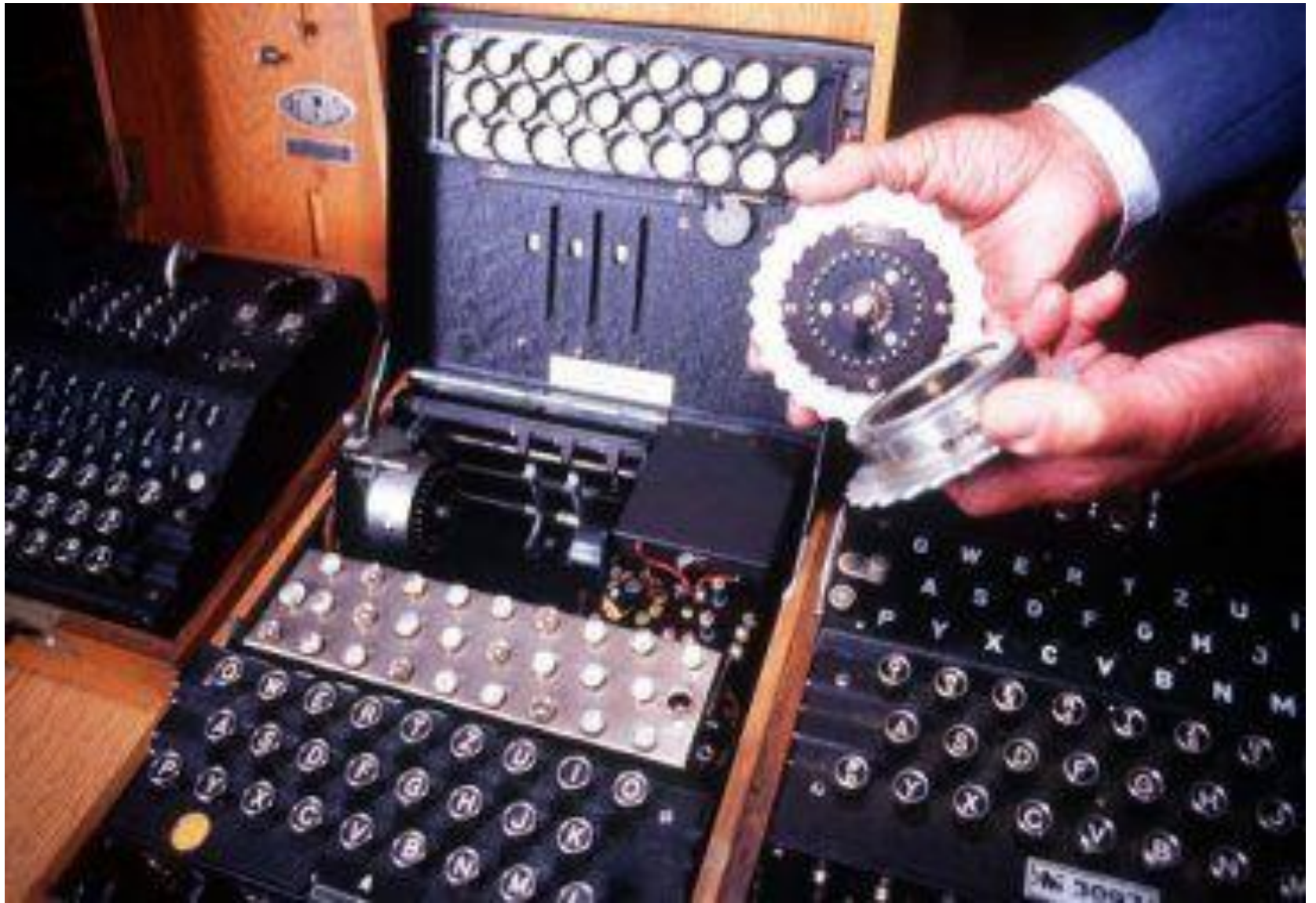
As a result of the **Enigma encryption machine**, any messages that are intercepted by the enemy will make no sense and deliver no secret information.



