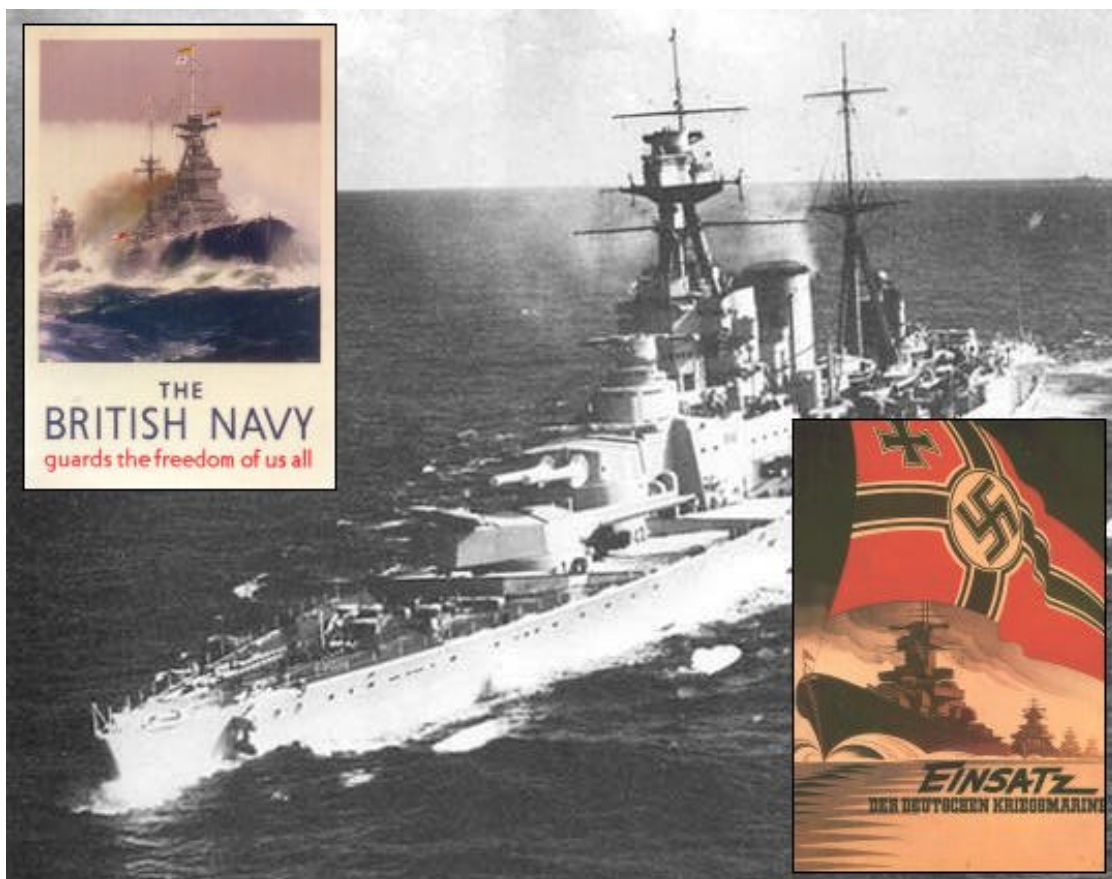


# FEATURE ARTICLE

## NAVAL VESSEL TYPES

written by

**James Davies**



*“He that commands the sea is at great liberty, and may take as much or as little of the war as he will” - Francis Bacon*

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# INTRODUCTION

There are many different types of ship, all designed for specific purposes and many with a long history of development behind them. This document attempts to detail the main types of vessel that were in existence in World War Two, explaining the difference between ships such as: a corvette and a frigate; a battle cruiser and a pocket battleship; a merchant aircraft carrier and an escort carrier; an armed merchant cruiser and a merchant raider.

This work is split into several sections:

- Fleet warships
- Other warships
- Offensive merchant vessels
- Merchant vessels

The main types of warship were formally defined in the 1922 and 1930 Naval Treaties, and this is the initial source for several of the definitions provided. Wherever necessary, the various clauses and sub-clauses have been simplified or combined for ease of reading – this work is intended not as a statement of law, more an informal guide.

I have concentrated on ocean-going vessels, and have omitted many types of support ships and naval ships that do not have an offensive capability (chief amongst these are the minesweepers), as well as small craft (such as fast attack boats).

# FLEET WARSHIPS

This section describes the types of warship that would be expected to operate with a battlefleet. These vessels could be expected to operate together against an enemy fleet made up of similar vessels.

This section includes the following vessels:

- Fleet Aircraft Carrier / Fast Aircraft Carrier
- Battleship
- Battle Cruiser
- Pocket Battleship
- Cruiser
- Destroyer
- Torpedoboat

These are the ships that are involved in the famous battles of the Second World War, such as: the Battle of Midway (in the Pacific); the Battle of the River Plate (in the South Atlantic); the Battle of the Barents Sea (in the Arctic); the Hunt for the Bismarck (in the North Atlantic); the Battle of Cape Matapan (in the Mediterranean).

These ships could be expected to go anywhere, and do anything.

# Fleet Aircraft Carrier / Fast Aircraft Carrier

## Definition and Description

Aircraft carriers are defined in the 1930 London Treaty as:

*“Any surface vessel of war, whatever its displacement, designed for the specific and exclusive purpose of carrying aircraft and so constructed that aircraft can be launched therefrom and landed thereon. The fitting of a landing-on or flying-off platform or deck on a capital ship, cruiser or destroyer, provided such vessel was not designed or adapted exclusively as an aircraft carrier, shall not cause any vessel so fitted to be charged against or classified in the category of aircraft carriers.”*

Fleet aircraft carriers have sufficient speed to operate with the battlefleet, usually around 30 knots. They carry aircraft below-deck in hangars, as well as on deck. Typically, a fleet aircraft carrier would carry between 70 and 90 aircraft (although some had fewer than this at the start of the Second World War).



*American Carrier USS Enterprise, September 1945.*

## Development and History

The development of naval air power began shortly after the invention of the aircraft, with attention focussed on developing seaplanes for use in reconnaissance. Experiments were also conducted with torpedoes and bombs, although there was considerable debate about the artificiality of the experiments (particularly the lack of defensive fire from the ships) and the likely performance in action. Nevertheless, most navies built seaplane carriers, generally equipped with torpedo-carrying aircraft. By the end of the First World War several cargo ships had been sunk by aircraft, but no warships had suffered more than slight damage.

At the start of the Second World War the ability of aircraft to sink warships was still unknown. Prophets in many countries insisted that aircraft would revolutionise naval warfare, however as similar claims had been made about other inventions in previous years (most notably the submarine and the motor torpedo boat), most naval powers adopted a ‘wait and see’ approach.

The initial performance of aircraft carriers was poor, with the carrier *HMS Courageous* sunk by submarine and *HMS Glorious* sunk by surface ships (*Scharnhorst* and *Gneissenu*), however once their true role was identified and their escorts needs addressed the aircraft carrier soon became the offensive weapon of choice. The *Königsberg* was the first major warship to be sunk by aircraft, on 10 April 1940, signalling the shape of things to come.

The aircraft carrier first showed its potential during the raid on Taranto in 1940, where 20 carrier-based aircraft from *HMS Illustrious* left two battleships with their keels resting on the bottom and damaged one other, however it was the Pacific theatre that the aircraft carrier revolutionised naval warfare. From the first day of the Pacific war, when the Japanese attacked Pearl Harbour (sinking or beaching five battleships and damaging another three, with 360 carrier-based aircraft), the aircraft carrier was the decisive factor.

The most striking example of the change in tactics brought about by the aircraft carrier was the battle of Midway. The American and Japanese aircraft carriers duelled over a period of five days, hunting for each other, launching strikes and recovering aircraft. At the end, four Japanese aircraft carriers had been sunk for the loss of one American aircraft carrier, and the Japanese fleet was forced to retire. Throughout the battle the fleets were more than 100 miles apart, and the large, expensive battleships were reduced to spectators.

If any doubt remained about the ascendancy of the aircraft carrier they were firmly dispelled by the sortie of the Japanese battleship *Yamato*. The *Yamato* was the largest battleship ever built, displacing 64,000 tons and armed with nine 460 mm (18.1 inch) guns. It was intended that she attack the US ships at Okinawa in a suicide attack. Whilst she was still only about 100 miles from the Japanese coast, and over 200 miles from her target area, she was found by reconnaissance aircraft. She was attacked and finally sunk for the loss of only 10 aircraft.

## **Operational Notes**

Aircraft carriers were the most important ship in a fleet, due to the large radius for attack and the heavy punch associated with their aircraft. Conversely, they were themselves very vulnerable to attack by opposing aircraft, submarines and surface vessels (if they got within range). This vulnerability was enhanced by the need for carriers to steam in to the wind when launching or recovering aircraft. This manoeuvre could result in the carrier moving away from the bulk of protective ships, although as the war progress tactics changed so that the protection followed the carrier.

