

Chapter 1 : Naval warfare - Wikipedia

This is essentially a general history of naval warfare between the Napoleonic Wars and the early 20th Century. There's a mix of general exposition about the nature of the ships, weapons and tactics along with brief descriptions of specific naval actions.

History[edit] Mankind has fought battles on the sea for more than 3, years. Even in the interior of large landmasses, transportation before the advent of extensive railroads was largely dependent upon rivers , canals , and other navigable waterways. The latter were crucial in the development of the modern world in the United Kingdom , the Low Countries and northern Germany , for they enabled the bulk movement of goods and raw materials without which the Industrial Revolution would not have occurred. Prior to , materials largely moved by river barge or sea vessels. Thus armies, with their exorbitant needs for food, ammunition and fodder, were tied to the river valleys throughout the ages. The oceanic influences throughout pre-recorded history Homeric Legends, e. Troy , and classical works such as The Odyssey underscore the past influences. The Persian Empire " united and strong " could not prevail against the might of the Athenian fleet combined with that of lesser city states in several attempts to conquer the Greek city states. For three centuries, the Northmen commonly called Vikings raided and pillaged and went where they willed, far into central Russia and the Ukraine , and even to distant Constantinople both via the Black Sea tributaries and through the Strait of Gibraltar. Many sea battles through history also provide a reliable source of shipwrecks for underwater archaeology. A major example is the exploration of the wrecks of various warships in the Pacific Ocean. The first dateable recorded sea battle occurred about BC: Suppiluliuma II , king of the Hittites , defeated a fleet from Cyprus , and burned their ships at sea. Assyrian reliefs from the 8th century BC show Phoenician fighting ships, with two levels of oars, fighting men on a sort of bridge or deck above the oarsmen, and some sort of ram protruding from the bow. No written mention of strategy or tactics seems to have survived. Josephus Flavius Antiquities IX " reports a naval battle between Tyre and the king of Assyria who was aided by the other cities in Phoenicia. The battle took place off the shores of Tyre. Although the Tyrian fleet was much smaller in size, the Tyrians defeated their enemies. An ancient Greek trireme vessel The Greeks of Homer just used their ships as transport for land armies, but in BC there is a mention of a battle at sea between Corinth and its colony city Corcyra. Ancient descriptions of the Persian Wars were the first to feature large-scale naval operations, not just sophisticated fleet engagements with dozens of triremes on each side, but combined land-sea operations. It seems unlikely that all this was the product of a single mind or even of a generation; most likely the period of evolution and experimentation was simply not recorded by history. After some initial battles while subjugating the Greeks of the Ionian coast, the Persians determined to invade Greece proper. Themistocles of Athens estimated that the Greeks would be outnumbered by the Persians on land, but that Athens could protect itself by building a fleet the famous "wooden walls" , using the profits of the silver mines at Laurium to finance them. The first Persian campaign, in BC, was aborted because the fleet was lost in a storm, but the second, in BC, captured islands in the Aegean Sea before landing on the mainland near Marathon. Attacks by the Greek armies repulsed these. The third Persian campaign in BC, under Xerxes I of Persia , followed the pattern of the second in marching the army via the Hellespont while the fleet paralleled them offshore. Near Artemisium , in the narrow channel between the mainland and Euboea , the Greek fleet held off multiple assaults by the Persians, the Persians breaking through a first line, but then being flanked by the second line of ships. But the defeat on land at Thermopylae forced a Greek withdrawal, and Athens evacuated its population to nearby Salamis Island. The ensuing Battle of Salamis was one of the decisive engagements of history. Themistocles trapped the Persians in a channel too narrow for them to bring their greater numbers to bear, and attacked them vigorously, in the end causing the loss of Persian ships vs 40 Greek. Aeschylus wrote a play about the defeat, The Persians , which was performed in a Greek theatre competition a few years after the battle. It is the oldest known surviving play. At the end, Xerxes still had a fleet stronger than the Greeks, but withdrew anyway, and after losing at Plataea in the following year, returned to Asia Minor , leaving the Greeks their freedom. Nevertheless, the Athenians and Spartans attacked and