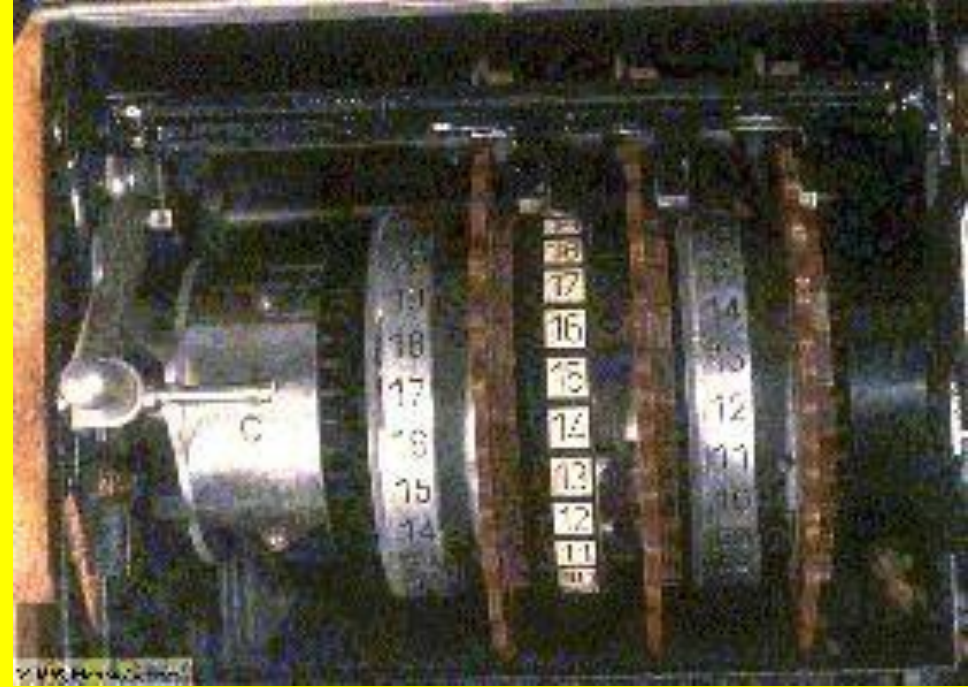
## Rotors or Rings







**Rotors in Enigma  
(chosen out of 5 /  
different order  
each day)**

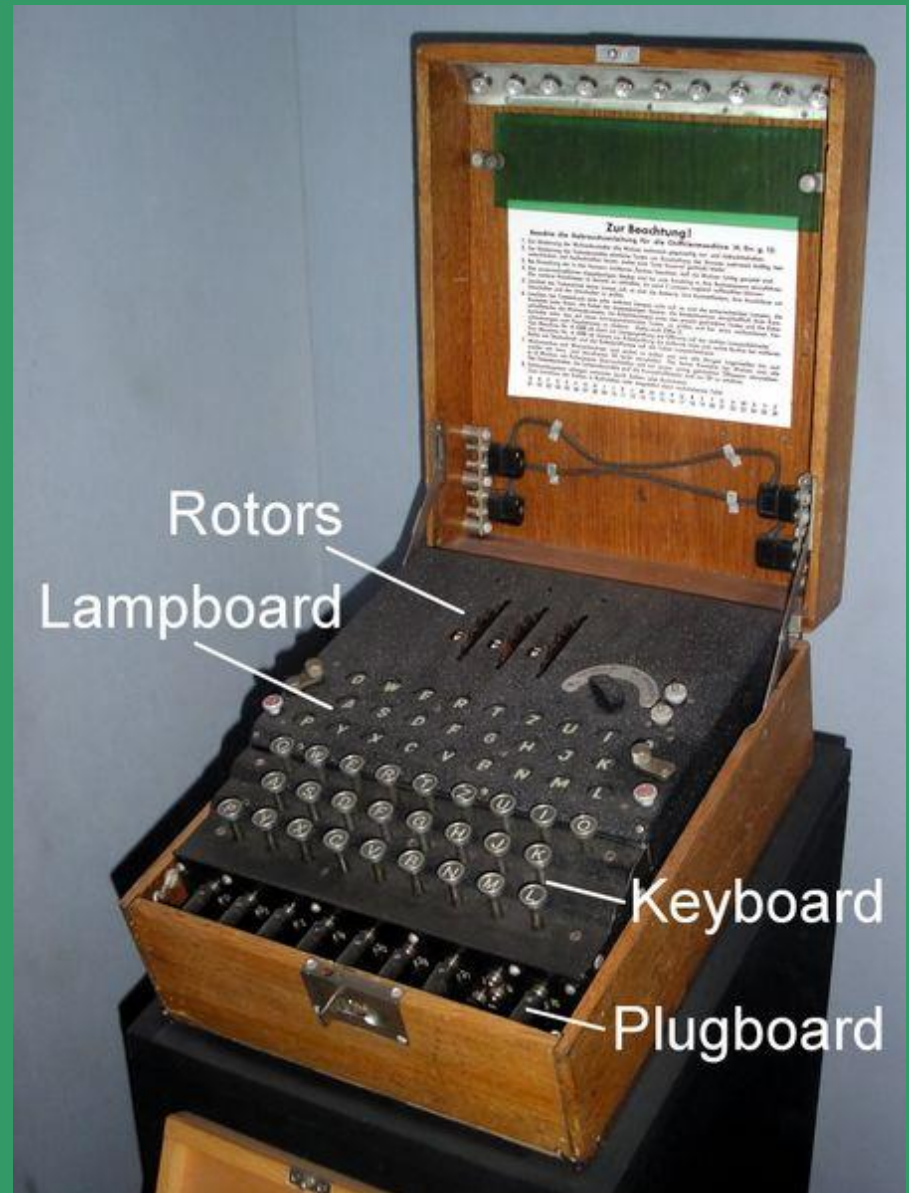


**\*\*Cipher Codes tell  
which rotors are  
used in each slot  
and the letter that  
is up for each rotor  
(at beginning of the  
day).**





# Enigma machine like the one captured on the U-110.





**Bletchley Park Code and Cypher School, 50 miles NW of London (British codebreaking and spying center)**



# Bletchley Park Campus





# Bunks in the USS Pampanito





**Crew Room in U-505**





**Forward Torpedo Room – USS  
Pampanito**



**Torpedoes required constant maintenance. Recharging of batteries and maintaining battery fluids were two important tasks.**