Carriers were also very vulnerable when preparing to fly off a strike force. With a mass of fully fuelled and fully armed aircraft on and below deck, any attack could spark a chain of destruction and result in the loss of a ship.

# Battleship

## Definition and Description

A capital ship is defined in the 1922 Washington Treaty as:

*“A surface vessel of war, the standard displacement of which exceeds 10,000 tons (10,160 metric tons) or with a gun above 8 inches (203 mm) in calibre.”*

In the 1922 Washington Treaty it was agreed that no ships with a standard displacement of over 35,000 tons would be built, no ships fitted with guns in excess of 14 inches, and no secondary guns fitted in excess of 6 inches, however this treaty lapsed shortly before the start of the Second World War. In addition, some existing ships that displaced more than 35,000 tons were permitted to be retained.

The broad definition of a capital ship includes many types of warship (including battleships, battle cruisers, pocket battleships and monitors). The term ‘battleship’ applies to conventional capital ships, intended to fight other ships at sea, well armed, heavily armoured and relatively slow (typically with a speed of between 25 and 30 knots).



*Japanese Battleship Yamato, 1941.*

## Development and History

The battleship is a direct descendant of the old ‘ships of the line’ (alternatively known as ‘line of battle ships’). In the 19th century, fuelled by the industrial revolution, nations began to make widespread use of iron plating to give added protection to their large warships, and steam power began to replace sails for propulsion. For a while it was possible to give ships so much armour that the latest guns could not penetrate it, and ships were armed with rams as they were the only means of sinking a heavily armoured enemy. Efforts were made to improve the power of guns resulting in the reduction, then elimination, of the old broadside in favour of a smaller number of huge guns that could be traversed through a wide arc.

In the latter half of the 19th century a farcical situation had developed. The modern warships (known as Ironclads) were slow moving, un-maneuvrable vessels armed with the most powerful guns in the world which nevertheless could not penetrate the armour of the enemy and (due to the pitching and rolling of the ship at sea) rarely hit the enemy anyway. Battles resembled cumbersome dances, with ships manoeuvring to try to ram each other but rarely succeeding.

Eventually the power of the gun maker overcame the ability of the armourer to provide protection, but it took the development of effective range finding and fire control to give ships a realistic chance of hitting the enemy at anything beyond point-blank range, and not until oil power and steam turbines were developed could sufficient propulsion be provided. The first vessel to take advantage of all these developments was the famous *HMS Dreadnought* (laid down in 1905). When she was commissioned she immediately made all previous ships obsolete due to her speed, numerous large guns, well-located range finding, good fire control and well thought out arrangement of armour. All subsequent battleships ever made followed *HMS Dreadnought’s* fundamental design. The ultimate extension of the concept was the Japanese battleship *Yamato*. This massive ship displaced 64,000 tons, and was the largest battleship ever built.

The Second World War marked the end of the era of the battleship. The British attack on Taranto (where 20 carrier-based aircraft left two battleships with their keels resting on the bottom and damaged one other) and the Japanese attack on Pearl Harbour (where 360 carrier-based aircraft sank or beached five battleships and damaged another three) relegated the battleship to secondary importance at sea. Thereafter, their major contribution was in providing immense fire support to troops ashore.

## **Operational Notes**

Battleships are large, expensive ships, and because of this they rarely operate alone. In the absence of a threat from the air (or in the days before the air threat was recognised) a typical arrangement would be for the battleships to be protected from enemy ships by a screen of cruisers, and for destroyers to screen the cruisers from enemy ships. More destroyers would be used to screen the whole fleet from submarine attack, or to sweep for mines ahead of the fleet. If opposing fleets met, the battleships would form a line of battle and attempt to manoeuvre so that they maximised the number of guns that could fire on the enemy whilst minimising the number of enemy guns that could be brought to bear on them. Cruisers or destroyers could be sent to make torpedo attacks on the enemy battlefleet, or could be used to protect the friendly battlefleet from similar attacks by the enemy.



# Battle Cruiser

## Definition and Description

Battle cruisers are sub-types of capital ships, and may be defined as:

*“A surface vessel of war, the standard displacement of which exceeds 10,000 tons (10,160 metric tons) or with a gun above 8 inches (203 mm) in calibre, and able to match speed with cruisers in calm weather.”*



*British Battle Cruiser HMS Hood.*

## Development and History

The battle cruiser concept was a product of discussions relating to the most appropriate design for capital ships following the commissioning of the *Dreadnought* in 1909. Lacking war experience with the new type of battleship, and aware of the difficulty of hitting fast moving targets at sea, one school of thought proposed that a fast moving, heavily armed and lightly armoured ship would be superior to a slow moving, heavily armed and heavily armoured ship. This was based on the assumptions that the battle cruiser would be unlikely to be hit, whereas the slower-moving battleship would be hit much more often, and that gun power would overcome armour protection.

Conclusive proof or disproof of the theory is hard to find, however the balance of opinion is that the increase in speed probably did not compensate for the reduction in armour.

The most famous battle cruiser of the Second World War was *HMS Hood*, which was hit and exploded during an engagement with the German battleship *Bismarck*, leaving only three survivors. Even today, the argument as to the exact series of events, the tactics employed and the final cause of loss rage undiminished.

## Operational Notes

No real role was found for battle cruisers. Their weaker armour made them vulnerable to battleships, although their speed advantage could sometimes be used to decisive effect. As with battleships, they must be screened from attack by cruisers and destroyers. They are best employed in fleets of similar fast vessels, as the presence of battleships would slow them down and negate their speed advantage.

# Pocket Battleship

## Definition and Description

The term 'pocket battleship' refers more to a class of very heavy cruiser rather than to a specific type of ship. Only three ships have ever been referred to as pocket battleships, and so a precise definition is difficult to give. An approximation is given below, however it is important to read the 'Development and History' subsection to get an understanding of what these ships were. A pocket battleship may be defined as:

*"Surface vessels of war, other than aircraft carriers, the standard displacement of which is around 10,000 tons, and with a gun above 8 inches (203 mm) in calibre."*

Pocket battleships may best be thought of as large cruisers with big guns. They have a typical battleship-type armament (several large main guns mounted in turrets fore and aft, with cruiser-style guns mounted port and starboard adjacent to the superstructure), moderate speed (25 to 30 knots), and cruiser-type displacement (around 10,000 tons).



*German Pocket Battleship Graf Spee.*

## Development and History

After the end of the First World War, the Treaty of Versailles restricted Germany to a collection of vessels that were barely adequate for coastal defence (6 obsolete battleships, 6 light cruisers, 12 destroyers and 12 torpedo boats). The treaty permitted the replacement of the battleships and cruisers 20 years after launch (i.e. in the 1920s), although replacement 'battleships' were limited to a maximum of 10,000 tons displacement, which matched the tonnage of cruisers (as defined in the inter-war Naval Treaties).

Germany had great difficulty deciding on an appropriate design of ship to replace the very old pre-Dreadnought era battleships. The tonnage limitation was severe, making it impossible to build a ship that was heavily armed and heavily armoured. Faced with treaty limitations on the number of ships, and with potential threats from Russia, Poland and France, the choice of design was not easy.

It was eventually decided to build a ship (the *Deutschland*) that was well armed (with six 11.1 inch guns and eight 5.9 inch guns), but with only moderate speed (26 knots design speed) and a long endurance (over 18,000 miles at 15 knots). She was also provided with eight torpedo tubes, a multitude of smaller guns, and two aircraft for scouting purposes. Due to weight restrictions, however, little armour could be provided. Such an arrangement made the vessel ideal for commerce raiding, with the ability to stay at sea for a long time, sufficient speed to catch any merchant cargo vessel and escape from any superior vessel, sufficient armour to be protected against the guns from any merchant vessel, and finally with sufficient guns to overcome any merchant vessel and most warships. By the time the Second World War began the speed of modern battleships was comparable with that of the pocket battleship.

The vessel actually displaced over 11,500 tons standard (over 15,000 tons full load), however the ship was a creditable effort to keep within the Versailles treaty limits whilst still providing a useful warship. Due to the battleship-type gun arrangement being combined with a relatively tiny hull, she was referred to as a 'pocket' battleship by the rest of the world. Two other warships followed; the *Admiral Scheer* and the *Admiral Graf Spee*. These ships differed in detail to the original (and to each other), however none of the fundamental design elements was altered.

The *Admiral Graf Spee* is probably the most famous pocket battleship. She made an extended raid in the South Atlantic, staying at large for many months and causing considerable disruption to shipping before being scuttled in Monte Video harbour after being convinced that a superior force was awaiting her at sea.

## **Operational Notes**

Pocket battleships acted as merchant raiders (see below). Although heavily armed, the light armour makes the ships extremely vulnerable, and thus all ocean-going warships pose a potential threat. Victory should be assured against cruisers or smaller vessels if encountered singly, as the long range and heavy hitting ability of the main guns will discourage attempts to bring her to within range of the smaller guns mounted by these vessels. If the range closes, the secondary armament will add to the weight of shot, making it difficult for even a group of cruisers to defeat her. Nevertheless, disengagement should be a priority, as the armour cannot be relied upon to ensure hull integrity or to protect vital areas in a prolonged engagement.