burned the laid-up Persian fleet at Mycale , and freed many of the Ionian towns. The opponent would try to maneuver and avoid contact, or alternately rush all the marines to the side about to be hit, thus tilting the boat. When the ram had withdrawn and the marines dispersed, the hole would now be above the waterline and not a critical injury to the ship. During the next fifty years, the Greeks commanded the Aegean, but not harmoniously. Naval strategy was critical; Athens walled itself off from the rest of Greece, leaving only the port at Piraeus open, and trusting in its navy to keep supplies flowing while the Spartan army besieged it. This strategy worked, although the close quarters likely contributed to the plague that killed many Athenians in BC. But the end came for Athens in BC at Aegospotami in the Hellespont , where the Athenians had drawn up their fleet on the beach, and were surprised by the Spartan fleet, who landed and burned all the ships. Athens surrendered to Sparta in the following year. A Roman naval bireme depicted in a relief from the Temple of Fortuna Primigenia in Praeneste Palastrina , [2] which was built c. Navies next played a major role in the complicated wars of the successors of Alexander the Great. The Roman Republic had never been much of a seafaring nation, but it had to learn. In the Punic Wars with Carthage , Romans developed the technique of grappling and boarding enemy ships with soldiers. The Roman Navy grew gradually as Rome became more involved in Mediterranean politics; by the time of the Roman Civil War and the Battle of Actium 31 BC , hundreds of ships were involved, many of them quinqueremes mounting catapults and fighting towers. Without any significant maritime enemies, the Roman navy was reduced mostly to patrolling for pirates and transportation duties. It was only on the fringes of the Empire, in newly gained provinces or defensive missions against barbarian invasion, did the navy still engage in actual warfare. Europe, West Asia and North Africa[edit] While the barbarian invasions of the 4th century and later mostly occurred by land, some notable examples of naval conflicts are known. In the late 3rd century, in the reign of Emperor Gallienus , a large raiding party composed by Goths, Gepids and Heruli, launched itself in the Black Sea, raiding the coasts of Anatolia and Thrace, and crossing into the Aegean Sea, plundering mainland Greece including Athens and Sparta and going as far as Crete and Rhodes. In the twilight of the Roman Empire in the late 4th century, examples include that of Emperor Majorian , who, with the help of Constantinople, mustered a large fleet in a failed effort to expel the Germanic invaders from their recently conquered African territories, and a defeat of an Ostrogothic fleet at Sena Gallica in the Adriatic Sea. During the Muslim conquests of the 7th century, Arab fleets first appeared, raiding Sicily in see History of Islam in southern Italy and Emirate of Sicily , and defeating the Byzantine Navy in Constantinople was saved from a prolonged Arab siege in by the invention of Greek fire , an early form of flamethrower that was devastating to the ships in the besieging fleet. These were the first of many encounters during the Byzantine-Arab Wars. The Islamic Caliphate , or Arab Empire , became the dominant naval power in the Mediterranean Sea from the 7th to 13th centuries, during what is known as the Islamic Golden Age. One of the most significant inventions in medieval naval warfare was the torpedo , invented in Syria by the Arab inventor Hasan al-Rammah in His torpedo ran on water with a rocket system filled with explosive gunpowder materials and had three firing points. It was an effective weapon against ships. The Vikings raided places along the coastline of England and France, with the greatest threats being in England. They would raid monasteries for their wealth and lack of formidable defenders. They also utilized rivers and other auxiliary waterways to work their way inland in the eventual invasion of Britain. They wreaked havoc in Northumbria and Mercia and the rest of Anglia before being halted by Wessex. King Alfred the Great of England was able to stay the Viking invasions with a pivotal victory at the Battle of Edington. Alfred defeated Guthrum, establishing the boundaries of Danelaw in an treaty. Kenneth Harl has pointed out that as few as eleven ships were sent to combat the Vikings, only two of which were not beaten back or captured. This was normally done by binding the ships on each side together, thus essentially fighting a land battle on the sea. However the fact that the losing side could not easily escape meant that battles tended to be hard and bloody. The Battle of Svolder is perhaps the most famous of these battles. As Arab power in the Mediterranean began to wane, the Italian trading towns of Genoa , Pisa , and Venice stepped in to seize the opportunity, setting up commercial networks and building navies to protect them. At first the navies fought with the Arabs off Bari in , at Messina in , but then they found themselves contending with Normans moving into Sicily, and finally with each other. The Genoese and Venetians fought four naval wars, in â€”, â€”, â€”,