# Galley in USS Cod

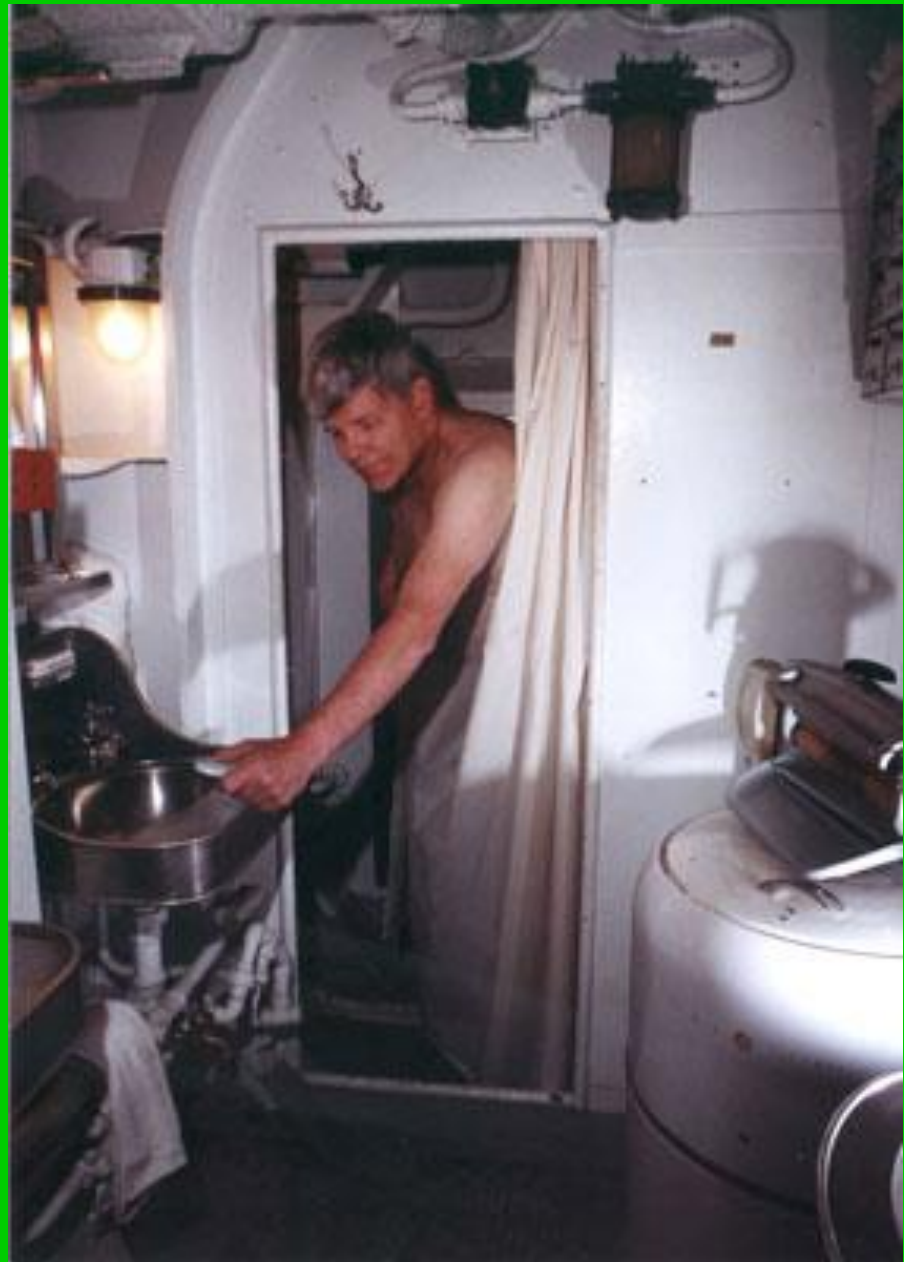




**Galley of USS Cod**

# **Navy Shower in USS Cod**

**Early Subs did  
not have this  
luxury!!**





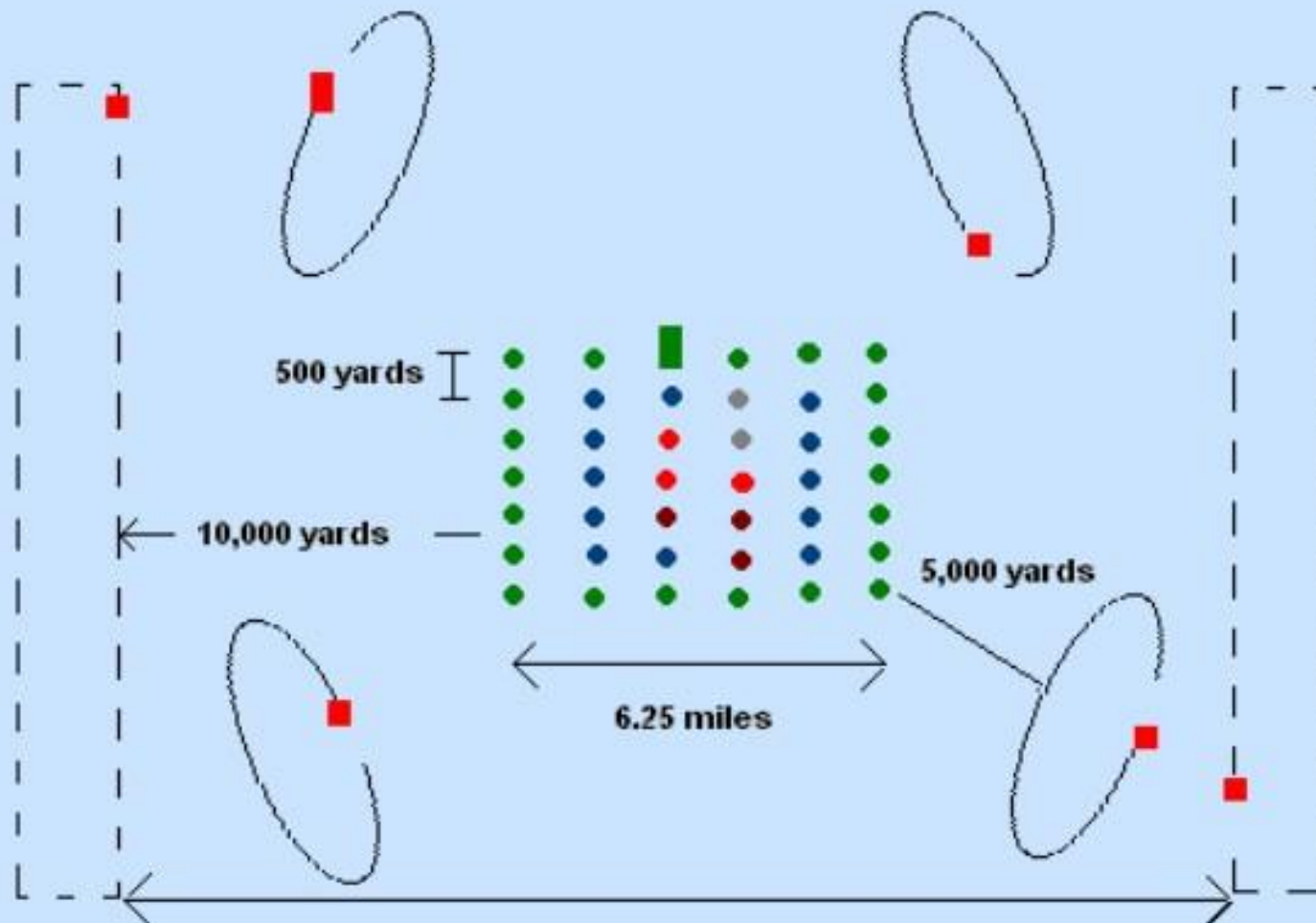