# Cruiser

## Definition and Description

Cruisers are defined in the 1930 London Treaty as:

*“Surface vessels of war, other than capital ships or aircraft carriers, the standard displacement of which is less than 10,000 tons (10,160 metric tons) and which exceeds 1,850 tons (1,880 metric tons), or with a gun above 5.1 inch (130 mm) calibre.*

*The cruiser category is divided into two sub-categories, as follows:*

*[Heavy cruisers], carrying a gun above 6.1 inch (155 mm) calibre;*

*[Light cruisers], carrying a gun not above 6.1 inch (155 mm) calibre.”*

Cruisers were usually armed with torpedo tubes, and often are fitted with facilities for carrying one to three floatplanes. They usually had a top speed of around 30 knots, were designed to mix speed with range, endurance and firepower, and were expected to be able to out-run any ship they can't out-fight.



*Italian Cruiser Bolzano, 1938.*

## Development and History

Cruisers developed out of a multitude of needs, related to the move from wind power to steam power and the advent of wireless communications. In the days of sail, the ability of a ship to stay at sea was limited by how much food and water could be carried, with re-supply being easy and quick at sea. Long journeys away from port were possible for all vessels, with noting except journey time preventing even far-flung seaways being patrolled. With the advent of steam power, ships could no longer stay at sea for extended periods. The supply of coal (later oil) was limited to established facilities, and replenishment could not easily be carried out at sea. This had the effect of making close blockade of ports impossible, and of protecting trade routes difficult.

There was a clear need for a vessel which had good endurance (to make extended patrols), significant size (preventing the enemy from easily driving the vessel off its patrol area, or for hunting down commerce raiders) and enough speed to be able to shadow and report enemy warships once discovered (to enable them to be brought to battle by the main fleet). The cruiser filled this need.

Over time, the role of the cruiser developed in to several main functions: protecting (or attacking) remote trade routes; patrolling off enemy shores (blockading); reconnaissance; shadowing a larger enemy vessel; protection of capital ships. During the Second World War, cruisers undertook all these tasks and proved their value repeatedly. Their air defence capability was particularly vital in the Pacific and Mediterranean; their endurance was valuable in hunting commerce raiders worldwide; their ability to shadow larger ships was demonstrated in the *Bismark* chase.

## **Operational Notes**

Cruisers were used extensively during the Second World War. Smaller and cheaper than a battleship, yet much larger and more powerful than a destroyer, the cruiser could be used whenever significant firepower was needed but when a battleship could not be risked. When with the fleet they were expected to screen the capital ships, protecting them against aircraft and enemy cruisers. During a fleet action they were expected to counter any attack by enemy cruisers, and could use their own torpedoes to attack enemy capital ships if needed.

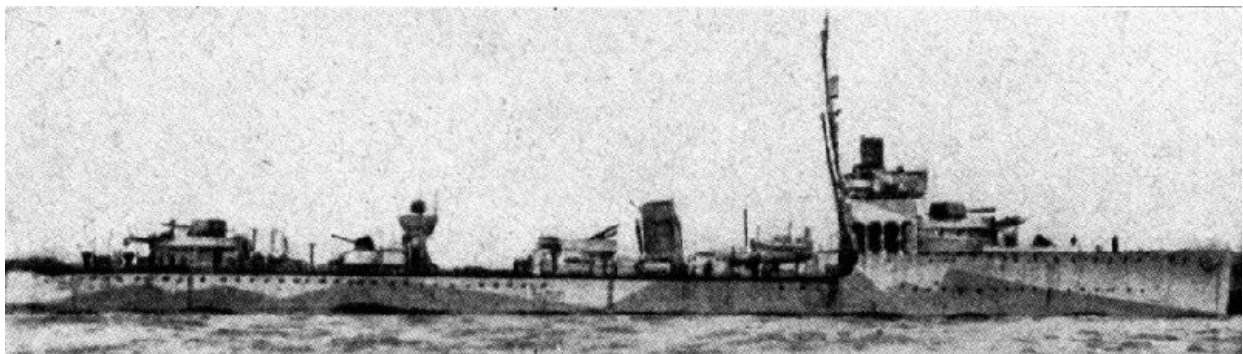
# Destroyer

## Definition and Description

Destroyers are defined in the 1930 London Treaty as:

*“Surface vessels of war, the standard displacement of which is greater than 600 tons (610 metric tons) and does not exceed 1,850 tons (1,880 metric tons), and with a gun not above 5.1 inch (130 mm) calibre. Vessels that are designed for a speed of less than 30 knots, do not carry torpedoes, and do not mount more than four guns above 3 inch (76 mm) calibre are not considered to be destroyers.”*

Most destroyers were fitted with four or six main guns, smaller calibre canon or machineguns, torpedoes, mine sweeping equipment, depth charges and asdic (sonar). Some destroyers were fitted for mine laying, although this was unusual. Destroyers usually had a top speed of over 35 knots.



*Australian destroyer HMAS Winchelsea, 1942.*

## Development and History

With the advent of self-propelled torpedoes, thoughts in many nations turned to the possibilities of being able to defeat any fleet blockading a port with a multitude of cheap coastal torpedo boats, or to defeat larger enemy ships at sea with cheap ocean-going torpedo boats. In order to provide a defence against this potential threat, there was seen to be the need for a small, fast, ocean-going boat that could travel with the fleet at sea to their destination, and then protect the fleet from torpedo-boat attacks on arrival. Thus the torpedo-boat destroyer (soon known simply as the destroyer) was born.

A dual role for destroyers was very quickly seen. Being large enough to travel with a fleet at sea and fast enough to fight torpedo boats, destroyers (if fitted with torpedoes) could be used as ocean-going torpedo boats, posing a threat to even the largest ship in a fleet action. Destroyers became essential to the fleet, providing a screen for larger ships from potential attacks from similar vessels, and being seen to be useful for most of the multitude of small tasks that are required in any navy. When ocean-going submarines became widespread, the protective role for the fleet from submarines naturally fell on the destroyer as an extension of their normal screening operations, and a minesweeping role was also soon added.

Due primarily to their anti-submarine capability, destroyers were used to escort merchant ships in both the First and the Second World War. This was soon seen to be a poor use for them, however, as their high speed (which was expensive to obtain in terms of engine power, size and cost) was rarely useful. They were replaced wherever possible with smaller, cheaper, slower and more specialised vessels.

## Operational Notes

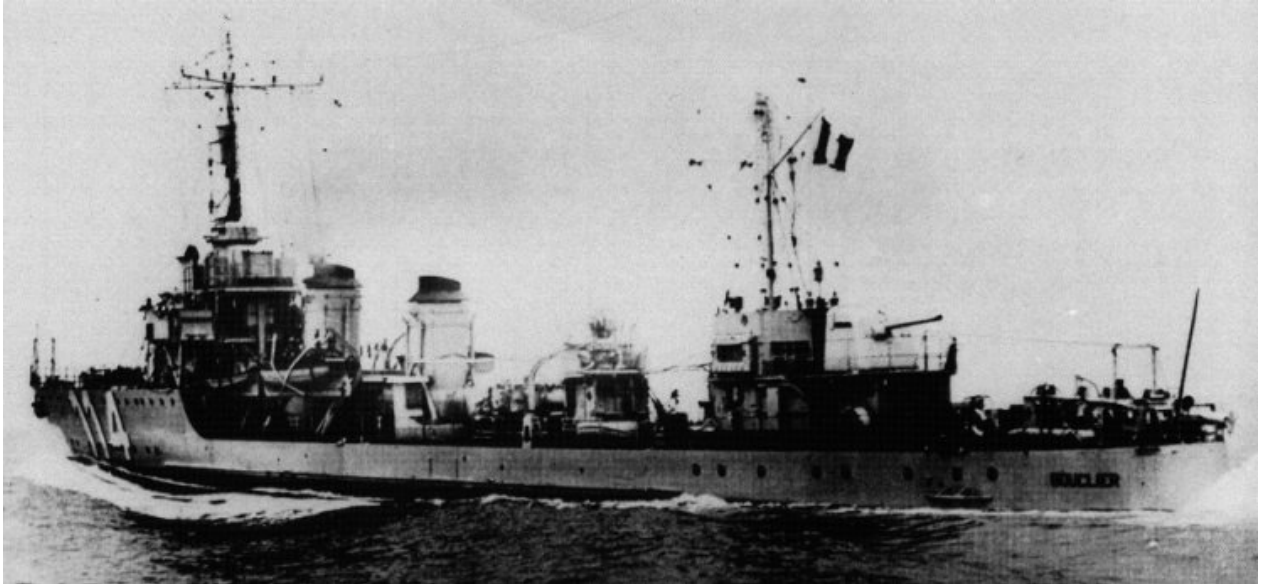
Whilst the fleet was at sea destroyers were expected to prevent submarines getting in range to attack cruisers, capital ships or aircraft carriers. Once battle was joined they were expected to prevent enemy destroyers closing to engage the larger ships with torpedoes, and (if ordered) to themselves close with larger enemy ships and attack them with their torpedoes. Destroyers were also used when larger ships could not be risked, and were described by one British Admiral as being 'expendable'. They were often used for scouting waters that were feared to contain mines, submarines or other hazards, or for work very close to shore (which might expose the ships to increased chance of bombardment or air attack).