and the last ended with a decisive Venetian victory, giving it almost a century to enjoy Mediterranean trade domination before other European countries began expanding into the south and west. In the north of Europe, the near-continuous conflict between England and France was characterised by raids on coastal towns and ports along the coastlines and the securing of sea lanes to protect troop-carrying transports. The Battle of Dover in 1213, between a French fleet of 80 ships under Eustace the Monk and an English fleet of 40 under Hubert de Burgh, is notable as the first recorded battle using sailing ship tactics. The battle of Arnemuiden 23 September 1338, which resulted in a French victory, marked the opening of the Hundred Years War and was the first battle involving artillery. The vessels appear to be propelled by a score of oars and armed with one bombard and a smaller culverin. The roof is recorded to be protected with hide or bronze plates against projectiles. The Sui and Tang dynasties of China were involved in several naval affairs over the triple-set of polities ruling medieval Korea Three Kingdoms of Korea, along with engaging naval bombardments on the peninsula from Asuka period Yamato Kingdom Japan. Two decades later, he returned with a copy of the Quran, establishing the first Islamic mosque in China, the Mosque of Remembrance in Guangzhou. A rising rivalry followed between the Arabs and Chinese for control of trade in the Indian Ocean. Rajaraja Chola I reigned to 1014 and his son Rajendra Chola I reigned 1014-42, sent a great naval expedition that occupied parts of Myanmar, Malaya, and Sumatra. The Cholas were the first rulers noted to have a naval fleet in the Indian subcontinent; there are at least two evidences to cite use of navies. Narasimhavarman Pallava I transported his troops to Sri Lanka to help Manavarman to reclaim the throne. Shatavahanas was known to possess a navy that was widely deployed to influence Southeast Asia, however the extent of their use is not known. Some argue that there is no evidence to support naval warfare in a contemporary sense. Others say that ships routinely carried bands of soldiers to keep pirates at bay. However, since the Arabs were known to use catapults, naphtha, and devices attached to ships to prevent boarding parties, one may conclude that Chola navies not only transported troops but also provided support, protection, and attack capabilities against enemy targets. This came about after the conquest of northern China by the Jurchen people see Jin dynasty in 1127, while the Song imperial court fled south from Kaifeng to Hangzhou. There were naval engagements at the Battle of Caishi and Battle of Tangdao. Until 1279, the Song were able to use their naval power to defend against the Jin to the north, until the Mongols finally conquered all of China. The Yuan emperor Kublai Khan attempted to invade Japan twice with large fleets of both Mongols and Chinese, in 1274 and again in 1281, both attempts being unsuccessful see Mongol invasions of Japan. Building upon the technological achievements of the earlier Song dynasty, the Mongols also employed early cannons upon the decks of their ships. While Song China built its naval strength, the Japanese also had considerable naval prowess. The strength of Japanese naval forces could be seen in the Genpei War, in the large-scale Battle of Dan-no-ura on 25 April 1185. The forces of Minamoto no Yoshitsune were ships strong, while Taira no Munemori had ships. In the mid-th century, the rebel leader Zhu Yuanzhang seized power in the south amongst many other rebel groups. His early success was due to capable officials such as Liu Bowen and Jiao Yu, and their gunpowder weapons see Huolongjing. Yet the decisive battle that cemented his success and his founding of the Ming dynasty was the Battle of Lake Poyang, considered one of the largest naval battles in history. In the 15th century, the Chinese admiral Zheng He was assigned to assemble a massive fleet for several diplomatic missions abroad, sailing throughout the waters of the South East Pacific and the Indian Ocean.