# Head in U-505





**“Head” in  
USS  
Pampanito**




# TYPICAL CONVOY DIAGRAM




 Convoy Commodore


 Convoy Commander


 Convoy Escorts

 Ammunition Cargo Ship

 Raw Material Cargo Ship

 Tankers

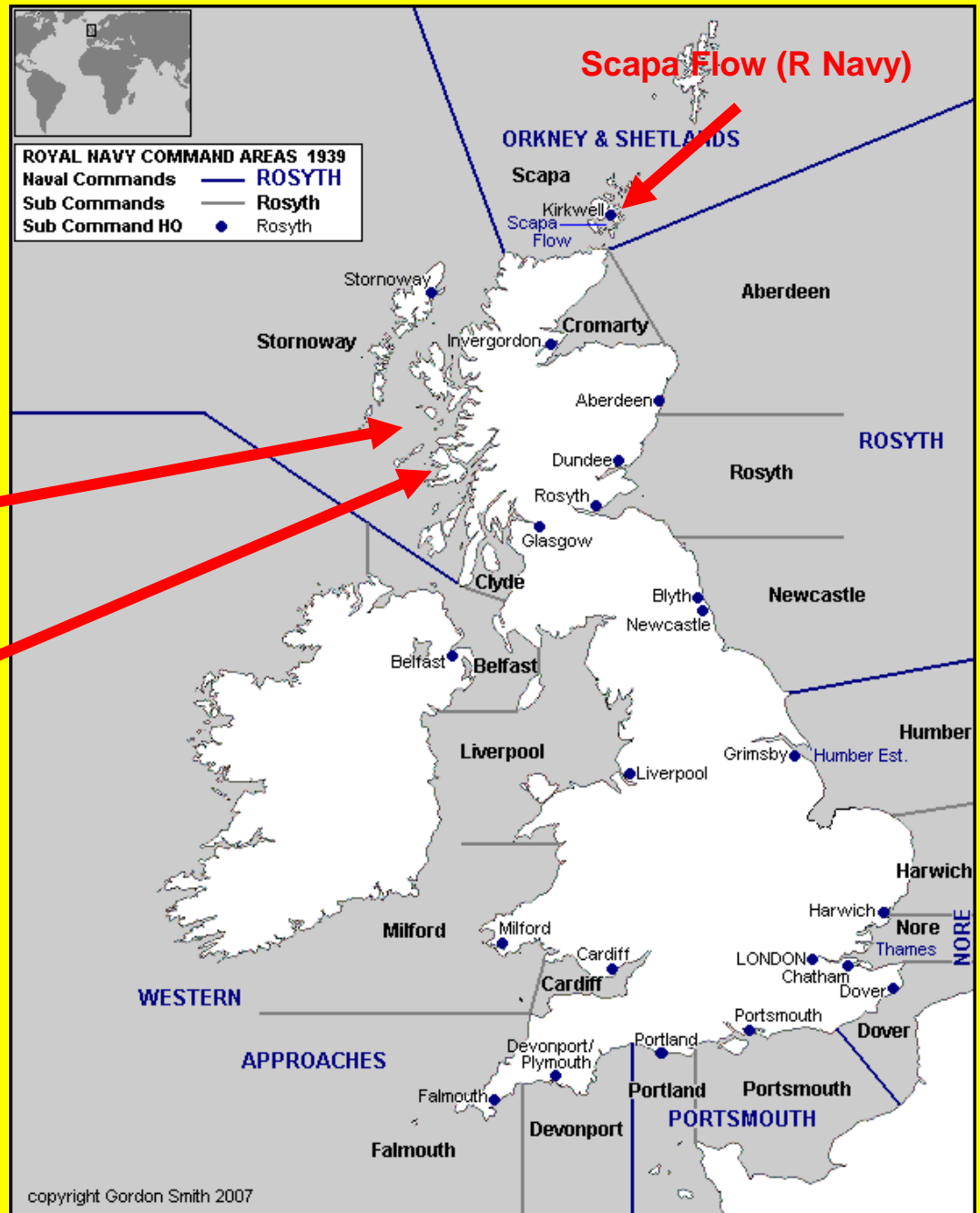
 Troop Transports

 Cargo Ships (Tanks, Planes etc)

# Royal Navy Headquarters = \*Scapa Flow (Orkney Islands)

Hebrides Islands

Location of HMS  
Western Isles naval  
escort training base - -  
on island of MULL