# Torpedoboat

## Definition and Description

A torpedoboat may be defined as:

*“A surface vessel of war whose main armament is torpedoes, and is intended to travel at sea with the battlefleet to attack major enemy warships.”*



*French torpedoboat Bouclier.*

## Development and History

When the self-propelled torpedo was invented, countries with small navies saw this as a way of beating big navies cheaply. They developed small boats that could sail out from harbour to attack an enemy fleet with torpedoes (similar to MTBs). This concept then grew into the idea of taking small, fast torpedo boats along with the fleet to attack enemy fleets when they met at sea. These small, fast torpedo boats had to be big enough to keep up with the fleet during heavy weather, and carry enough fuel to stay with the fleet for a while. These 'small' torpedo boats were generally under 1000 tons.

Torpedoboats did not have a big impact in World War Two as the torpedo-carrying aircraft became the principal threat to major surface warships.

## Operational Notes

Torpedoboats were intended to be used to attack major warships at sea. The major warships were screened by destroyers, and the task of the torpedoboat was to manoeuvre to avoid the destroyers, and sink the enemy warships with torpedoes.



## OTHER WARSHIPS

This section describes warships whose primary purpose is to operate as escorts to merchant ships. This section specifically includes the following ships:

- Escort carrier
- Monitor
- Frigate / Destroyer Escort
- Sloop
- Corvette
- Submarine

In addition, there are many other seagoing craft that may be encountered. Most of these are self-explanatory (minelayer, minesweeper, motor torpedo boat, motor gun boat), and will not be described further here.

There are also other smaller vessels which may be encountered (e.g. sloop, anti-submarine trawler, boom-defence vessel). All these ships may be defined as follows:

*“Surface vessels of war which fulfil the following criteria:*

- *the standard displacement of which does not exceed 1,850 tons (1,880 metric tons);*
- *with a gun not above 5.1 inch (130 mm) calibre and no more than four guns above 3 inch (76 mm) calibre;*
- *designed for a speed of less than 30 knots;*
- *does not carry torpedoes.”*

# Escort Carrier

## Definition and Description

Escort carriers are smaller, less well armed, and slower than fleet / fast aircraft carriers. They can be defined as:

*“Any surface vessel of war, whatever its displacement, designed for the specific and exclusive purpose of carrying aircraft and so constructed that aircraft can be launched therefrom and landed thereon, and with a maximum speed of less than 20 knots.”*



*US Escort Carrier USS Rendova.*

## Development and History

During the Second World War the threat from aircraft was seen to be very high. The presence of friendly aircraft brought with it a large degree of security, whilst enemy aircraft brought with them fear and death. This applied equally to the land as well as the sea.

Whilst fleet / fast carriers were available, they were small in number and expensive to produce due to their size and speed. Speed was not essential unless a carrier needed to operate with a battle fleet however, and the escort carrier was conceived as a small, slow carrier to keep pace with merchant ships. The initial escort carriers were themselves converted merchant ships, however soon specific designs appeared.

In the Atlantic, escort carriers sailed with convoys to protect them from submarine attack. The mere presence of an aircraft with a convoy made a huge difference, forcing submarines to dive and loose contact. In the Pacific, escort carriers not only provided air cover for large masses of shipping against air attack, they also provided aircraft in a ground attack role.

## Operational Notes

Escort carriers are too slow, small and poorly protected to operate with fleet warships. They should remain in convoy with merchant shipping, where the other escorts can protect them from the multitude of threats.

# Monitor

## Definition and Description

A monitor may be defined as:

*“A surface vessel of war fitted with a gun above 8 inches (203 mm) in calibre and intended for use in a shore bombardment role.”*



*British monitor HMS Terror.*

## Development and History

Monitors developed from a need to provide cheap big-gun fire support to forces ashore, and out of a desire to use ‘spare’ battleship turrets. Whilst the battleship could (and did) fulfil the shore bombardment role, they were designed to fight opposing battleships at sea. This made them very expensive, due to their need for high speed, significant armour protection and good sea keeping qualities. A monitor provided all the benefits of a battleship for shore bombardment (big guns) without the expensive (and unnecessary) features of a battleship.

## Operational Notes

A monitor made an excellent shore bombardment vessel, however they were extremely vulnerable to other warships or aircraft.

# Frigate / Destroyer Escort / Sloop

## Definition and Description

Frigates, destroyer escorts and sloops are very similar craft. They generally have anti-submarine capabilities similar to (or superior to) a destroyer, but lack a destroyer's speed and armament, and may be considered to be destroyers that are specially adapted for anti-submarine operations. They could be defined as:

*Surface vessels of war, the standard displacement of which is greater than 600 tons (610 metric tons) and does not exceed 1,850 tons (1,880 metric tons), with a gun not above 5.1 inch (130 mm) calibre and no more than four guns above 3 inch (76 mm) calibre, do not carry torpedoes and are equipped for an anti-submarine role."*

They carried modern anti-submarine equipment (sonar and depth charges were standard, whilst ahead-firing weapons and radar were common), and were capable of moderate or significant sustained speed.



*Canadian Frigate HMCS Kokanee*

## Development and History

Although frigates have been in service since the days of sail, the modern frigate developed to fulfil a specific role. That role was in providing a fast escort vessel, primarily for hunting submarines.

It was found during the Second World War that existing destroyers were too expensive and in too short supply to be used as escort vessels. Destroyers were designed to operate with a battlefleet, with significant firepower (guns and torpedoes) that was for the sole purpose of defeating enemy destroyers and sinking larger ships (cruisers and battleships). This equipment was redundant in convoy escorts, where the main threat came from submarines or aircraft. In addition, destroyers were capable of very fast speeds for short periods of time, and had a short endurance. Great bursts of speed were not needed for hunting submarines, although there was a need to be able to move quickly to react to a threat or catch up with a convoy after a prolonged hunt.

Thus the frigate (destroyer escort) was conceived as a small ship that did not carry this redundant equipment, but capable of reasonable sustained speed and with a good endurance. The main guns were reduced in number and size, and the torpedo tubes were removed. Thus the frigate retained only the equipment necessary for its role as an escort, and lost any offensive capability against warships. Maximum speed could be up to 25 knots, which was comparable to a destroyer's cruising speed, and they had much increased fuel capacity.

## Operational Notes

Frigates made ideal anti-submarine vessels. They usually formed the bulk of the Atlantic support groups (hunter-killer groups), and due to their speed were able to react quickly to threats. When forming part of a convoy escort their speed enabled them to catch any surfaced submarine, and return to the convoy quickly after a prolonged hunt.

# Corvette

## Definition and Description

A corvette may be defined as:

*“A small, cheap vessel that can be produced quickly, and is equipped for anti-submarine operations.”*

Corvettes were used by the British as small, cheap ships that could provide anti-submarine escort for convoys. Two main types of corvette were produced, the Castle class and the Flower class. They were based on the design of a commercial whale catcher, and were fitted with asdic and depth charges. One small deck gun was fitted, for fighting a surfaced U-boat. Later versions were also fitted with radar.



*Canadian Corvette HMCS Moncton.*

## Development and History

The corvette was conceived in 1939 as a small anti-submarine vessel for use in coastal waters. The vessels had excellent sea-keeping abilities, and when faced with a shortage of seagoing escorts they were also assigned to ocean convoy routes. Despite being uncomfortable vessels to sail in due to their severe roll motion (it was said that they would ‘roll on wet grass’) they were able to operate in conditions that would have damaged destroyers.

These ships will always be associated with the battle of the Atlantic, and were operated by many Allied nations.

## Operational Notes

The ships were well adapted for hunting submerged U-boats, with modern anti-submarine equipment and good sea-keeping qualities. They were weak against surfaced U-boats, however, as their maximum speed of only 16 knots was not sufficient to catch a U-boat on the surface and their small (4 inch) deck gun was matched by a similar weapon on the U-boat. In addition, their slow speed meant that after any prolonged hunt the ship could not quickly rejoin the convoy.