Chapter 2 : Living Conditions in the 19th Century US Navy

He then describes the revolutions that followed in naval ordnance, propulsion, iron hulls, and underwater warfare and reviews the naval situation before the First World War, showing how changes played out in the Sino-Japanese, Russo-Japanese, and Spanish-American Wars.

From early times, the substantial carrying capacity of the warship made it an indispensable element in its own logistic support, particularly in the era before steam power eliminated the problem of covering long distances between ports. Tactical science is an orderly description of these activities, and tactical art is the skill required to carry them out in combat. The search for constants It should be said that, in order to achieve victory, willpower and courage must always accompany tactical art and science and often dominate the outcome of battle. These qualities are not tactics, but they are related to tactics in the way a sound decision is related to the resolution with which it is implemented. There is no finer example than Horatio Nelson. In a similar manner, new technology is not tactics, but it may have a decisive effect in both altering the face of battle and affecting its outcome. Navies put special emphasis on warships and aircraft. It is well said that on the ground men are served by their weapons while at sea weapons are served by men. He pointed out that in the American Civil War the Confederate ironclad Virginia, with 10 guns, handily defeated the Union sloop-of-war Congress and Cumberland, which carried a total of 74 guns. Courage and resolve were powerless against progress and armour. Tacticians, on the other hand, are conscious of tactical constants as well, especially the following: The study of trends Naval officers also study history for its trends, because trends are the only clue as to how tactics are changing and are the best check against the fatal sin of preparing to fight the last war. The trend that has influenced all else in the conduct of naval battle is the increasing range and lethality of naval weapons. Paradoxically, greater lethality has not led a trend toward greater loss of life. The first reason is that, unlike ground combat, the principal aim at sea is to put the fighting machine, not the fighting man, out of action, and modern machines are thus far sensitive to damage. Second, it is a long-standing constant that naval battles, once joined, are fast-moving and decisive. To sketch how the range of weapons has affected naval tactics, a simple structure that describes the processes of combat must be established. First is firepower delivery itself. Second is the scouting process, which gathers information by reconnaissance, surveillance, cryptanalysis, and other means and delivers it to the tactical commander. Third is command itself—or command and control C2 in modern parlance—which assimilates the information, decides which actions are called for, and directs forces to act accordingly. Combat being the activities of force against force, there is a natural antithesis to all three processes described above. Second, when scouting was accomplished by ships or aircraft flung out ahead of a formation, information denial was accomplished by screening—that is, by flinging out an opposing line of ships and aircraft. Third, enemy C2 can be confused by deceptive signals or decoy forces. It can also be crippled or delayed by electronically jamming enemy communications. The six processes described above—namely, firepower delivery, scouting, C2, and the three countermeasures against them—as well as maneuver, are the raw materials of naval tactics. To achieve success, they are synthesized into a harmonious blend of action and counteraction. For example, a modern naval screen of ships or aircraft defends a formation both by destroying enemy aircraft or missiles and by denying tactical information. The screen itself may even be so central in importance that it becomes the focus of enemy attack, with destruction of the screen being tantamount to destruction of the force. Thus, the study of naval tactics has become more than the study of formations, firepower, and maneuvers. Tactics in the modern era The study of tactics has always emphasized actions between fleets that gain or challenge control of the sea lines of communications. That traditional emphasis is retained here, but in the 20th century three other types of combat at sea have demanded greater attention. War from land to sea and from sea to land While navies have always had as their ultimate objective an influence over events on land, aircraft and missiles have extended the range and amplified the influence. Likewise, land-based systems have made their growing influence felt on warships and sea-lanes alike. Putting ground forces ashore from the sea by amphibious landing is an operation that has neither gained nor lost importance since the earliest galley warfare, but modern combined-arms tactics are quite different and require