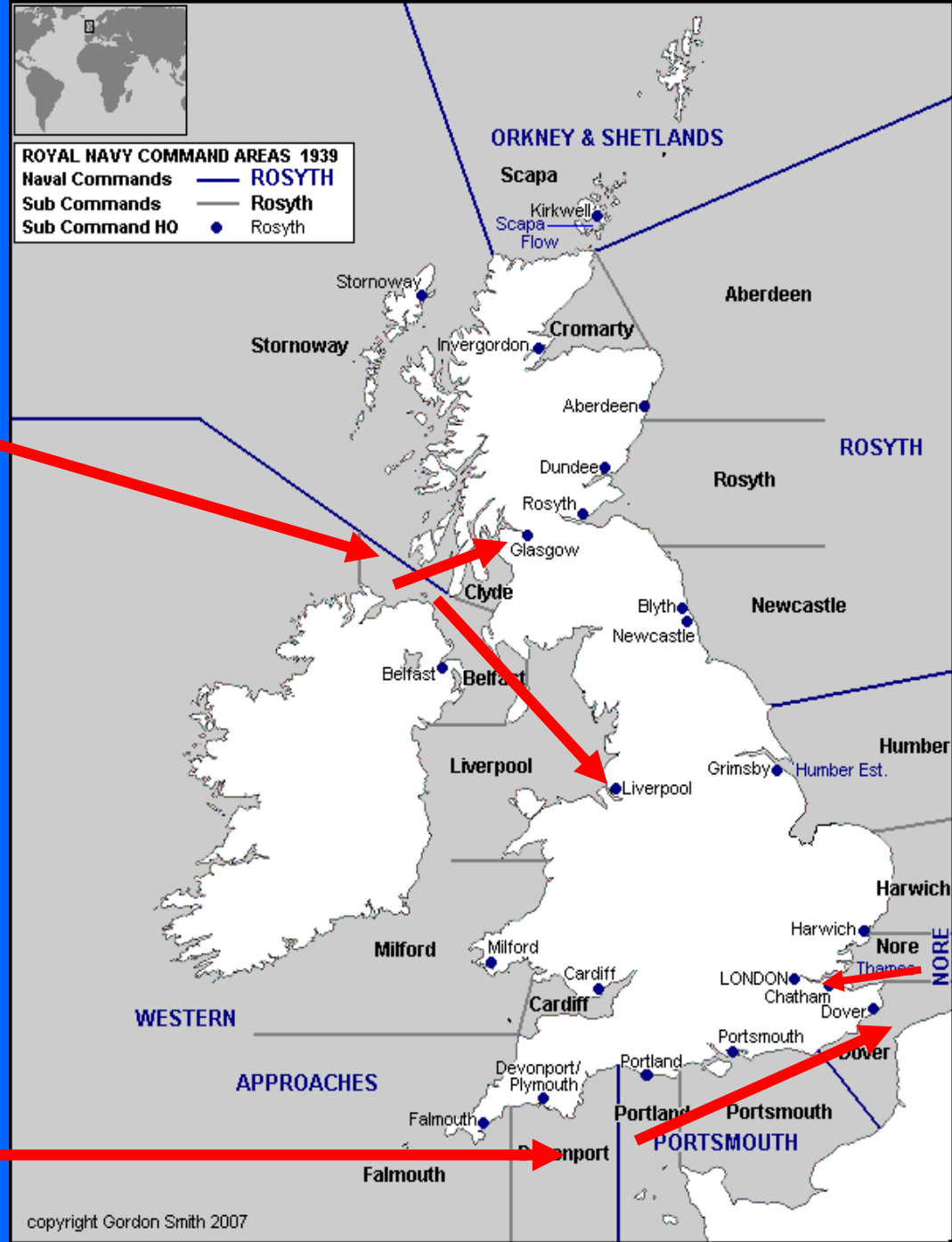




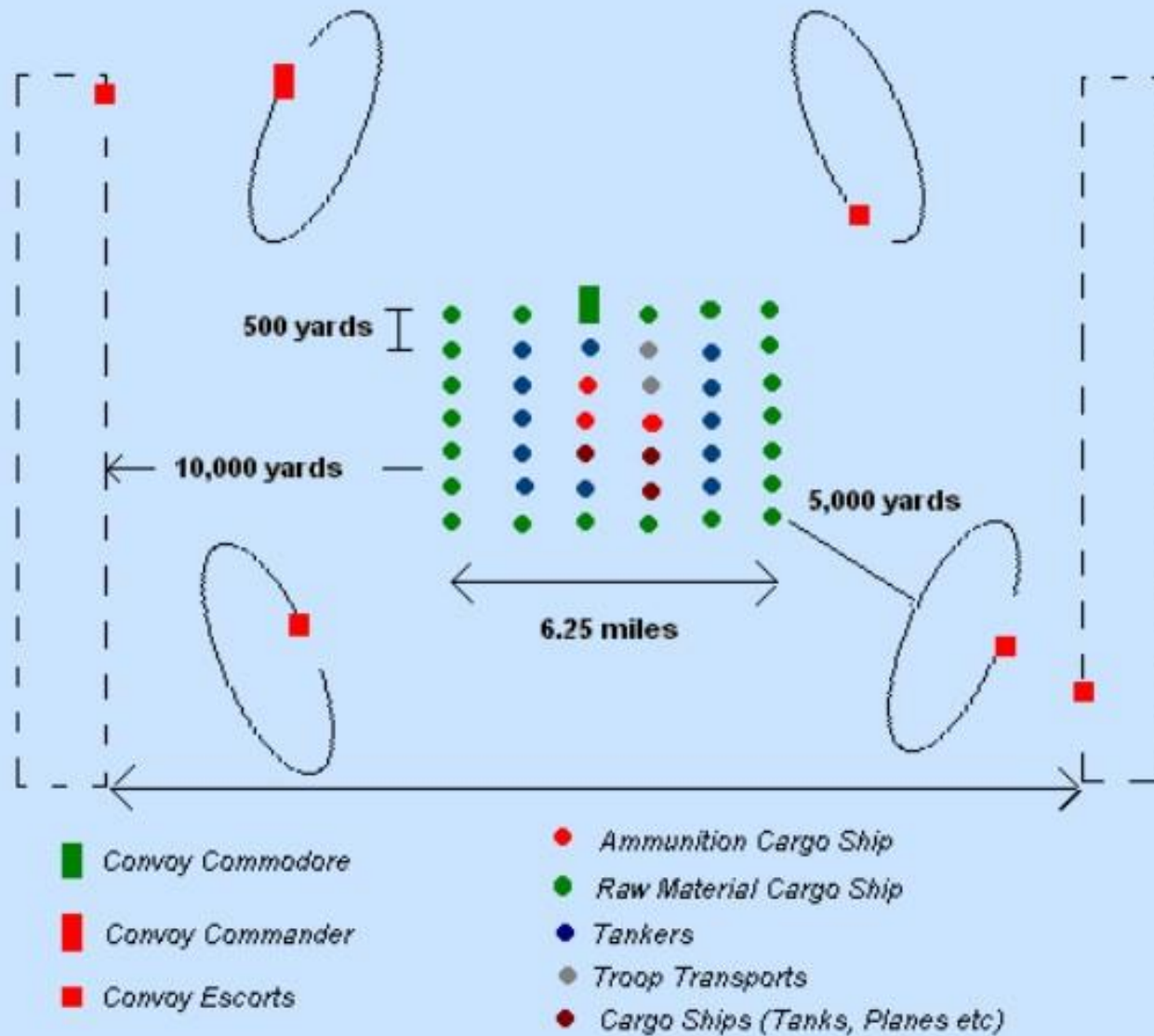
ROYAL NAVY COMMAND AREAS 1939	
Naval Commands	— ROSYTH
Sub Commands	— Rosyth
Sub Command HO	● Rosyth