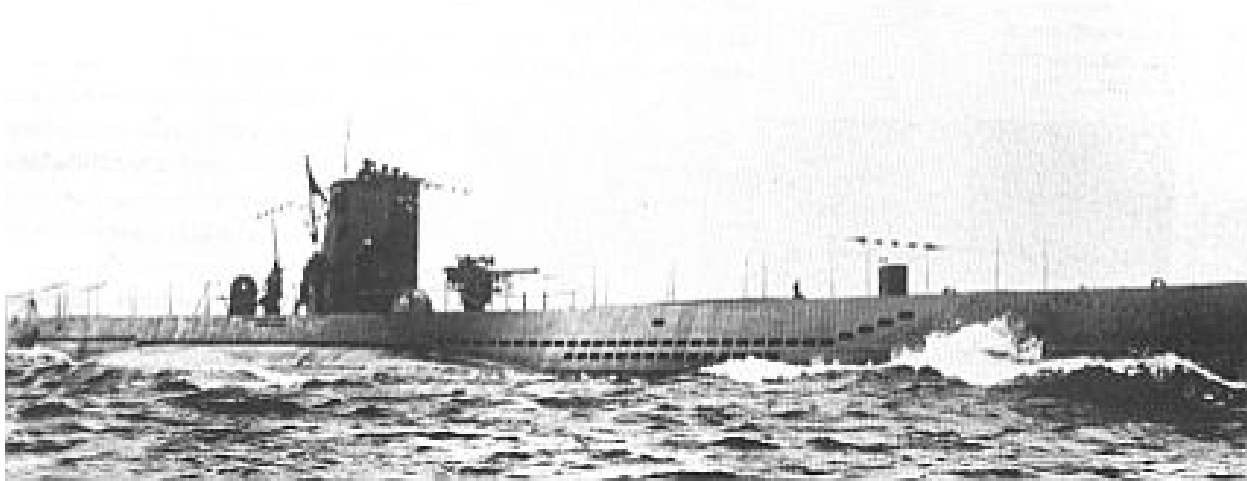
# Submarine

## Definition and Description

Submarines may be defined as:

*“Any vessels of war designed to submerge below the surface of the ocean.”*

Submarines normally have diesel and electric engines, torpedo tubes forward and aft, a single deck gun and often multiple anti-aircraft guns.



*German type VII U-Boat.*

## Development and History

The first boat designed to submerge below the surface and return was launched in 1620 by a Dutch physician, and was powered by oars, and in 1776 that the first submarine attack was made (by the Americans against the British). This was unsuccessful (the submarine was unable to attach the explosives to the hull of the ship), and it wasn't until 1863 that the first successful attack took place (by the Southern American States against the Northern American States, in the US Civil War). These attacks used an explosive charge at the end of a pole (then known as a 'torpedo'), which detonated on impact with the target, and usually caused the loss of the attacking boat.

The invention of the self-propelled torpedo (in 1868) made the submarine a much more practical weapon of war, and by 1900 most navies were adding submarines to their list of vessels. Combined with the Diesel engine and battery power, by the advent of the First World War submarines were ready to play a major role in the conflict.

Although initially intended for use against warships, submarines often found it difficult to score successes due to their slow speed compared to that of warships. Although some notable sinkings were achieved, it was against merchant shipping that submarines were to prove their worth. It was thought that by strangling the enemy's supply chain, victory on land could be hastened, and this concept had formed the foundation of the British strategy for many generations (although it's implementation was based on a strong surface, rather than submarine, fleet). It is Germany, however, who will be remembered for her war against commerce.

For hundreds of years, war against non-combatant (merchant) ships followed a strict set of rules, known as the prize rules. These rules prohibited indiscriminate attack on merchant ships, and required in stead that they be ordered to stop and submit to a search for contraband (i.e. goods which are being shipped to the enemy and which may aid them in the war). If contraband is found the vessel can be sunk or seized (taken as a prize). The crew of a vessel must be taken to a place of safety, which is either on board another ship, or in lifeboats within sight of land and with good prospects of reaching land safely. Only if the merchant vessel offers resistance can it be fired on, and treated as a warship (the prize rules no longer apply). Failure to abide by these rules was considered by all nations to be an extreme act of barbarism, with offenders being put to death on capture.

Submarines had obvious difficulties in complying with the prize rules. Their chief weapon was stealth; they are lightly armed; they are very vulnerable when on the surface; they have no capacity for taking on board the crew of a captured ship; and they have insufficient manpower to enable them to put a prize crew on board (thereby avoiding having to take the merchant crew on board their submarine).

Nevertheless, during the First World War Germany initially attempted to abide by the prize rules. This was quickly shown to be impractical, however they were only reluctantly relaxed, principally because Germany wanted to avoid the anticipated outcry from neutral countries. When the rules were first relaxed (in February 1915) the international community was shocked at the disregard for the long-established rules of war, and disgusted at the indiscriminate killing of non-combatants. The rules were re-instated, relaxed then re-instated again, with the final relaxation in February 1917. This action was one of the factors that caused America to enter the First World War (in April 1917), and also led to the common opinion that German submarine commanders and crews were no better than pirates, and deserved treatment appropriate to that given to pirates in the previous centuries.

Between the wars the prize rules were reinforced as being part of international law, and Hitler confirmed in 1935 that German would abide by them in any future war. When the Second World War began in 1939, German submarines were instructed to follow the prize rules. Although the first submarine attack of the war totally disregarded these instructions, in general the German submarine commanders attempted to stop and search ships and ensure the safety of their crews. Even when the rules were relaxed, and finally abandoned, there were many recorded cases of submarine commanders passing supplies to people in lifeboats, pointing (or even towing) them towards land, and radioing the position of survivors to the Allies.

The Allies attempted to abide by the prize rules for considerably longer than the Germans, however the bleak facts of modern submarine warfare were eventually acknowledged and areas were designated where Allied submarines were free to disregard the prize rules and attack any merchant ship on sight.

German submarines caused the Allies significant concern in the Atlantic Ocean, with sinkings per year outstripping new-buildings per year until 1943. It was the Axis who were to suffer most, however, with merchant shipping losses in the Mediterranean preventing sufficient supplies from reaching the army in North Africa, (greatly aiding its defeat, and preventing the defeated army from being evacuated), and Japanese shipping losses preventing troops from being moved and vital materials from being transported.

## **Operational Notes**

Submarines scored their most notable early successes whilst operating on the surface at night, in the company of other submarines. Whilst submerged, submarines were slow and un-maneuvrable, and could be detected by asdic. On the surface they could not be detected by asdic, and their low silhouette made them difficult to spot by eye.

Submarines were found to be very vulnerable to aircraft, which could force them to dive and often loose contact with a convoy, or could attack with little warning if the lookouts were not vigilant.

# OFFENSIVE MERCHANT VESSELS

This section describes those merchant vessels that were converted to attack the enemy. They include:

- Armed Merchant Cruiser (Auxiliary Cruiser)
- Merchant Raider (Auxiliary Cruiser)
- Q-Ship (Auxiliary Cruiser)
- Merchant Aircraft Carrier
- Catapult Aircraft Merchant

Although with an offensive role, these ships retained their merchant vessel character.



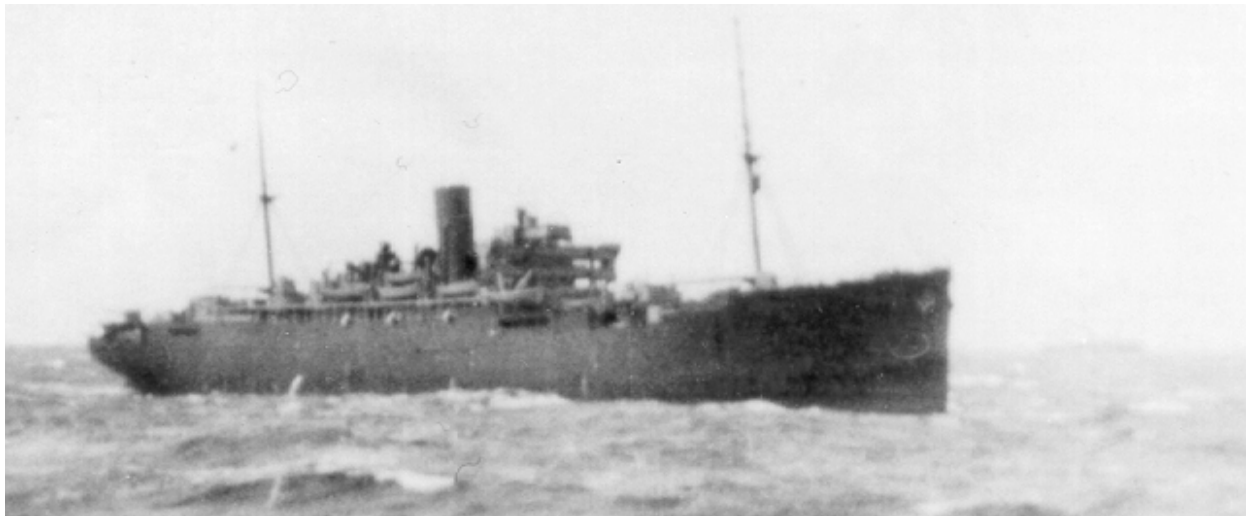
# Armed Merchant Cruiser (Auxiliary Cruiser)

## Definition and Description

Auxiliary cruisers can be defined as:

*“Ocean-going converted merchant vessels armed with guns of 5.1 inches (130 mm) calibre or more.”*

Armed merchant cruisers are auxiliary cruisers operated by the British. They are generally converted passenger liners, equipped with old six-inch guns (left over from the first world war). They are commanded by a Royal Navy captain (usually one re-activated after retirement) and crewed by a mixture of Royal Navy and Merchant Navy personnel. No attempt is made to hide the armament, and no protective armour is provided.