separate attention. A by-product of the extended range of modern weapons is the greater complexity of joint operations. The reorganization of many armed forces has been in large measure a response to the demand for well-coordinated operations. Nuclear weapons The United States , the Soviet Union , the United Kingdom, France , and China keep a considerable strategic deterrent force at sea in the form of submarine-launched ballistic missiles. The safeguarding or threatening of nuclear submarines has inspired a set of tactics unique in history. This does not mean that such tactics, if ever used, will prove unsound. During the great transition from sail to steam and big gun, keen study by naval tacticians throughout the world developed the sound tactics that were finally practiced in World War I. Raiding War against trade is the war of an inferior navy that cannot compete for command of the sea but that, instead, dispatches raiders to deny the enemy its free use. These tactics of sea denial are those of predator and prey, of hunter and evader, and are as unique from the force-on-force tactics of major sea battles as are guerrilla war tactics from those of decisive land battle. With the maturity of submarines, these tactics have become so important that a separate section is devoted to them see below Guerrilla war at sea: Historical development In the following examination of the history of naval tactics, a shift in importance between elements of combat will be apparent. In galley warfare, sheer power dominated the outcome, and maneuver of numerous small ships, much as on land, contributed to its concentration. In warfare under sail, great firepower could be concentrated in individual ships, and doctrine, formations, and signal flags were means of controlling the slow-moving, wind-constrained formations. With battleships, steam power gave freedom to maneuver in any direction, and the range of the big guns allowed a concentration of fire from the whole formation. The defensive element came to prominence, symbolized by armour. Tactical decisions had to be made before the enemy was in sight, so that scouting became more evident as a tactical ingredient. Control had to be exercised over much greater distances, which expanded the possibilities of exploiting the means of control, notably through radio direction finding and code breaking. The growth in the tactical influence of scouting, anti-scouting, command and control, and countermeasures against command and control continued through the era of the aircraft carrier and into the era of the guided missile. These elements have become as important to tactical success at sea as firepower, consuming comparable thought and resources. The age of galley warfare Galleys being relatively unseaworthy, war at sea among the ancients was always near land. Pictures of billowing sails notwithstanding, masts and canvas were stowed for battle, and oars were the means of propulsion. The most destructive weapon was a ram in the bow, which dictated a line abreast as the tactical formation. In the line abreast, two lines of opposing galleys approached each other head on, with the ram of each vessel unobstructed by the ships on either side. Multiple banks of oars afforded speed, and the geometry of their arrangement fascinated naval architect-historians of later eras. Major battles comprised hundreds of ships on a side. Battles occurred because of the threat of invasion, so that many armed men were present. These participated as archers or boarders. Rome developed grappling hooks and the corvus a long boarding plank spiked at the end to secure the victim ship while disciplined legionnaires fought their way on board. Scouting the enemy formation was a subordinate issue, although contemporary descriptions indicated that formations and maneuvers, showing ingenuity and cunning, played a large part in the outcomes. Since battles were nearly impossible in foul weather, good visibility permitted the deployment of the lines abreast, often in two echelons, much as the commander intended. Descriptions of the battles and the period was rich in them were usually couched in the terms of land warfareâ€”such as the routing of a flank, or an attempt to crush by encirclement. Galley tactics were so similar to land tactics that a reserve was actually held backâ€”a practice that ever afterward was regarded in navies as a mistake. An inference cannot be drawn that a commander had tight control of his ships in action, however, and the correct image of a galley battle would be that of a wild melee, with oars smashed, hulls crushed, armour-clad soldiers drowned, losses enormous, and battles decisive with lasting consequences. The ultimate battle under oar was at Lepanto on October 7, 1571. By this time, three to five guns were fitted in the bows of galleys, and harquebuses were fired by Spanish soldiers. But, as was usual in galley warfare, the outcome was decided by boarding and hand-to-hand fighting with sword and pike. The Christian fleet under Don John of Austria prevailed in a bitterly contested donnybrook; losses to the Turks were placed at 30, killed, against 8, among the victors. The age of fighting sail By the middle of the 17th century guns arrayed along the sides of fighting ships were the decisive weapon.