New shipping lanes after WWII starts

Main shipping lanes before WWII

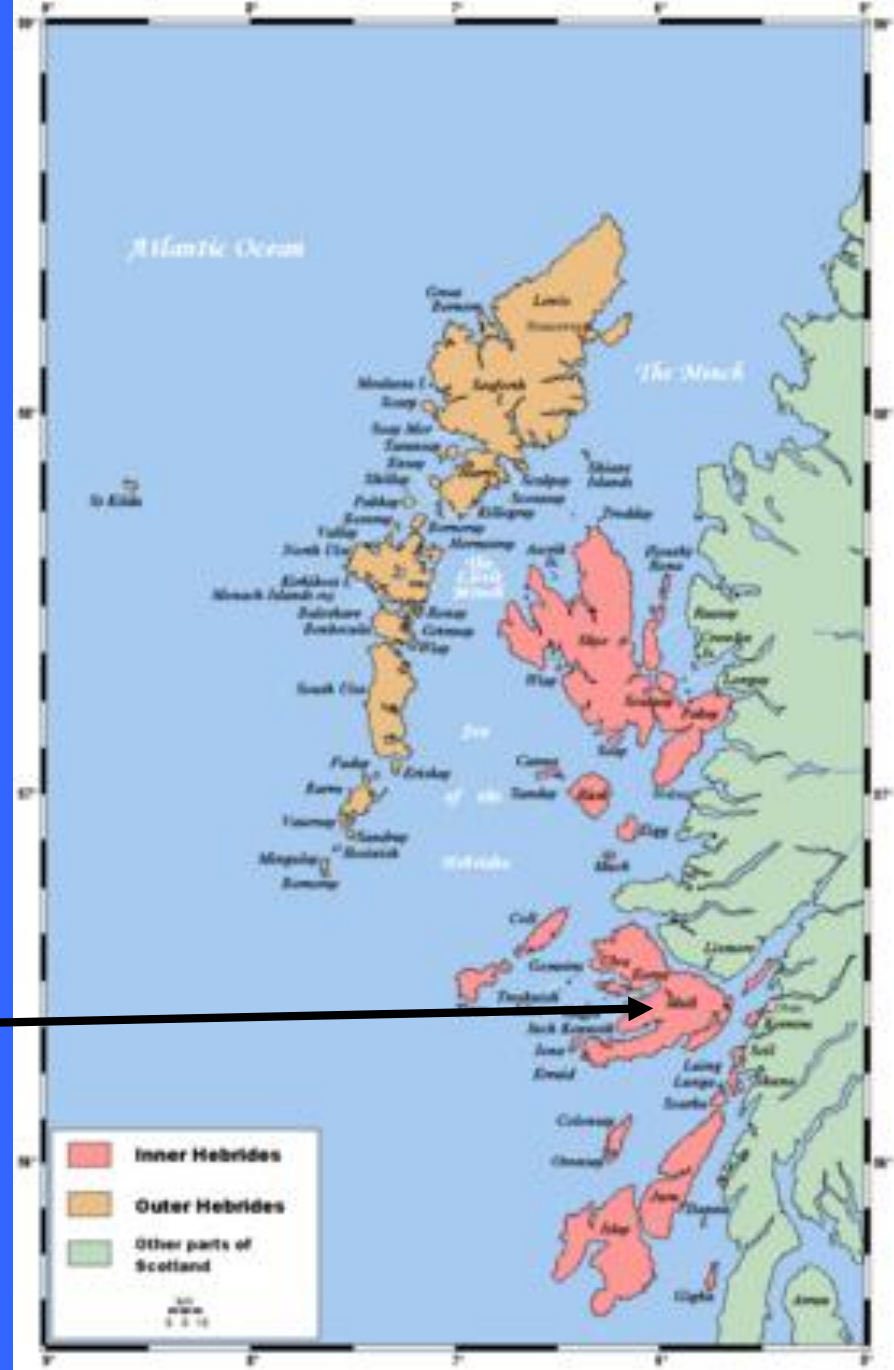


# TYPICAL CONVOY DIAGRAM



# HMS Western Isles Naval Training Center

Hebrides Islands off  
NW coast of Scotland –  
island of Mull



**Commodore Gilbert O. Stephenson =**  
**Commander of the HMS Western Isles Naval  
Escort Training Center**