*The British Armed Merchant Cruiser HMS Jervis Bay*

## Development and History

Along with the merchant raider, the armed merchant cruiser has the longest history of any fighting vessel. In the days before formal navies, countries would commandeer and arm merchant vessels to protect their seaways from enemy attack.

Faced with a shortage of warships, and with most of the sea-lanes of the world to protect, the British commandeered a number of passenger liners at the start of the Second World War. These vessels were fitted with World War One vintage naval guns, and placed on duty in a reconnaissance or convoy escort role. When acting in a reconnaissance role the ship was hampered by its low speed, however (being ex-merchant ships) they were generally seaworthy and able to operate in weathers that may have damaged conventional warships.

Two armed merchant cruisers were involved in particularly gallant actions. First, *HMS Rawilpundi* came across the German battle cruisers *Scharnhorst* and *Gneisenau* as they attempted a brief sortie to the Atlantic. Despite being completely outgunned, and with no hope of victory, the *Rawilpundi* refused to surrender and was sunk by gunfire from the *Scharnhorst*. Secondly, *HMS Jervis Bay* was the sole escort for convoy HX84 when it was detected by the German pocket battleship *Admiral Scheer*. The *Jervis Bay* held off the *Admiral Scheer* for long enough for the convoy to scatter. Of the 37 ships in the convoy, 32 escaped. The *Jervis Bay* was sunk.

## Operational Notes

Armed merchant cruisers are very much a desperate measure. They are poorly armed, un-armoured, and cannot outrun any superior warships. The best that can be hoped is that such vessels will report the presence of enemy warships, and divert their attention for long enough so that any escorted ships can escape.

# Merchant Raider (Auxiliary Cruiser)

## Definition and Description

Auxiliary cruisers can be defined as:

*“Ocean-going converted merchant vessels armed with guns of 5.1 inches (130 mm) calibre or more.”*

Merchant raiders (also known as ‘commerce raiders’) are auxiliary cruisers operated by the Axis powers (predominately by Germany, although Japan is also known to have used them) and intended to sink merchant vessels. In outward appearance they look like a normal merchant vessel, however they carry concealed guns (and often torpedo tubes also) and have some armour.



*The German Raider Komet*

## Development and History

Along with the armed merchant cruiser, the merchant raider has the longest history of any fighting vessel. In the days before formal navies, countries would commandeer and arm merchant vessels for use against the merchant vessels of another country.

Over the years, a common code of conduct developed for the commissioning and use of these vessels of war. Importantly, vessels must carry with them proof of their authorisation to raid commerce (such as a ‘letter of marque’) otherwise they would be considered to be pirates (and subject to execution on capture). In addition, they must adhere to a strict set of rules (known as the ‘prize rules’).

The prize rules require that merchant vessels are not sunk on sight, rather they must be ordered to stop and submit to a search for contraband (i.e. goods which are being shipped to the enemy and which may aid them in the war). If contraband is found the vessel can be sunk or seized (taken as a prize). The crew of a vessel must be taken to a place of safety, which is either on board another ship (such as the raider itself) or in lifeboats within sight of land and with good prospects of reaching land safely. Only if the merchant vessel offers resistance can it be fired on, and treated as a warship (the prize rules no longer apply). During the Second World War, ‘resistance’ included using the radio to signal for help.

By the Second World War, the days of the merchant raider were clearly numbered. The advent of the radio and the aeroplane both hampered raider operation, allowing alerts to raider positions and activities to be given quickly, alternative ship routings transmitted, and facilitating rapid, coordinated, searches of large areas of ocean. In this environment raiders could not hope to score many successes, or stay at large for long. Nevertheless, Germany had some particularly successful commerce raiders during the early years of the Second World War as, although the number of merchant ships captured or sunk was small, large numbers of warships were tied up hunting for the raiders. In addition, the flow of supplies along the trade routes was seriously disrupted due to the diversion or postponement of merchant traffic. After 1942 the increase in available Allied warships and aircraft made the task nearly impossible, and the subsequent raiders (both Japanese and German) achieved very little.

Merchant raiders could be expected to outfight destroyers, and could be formidable adversaries even to larger ships if approached without proper caution (as shown by the sinking of *HMAS Sydney* by the *Kormoran* in 1941).

## Operational Notes

Merchant raiders rely on deception, surprise and mobility for their survival. Typically, raiders would disguise themselves as a vessel known to be neutral (or under the control of the enemy) and travel to seaways that are a considerable distance from concentrations of enemy warships. They would then search the oceans for merchant craft, relying on their disguise and false colours to fool any ships encountered until they were close enough to be assured of success. They would then raise their true colours, uncover the guns, and demand surrender.

Typically, a successful raider would operate in an area for a short period of time, then move to another distant location and wait until the hunt had died down before resuming operations. If they sight enemy warships, they would attempt to avoid contact and move away. If contact were inevitable they would attempt to maintain their bluff, and only attempt to fight if there was no other option.

# Q-Ship (Auxiliary Cruiser)

## Definition and Description

Auxiliary cruisers can be defined as:

*“Ocean-going converted merchant vessels armed with guns of 5.1 inches (130 mm) calibre or more.”*

A Q-Ship is a disguised merchant vessel intended to destroy submarines. In outward appearance the ships look identical to normal merchant cargo vessels, however they carry concealed guns (usually under covers on deck, disguised as deck cargo). The ships carry light but bulky material (such as cork) in their holds to provide buoyancy if they are torpedoed, and they are un-armoured. They may also be fitted with hydrophones.

## Development and History

Q-ships were developed in direct response to the German submarine threat of the British coast during the First World War. At that time, submarine hunting methods were crude. Asdic (sonar) had not been invented, and neither had depth charges. The only realistic prospect for sinking submarines was by catching them on the surface, and Q-ships were an effective method of doing this. They were aided by the prize rules (see ‘Merchant Raider’ above), which required submarines to stop and search ships before attacking them. Even when unrestricted submarine operations began, Qships were still somewhat effective as submarines carried few torpedoes, and there was a natural tendency for submarine commanders to try to conserve them by engaging with their deck gun whenever practicable.

By the start of the Second World War significant advances had been made in hunting submarines. Asdic (sonar) had been invented, enabling submarines to be effectively hunted underwater. Depth charges were more powerful and of better design, and tactics had been developed for protecting ships from submarines. The use of Q-ships was thus rare, and in fact was predominantly tried by the Americans in early 1942 as an alternative to convoys. They were not a success, probably due to their low number, the lapsing of the rules for stop and search, increased fear of air attack resulting in submarines being reluctant to surface, and the submarines off the US East coast being limited by fuel and lack of supplies rather than just number of torpedoes.

## Operational Notes

Q-ships sail alone in to waters thought to be inhabited by submarines. They wait until they are attacked (either by deck gun or torpedoes, relying on their improved buoyancy to survive), whereupon some crewmembers make a show of launching lifeboats and abandoning the ship in panic. When the submarine closely approaches the ship the disguise is dropped, the covers are thrown off the guns, and the submarine is engaged.

# Merchant Aircraft Carrier (MAC)

## Definition and Description

A merchant aircraft carrier can be defined as:

*“A merchant vessel equipped for the dual role of transporting cargo and operating aircraft”*

Merchant aircraft carriers were normal merchant ships converted by the addition of a flight deck. All vessels were converted from bulk grain or bulk oil vessels, as these ships could be loaded and unloaded with hoses. This avoided the complex problem of how to access cargo spaces through a flight deck. The cargo capacity of these converted vessels was only slightly reduced by this conversion.

Typically, merchant aircraft carriers carried six Swordfish aircraft, along with flight crew, maintenance and control personnel. On converted oil tankers the aircraft were kept in a deck park, however in the grain carriers they were stowed below decks in the aft hold.



*The British Merchant Aircraft Carrier Empire MacKendrick*

## Development and History

The merchant aircraft carrier was an attempt to provide air cover to convoys in the North Atlantic against the submarine threat. It was found that submarines had great difficulty prosecuting attacks against convoys protected by even one aircraft, and merchant aircraft carriers were seen to be one means of providing air cover to a convoy in waters too far from land for existing aircraft to be of use. The aircraft were armed with only one depth charge.

As Allied superiority at sea exerted itself, aided by technological innovations and mass production (items such as centimetric radar, HF/DF, ahead-firing weapons, very long range aircraft, support groups and escort carriers), the merchant aircraft carriers were no longer needed. They were thus frequently used to transport additional aircraft as deck cargo, preventing flight operations but increasing the quantity of aircraft shipped across the Atlantic.