Thus, the shift to sail was a victory of fighting strength over maneuver. The column, or line ahead, became the logical tactical formation for bringing the most guns to bear. With all the ships of a battle line following one another, their guns could face the enemy line without obstruction. The three Anglo-Dutch Wars of 1666-74 saw the first closely studied battles of sail and gun. In them the column was as much a means for command and control as it was for concentration of fighting force, for as long as a fleet maintained station in line ahead, each ship separated by a scant or yards, cohesion was assured, maneuvers were coordinated, and any malingering by reluctant captains was obvious. The line was not a formation that permitted the concentration of fire, however, for naval guns in a rolling platform were effectively accurate at only about one-quarter of a mile, and the range for penetrability of shot was even less. In effect, engagements were decided within pistol shot, a battle line being a thin ribbon of death, miles long but scarcely yards wide. When the English fought the Dutch in the 17th century, this was not considered a problem, because the tactics of both sides called for closing with the other aggressively. But in the 18th century their French opponents felt that their strategic interests lay in avoiding battle at close quarters, and in the Anglo-French wars the Royal Navy endured a long period of indecisive actions handicapped by a tactical doctrine so rigidly interpreted by courts-martial as to have become tactical dogma. These Fighting Instructions, though soundly conceived when first issued in 1757, were unsuited to this new opponent, for the implementing system of signals was unimaginative and constraining. Toward the end of the 18th century, the British admiral Richard Kempenfelt began to unshackle the Royal Navy with a better system of signaling. The new freedom of maneuver came finally and forever to be embodied in the tactical genius and personal inspiration of Horatio Nelson, whose matchless victories at the battles of the Nile, Copenhagen April 2, 1801, and Trafalgar October 21, 1805, drew the enduring admiration of naval tacticians. Tactical study during this era concentrated on maneuver. Popular aims were raking firing a broadside the length of an enemy ship from across the bow or stern or doubling concentrating force by putting ships on both sides of the enemy line. The most reliable way to concentrate gunfire was to build it into ships vertically by stacking gun decks one over the other. Later tacticians demonstrated analytically what every fighting seaman of the seafaring era knew instinctively: The age of steam and big gun Tactics and technology complement each other, and there is no better period in history for studying their interrelationship than the shift from sail to steam in the 19th century. The shell gun raised to naval attention during the Crimean War by the Battle of Sinope, November 30, 1853, compelled navies to adopt the iron sheathing of hulls. This pointed the way to all-metal hulls iron, then steel, which in turn both permitted and demanded as a response the installation of rifled, breech-loaded guns of major calibre. Concurrently, iron boilers and screw propellers made steam propulsion practical and gave great new freedom of maneuver. Navies were unfettered tactically from the wind, but only at the strategic price of having to remain within steaming range of coaling stations. The sweeping consequences of these and other technological innovations lacked the crucible of war in which to test them, for it was an era of Pax Britannica, with the maritime peace kept by the Royal Navy. The Monitor and the Virginia at the battle of Hampton Roads, March 9, 1862, marked the short-lived ascendancy of armour and the defense. This led to a brief revival of the ram and to some very speculative tactical concepts that looked outrageous in later days. But the superiority of defense at sea did not last long. The tactical-technical turning point came from the observation of a few battles in East Asia around the turn of the century and from an often overlooked bit of military technology. By World War I the tactical issues were settled. First, big guns would dominate, a burly battleship firing a battery of them in broadside.