## Operational Notes

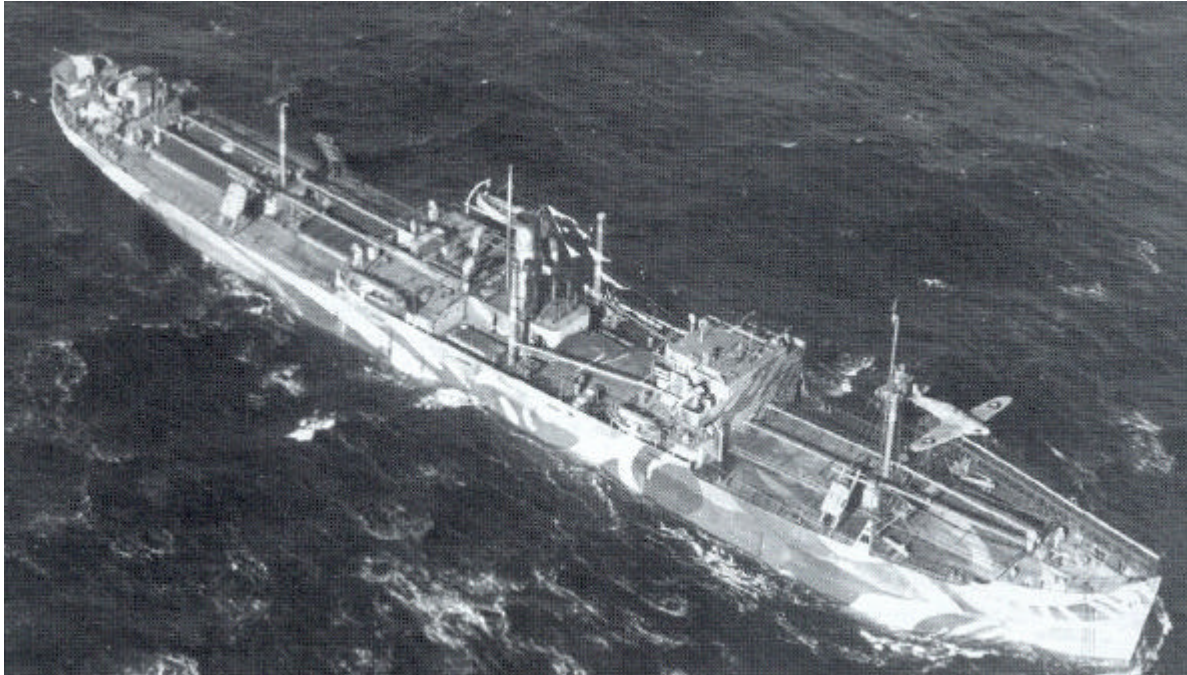
Submarines on the surface were very vulnerable to air attack, and generally submerged when an aircraft was spotted. The small numbers of aircraft on board a merchant aircraft carrier are used to force submarines to submerge, thereby losing contact with the convoy.

# Catapult Aircraft Merchant (CAM)

## Definition and Description

A catapult aircraft merchant vessel may be defined as:

*“A merchant vessel equipped with a catapult and fighter aircraft, but with no landing-on or flying-off deck.”*



*British CAM ship Empire Darwin*

## Development and History

Enormous losses were being caused to merchant shipping in the Allied Atlantic and Arctic convoys by bomber aircraft and U-boats. Due to the shortage of aircraft carriers it was not possible to provide air cover to these convoys, and so it was decided to provide a minimum of cover by fitting old Hurricane fighters to selected merchant ships. The fighter was launched by rocket catapult (the rockets were similar to those fired by ground-attack aircraft), and the pilot was expected to either bail out or ditch his aircraft near the convoy, being recovered by the nearest ship.

There were only eight occasions where the fighter was launched, resulting in seven enemy aircraft being shot down. One of the CAM pilots was killed.

## Operational Notes

The fighter was a one-shot weapon – once launched it could not be recovered. This made the choice of when to launch very difficult, as convoys were often shadowed by an aircraft for hours (or days) before an attack developed. If the shadowing aircraft was shot down and the convoy made an abrupt change of course then it might be able to avoid attack and even escape further detection. However, if the shadowing aircraft were not shot down, or the convoy was detected again later, then the convoy would be left without any form of fighter protection if an air attack developed.

# MERCHANT VESSELS

This section describes the various types of merchant vessel. These ships continued in their everyday tasks once war was declared, however all were exposed to the additional hazards of mines, torpedoes, air attack and surface attack without any meaningful protection of their own. Instead, they had to rely on others to protect them from harm.

Ships included in this section are:

- Tanker
- Passenger Liner
- Cargo Liner
- Bulk Carrier
- General Cargo Vessel
- Wartime Emergency Vessels

The descriptions below of merchant ships are focussed on their design during the Second World War. Since then there has been a significant change in the arrangement of world shipping, with mass containerisation and massive bulk ore and oil carriers replacing the ships described below. Along with an increase in size has come a reduction in crew. It was not unusual to have a total compliment of 80 or more, whereas now it is not unusual to have a total compliment of about 25. Improved designs (with respect to both safety and cargo carrying capacity) have generally removed the central navigation bridge, and the aircraft has all but eliminated the passenger liner.

# Tanker

## Definition and Description

A tanker can be defined as:

*“A merchant ship, designed for the specific purpose of transporting liquid cargoes in bulk.”*

Tankers generally have their machinery spaces aft (at the stern, or back end, of the ship). Forward of this are the cargo tanks. These are numbered from forward to aft, with the number one tank being the furthest forward. Each tank is further divided longitudinally (from fore to aft) by one or more oil-tight bulkheads, so the vessel may have an arrangement such as port number one tank, starboard number one tank, and (perhaps) centre number one tank. This improves stability by preventing liquid sloshing from side to side when the vessel rolls. One or more pump rooms would be provided, and these are used for discharging cargo.

Tanks can be fitted with heating systems (to allow heating of heavy oils to enable them to flow), steam smothering systems (to put out a fire in the tank) and vents (to allow gas to escape). These vents would be fitted with flame arrestors on vessels where light oil cargoes were intended to be carried. At around the mid point of the ship would be the main superstructure, containing accommodation for deck officers, the navigation bridge and the radio room. The accommodation for the engineers would be at the stern, above the engine room.



*The Tanker SS Mission Dolores*

## Development and History

During the Second World War, tankers were particularly valuable targets. Whilst the loss of general cargo vessels caused much concern, it was the loss of tankers that caused the most anxiety as they were being lost at a much greater rate. As the highest-value ships in a convoy, tankers were normally placed in the inner columns. This shielded them somewhat from attack, although the losses continued to be a problem until the Battle of the Atlantic was finally decided.

## Operational Notes

Tankers are difficult ships to sink. They are well subdivided into watertight compartments, and are designed to carry a liquid of approximately the same density as water. If you put a hole in the starboard (right) side of the tanker, the oil will run out and the vessel will list (lean) to port (the left) whilst rising slightly out of the water as the weight of cargo is reduced. The vessel will only sink if structural failure occurs.

The main danger faced by crews of tankers was fire. Whilst crude oil is difficult to set alight (it is thick, often does not flow unless it is heated, and if a lighted match is dropped in to it the match will simply go out), refined products (such as petrol and aviation fuel) can be very flammable.



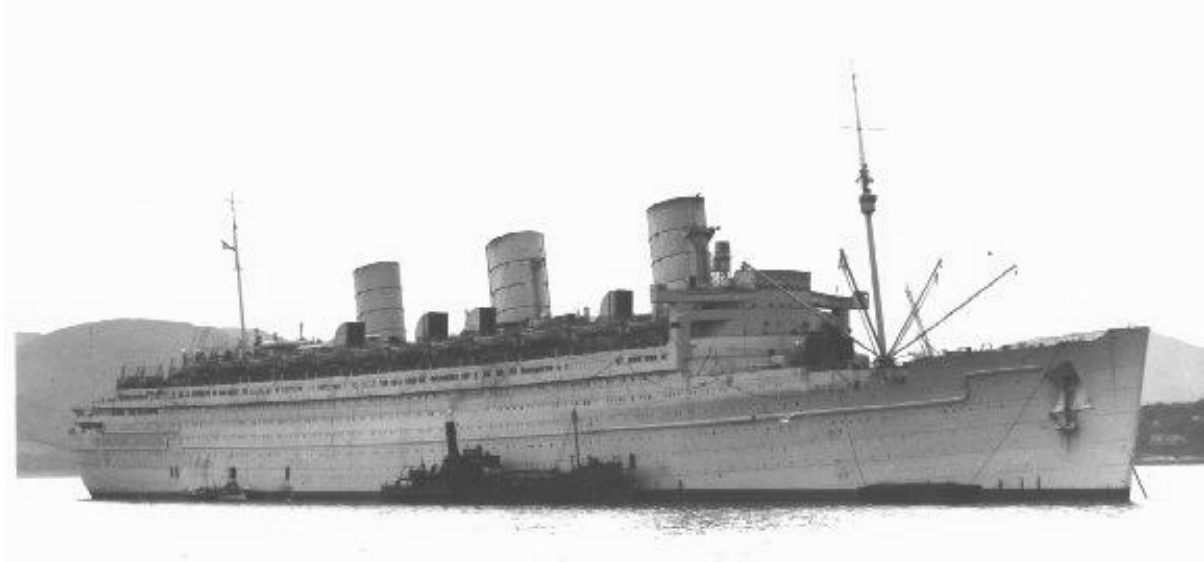
# Passenger Liner

## Definition and Description

A passenger liner may be defined as:

*“A merchant vessel designed for the main purpose of carrying passengers.”*

Passenger liners are usually fast ships, with a speed between 25 and 30 knots.



*The RMS Queen Mary as a troopship*

## Development and History

Passenger liners were very different ships from the cruise liners of today. Their main purpose was to transport people between destinations, in much the same way as the airliner does today, rather than to provide a pleasant holiday experience. In the same manner as a modern airliner, passengers were split in to a number of classes. The first class passengers travelled in luxury, whilst the lowest class passengers were packed in as densely as possible.

The most important aspect of a passenger liner was its speed, with faster ships attracting more passengers and higher prices. This was because passengers simply wanted to get to their destination rather than enjoy the process of travelling. This obsession with speed fuelled great rivalry between the great liner companies, particularly on the prestigious North Atlantic route where the Blue Riband trophy was handed to the fastest ship to make the crossing.

The speed of these ships was a great advantage during the Second World War, as it made them almost invulnerable to submarine attack. As they could easily outpace even a surfaced submarine, they could be torpedoed only if the ship accidentally sailed in to range of the submarine. As the torpedo range was limited, the ocean very big and submarines reasonably few in number, passenger liners were unlikely to be attacked even if unescorted.

Passenger liners were essential to moving the large quantities of troops needed around the world. One of the largest ships was the *RMS Queen Mary*, which carried up to 15,000 troops per trip, and their presence simplified the vast logistical problem facing the Allies. Germany and Italy had less need for such vessels, particularly as their sea lanes were generally less secure than the Allies and the fighting was generally reachable by land, although if they had managed to take Europe as planned they would have been essential to any next steps and their lack was keenly felt in the Norwegian campaign. Japan's problems were more complex. Passenger liners would have made their expansion much easier, however once they began retreating their shipping was not safe and such ships would not have helped.

## Operational Notes

Passenger liners were very vulnerable to surface and air attack and, in areas where such threats were present, needed to be heavily escorted. Submarines, however, posed little threat and liners could operate in waters known to contain submarines provided they had a choice of routes (i.e. were not constrained to going through a particular area).

# Bulk Carrier

## Definition and Description

A bulk carrier may be defined as:

*“A merchant vessel designed for the primary purpose of carrying solid cargo in bulk.”*

## Development and History

These vessels were developed from a need to be able to handle certain types of cargo more efficiently than could be done in standard general cargo vessels. This included goods such as grain (which could be piped in and out of holds quickly), coal and iron ore (which were easier to handle in bulk rather than bagged on pallets).

## Operational Notes

Bulk carriers could be extremely vulnerable to submarine attack if they carried very dense cargoes, such as iron ore, scrap metal etc. Such dense cargoes mean that holds contain a lot of empty space to provide the necessary buoyancy. If the ship is torpedoed, water rushes in to the empty space, rapidly destroying the ship's reserve of buoyancy and often causing structural failure. It was not unusual for scrap metal or iron ore carriers to sink within two minutes of being torpedoed, and they were not popular assignments for merchant crews because of this.

# General Cargo Vessel

## Definition and Description

A general cargo vessel may be defined as:

*“A merchant vessel designed for the primary purpose of carrying break-bulk dry cargo.”*

These ships generally had a central engine room, with cargo holds forward and aft of this. The accommodation and navigating bridge was located above the engine room. Accommodation could also be provided at the stern of the vessel (in the poop) and at the bows (in the forecastle). These ships generally had their own cargo-handling equipment (booms) so that they could handle cargo without having to rely on shore facilities. During the Second World War, guns were fitted for defensive purposes. The speed of these vessels varied considerably, from only five or six knots for old tramp steamers up to over 15 knots for fast cargo liners.

## Development and History

Although a rare sight nowadays, the general cargo vessel has a long history, stretching back for as long as cargo was carried by sea. This type of vessel usually carries cargo stowed on pallets, lifted in and out of the hold by cranes and stowed within the hold by the ship's crew. Cargo handling operations were labour-intensive, and it was for this reason that large crews were carried.

These vessels carried almost everything that was required to be shipped (from bags of flour to ammunition and military vehicles). Containerisation (with all its efficiency improvements) has resulted in this type of vessel being almost eliminated in the modern world.

In the days immediately before the Second World War there were many different shipping lines, and the lines that ships belonged to were easily recognisable by the distinctive paint schemes and funnel markings. The outbreak of war brought this flourish of colour to an end, with ships being painted a uniform drab grey.

## Operational Notes

Merchant shipping is very vulnerable to attack, although a determined defence sometimes made an attacker withdraw.

# Wartime Emergency Vessels

## Definition and Description

Wartime emergency vessels were built by Britain, Canada and the United States of America. They can be defined as:

*“Merchant vessels falling in to the category of: Empire ships; Liberty ships; Victory ships; ‘Oceans’, ‘Forts’ and ‘Parks’; T1, T2 and T3 tankers.”*

The wartime emergency designs are vessels mass-produced under emergency programmes in Britain, Canada and the United States of America. They include almost every type of ocean-going merchant ship.



*Liberty ship*

## Development and History

Having filled her large shipyards with warships, Britain had a pressing need to find new merchant tonnage to offset the losses of those being sunk. Ships were built wherever there was space in British territories, with those built in Britain bearing the prefix ‘Empire’ and known as ‘Empire’ ships, whilst those built in Canada bore the prefix ‘Fort’ or the suffix ‘Park’.

The Empire ships were a wide variety of different types. Each shipyard was tasked with building the vessels that they could build most efficiently, resulting in a very mixed bag of ships but having the advantage that work could begin immediately, with the existing skill base, in existing yards, and without any special provisions being required for their construction. One ship type, devised by the J L Thompson & Sons yard, had been specifically modified for mass production. This was based on a pre-war design for the *Dorington Court*, and resulted in a general cargo ship of around 10,000 tons deadweight and a speed of 11 knots. The first wartime ship of this type was the *Empire Liberty*, launched on the 28th August 1941.

Desperate for even more new tonnage, in late 1940 British representatives (including one from the Thompson yard) took the *Empire Liberty* plans to America to try to persuade the American government to let Britain place orders for 60 new ships. The Americans agreed, however no space existed in shipyards to allow them to be built and it was decided to build two new shipyards to meet the British need. These ships bore the prefix 'Ocean', with the first ship (the *Ocean Vanguard*) being launched on 15th October 1941.

The first vessels built in Canada (the 'Forts') were closer to the *Dorington Court* plans, and were known as the 'North Sands' type (after the J L Thompson & Sons yard). Improvements in machinery produced the 'Victory' ship (which was very different to the US 'Victory' ship), and further machinery changes resulted in the 'Canadian' ship.

The 'Parks' were built in Canada by the Park Steamship Company Ltd. The majority were 'North Sands', 'Victory' or 'Canadian' type, identical to the 'Forts', however some bulk cargo and tanker vessels were also built. Other merchant ships were also mass produced in Canada, including repair ships, coasters and tugs.

Simultaneous with the decision to build ships for the British was a decision to rapidly expand the US merchant fleet, however the choice of a design appropriate for mass production was a difficult one. The previous ships built by the US Maritime Commission were of a very high quality (but not suited to mass production), in stark contrast to the British wartime designs (which deliberately emphasised speed of construction), and there was considerable resistance to the idea of lowering standards to build ships rapidly. Faced, however, with an urgent need, little time and a sound and readily available design a common-sense decision was taken to adopt the basic British concept for the American emergency fleet. This design was modified somewhat to further aid mass production and to suit American building techniques and other US preferences, and orders were placed for the first 200 of these ships in early 1941.

As with the 'Ocean' ships, no shipyards existed to build these vessels and a total of nine new shipyards were announced (including the two required to build the British vessels). Later expansions resulted in even more shipyards, and a total completed fleet of 2,710 ships.

Whilst the Liberty ship programme was in its early stages it was recognised that there was a need to provide higher quality vessels to meet post-war requirements. This led to the design of the 'Victory' ship, which was faster than the Liberty ship, with improved seakeeping abilities, better machinery and more modern cargo handling gear.

Along with the programme to build general cargo vessels (the Liberty and Victory ships) there was also a requirement to build new tankers, to replace losses, meet anticipated new demand and provide a post-war tanker fleet. These ships were a mix of mass-produced and individually designed vessels, some being built in yards originally intended for Liberty ship production and some being built privately.

After the war, many of these 'emergency' vessels deteriorated rapidly (particularly the Liberty and North Sands vessels). One post-war mariner summed up the attitude amongst seafarers when he said "you knew your career was over when they assigned you to a Liberty ship". Nevertheless, all these vessels fulfilled a vital need. They quickly provided essential cargo capacity, to an adequate standard and (generally) without major flaws.

## Operational Notes

Generally the emergency ships can be regarded as normal merchant vessels, however concessions made to aid rapid production often made the ships less pleasant to sail on, uglier and less than ideal in many small ways.

# APPENDIX A: FURTHER READING

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