Chapter 3 : Handbook of the 19th Century Naval Warfare : Spencer C Tucker :

Get this from a library! Handbook of 19th century naval warfare. [Spencer Tucker] -- "The Napoleonic Wars at the beginning of the century saw the zenith of the age of fighting sail, with wooden-hulled vessels mounting muzzle-loading guns firing projectiles weighing up to 68 lb.

Naval warfare The sinking of the Cumberland by the Confederate ironclad Virginia in marked the beginning of the end for wooden warships. Ironclads and Dreadnoughts[edit] The period after the Napoleonic Wars was one of intensive experimentation with new technology; steam power for ships appeared in the s, improved metallurgy and machining technique produced larger and deadlier guns, and the development of explosive shells, capable of demolishing a wooden ship at a single blow, in turn required the addition of iron armor, which led to ironclads. Although the battle was inconclusive, nations around the world subsequently raced to convert their fleets to iron, as ironclads had shown themselves to be clearly superior to wooden ships in their ability to withstand enemy fire. Mahan argued that in the Anglo-French wars of the 18th and 19th centuries, domination of the sea was the deciding factor in the outcome, and therefore control of seaborne commerce was critical to military victory. Mahan argued that the best way to achieve naval domination was through large fleets of concentrated capital ships , as opposed to commerce raiders. His books were closely studied in all the Great Powers, influencing their naval arms race in the years prior to WWI. In the British warship HMS Dreadnought became the first warship to have both a uniform main battery and steam turbine engines, creating a standard for warships that lasted until the s. As the century came to a close, the familiar modern battleship began to emerge; a steel -armored ship, entirely dependent on steam, and sporting a number of large shell guns mounted in turrets arranged along the centerline of the main deck. The ultimate design was reached in with HMS Dreadnought which entirely dispensed with smaller guns, her main guns being sufficient to sink any existing ship of the time. The Russo-Japanese War and particularly the Battle of Tsushima in was the first test of the new concepts, resulting in a stunning Japanese victory and the destruction of dozens of Russian ships. Following the war, many nations agreed to limit the size of their fleets in the Washington Naval Treaty and scrapped many of their battleships and cruisers. Growing tensions of the s restarted the building programs, with even larger ships than before: This marked the climax of "big gun" warfare, as aircraft would gradually play a larger role in warfare. By the s, battleships had all-but vanished from the fleets of the world. Aircraft carriers[edit] In the s aircraft carriers supplanted battleships as the centerpiece of the fleet. Here, American torpedo bombers prepare to take off during the Battle of Midway in Between the world wars, the first aircraft carriers appeared, initially as a way to circumvent the tonnage limits of the Washington Naval Treaty many of the first carriers were converted battlecruisers. Though several ships had previously been designed to launch and in some cases, the first true "flat-top" carrier was HMS Argus , launched in December By the start of WWII, aircraft carriers typically carried three types of aircraft: Because of the restricted space on aircraft carriers, these aircraft were almost always small, single-engined warplanes. Following WWII, aircraft carriers continued to remain key to navies throughout the latter 20th century, moving in the s to jets launched from Supercarriers , behemoths which could displace as much as , tons. Submarines[edit] Just as important was the development of submarines to travel underneath the sea, at first for short dives, then later to be able to spend weeks or months underwater powered by a nuclear reactor. The first successful submarine attack in wartime was in by the Confederate submarine H. Hunley which sank the frigate USS Housatonic. In both World Wars, submarines primarily exerted their power by sinking merchant ships using torpedoes , in addition to attacks on warships. In the s the Cold War inspired the development of ballistic missile submarines, each one loaded with dozens of nuclear-armed missiles and with orders to launch them from sea should the other nation attack.

Chapter 4 : Military Manuals of the 18th and 19th Centuries

Well illustrated account of a crucial period in naval history, when greate technological advances were made in almost every area of maritime military activity. From the fighting sail of the napolionic wars to the steel warships of the century's end.

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