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Chapter 1 : 12 Technological Advancements of World War I | Mental Floss

A specialist on armoured vehicles has produced this book on tank technology. Richard M. Ogorkiewicz examines the major aspects of tank design, from the ballistics of tank guns and fire control systems, tank engines, steering systems and suspensions to the various types of armour.

See Article History Alternative Titles: The M4 General Sherman was the most widely used tank series among the Western Allies , being employed not only by the U. A total of 49, Sherman tanks were produced in 11 plants between and When World War II began in , the United States lagged far behind the major European states in the development of tank technology and armoured warfare doctrine. The fall of France in May awoke and alarmed the United States. The German army had defeated France in a matter of weeks through the use of a new operational doctrine based on fast-moving, massed armoured formations supported by air power. Army needed a new main battle tank at least equal to that employed by the Germans and that it had to adopt German operational doctrine. To that end, in July the War Department authorized the development of a new medium tank, and it also authorized the organization of the first armoured divisions. By the time the Japanese attacked Pearl Harbor in , the United States had five armoured divisions organizing and training for war in Europe. The British fought with this tank in North Africa as early as The M3 was the result of a crisis atmosphere that was prevalent immediately following the fall of France. It is likely that no tank in history ever went from design to production faster than the General Grant. Its major defect was its gun mount: However, the M3 was only an interim measure. Production ceased in late , when the M4 went into full production. Library of Congress, Washington, D. Its designers consciously emphasized speed and mobility, limiting the thickness of the armour and the size of the main gun, thereby compromising on firepower and survivability. The tank had a maximum speed of 38 to 46 km 24 to 29 miles per hour and a range of to km to miles , depending on the series M4 to M4A3E2. The vehicle weighed about 33 tons, depending on the series. A typical power plant was a horsepower gasoline engine. Sherman tankSherman tank with a mm gun. It was roughly in the same class as early versions of the German Pz. IV panzer , which at that time weighed 25 tons, had a top road speed of 40 km 25 miles per hour, and mounted a mm gun. Later-model German tanks were much improved, so that by the time of the Normandy Invasion in June the M4 was outclassed by superior tanks such as the Pz. V Panther and the Pz. The American penchant for mass production tended to stymie innovations in technology, and American doctrinal thinking tended to remain stuck in the prewar period, when the tank was seen as primarily an infantry support weapon. The M4 had a faster rate of fire and greater speed, but both the Panther and the Tiger had significantly greater range and accuracy. The German tanks were also more survivable. Consequently, it took superior numbers for Anglo-American forces to defeat German armoured formations. For the Normandy Invasion and subsequent campaigns on the Continent, the M4 was retrofitted with special-purpose devices by both the Americans and the British. The British added flails a system of rotors and chains to clear paths through minefields, and American servicemen added jury-rigged plows for breaking through hedgerows in the bocage country of Normandy.

Chapter 2 : Technology during World War I - Wikipedia

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Technological progress was swift, leading to ground attack, tactical bombing , and highly publicized, deadly dogfights among aircraft equipped with forward-firing, synchronized machine guns from July onwards. However, these uses made a lesser impact on the war than more mundane roles in intelligence, sea patrol and especially artillery spotting. Antiaircraft warfare also had its beginnings in this war. As with most technologies, aircraft and their use underwent many improvements during World War I. As the initial war of movement on the Western Front settled into trench warfare, aerial reconnaissance over the front added to the difficulty of mounting surprise attacks against entrenched and concealed defenders. Manned observation balloons floating high above the trenches were used as stationary observation posts, reporting enemy troop positions and directing artillery fire. Balloons commonly had a crew of two, each equipped with parachutes: At the time, parachutes were too heavy to be used by pilots in aircraft, and smaller versions would not be developed until the end of the war. In the British case, there arose concerns that they might undermine morale , effectively encouraging cowardice. Recognized for their value as observer platforms, observation balloons were important targets of enemy aircraft. To defend against air attack, they were heavily protected by large concentrations of antiaircraft guns and patrolled by friendly aircraft. While early air spotters were unarmed, they soon began firing at each other with handheld weapons. An arms race commenced, quickly leading to increasingly agile planes equipped with machine guns. As the stalemate developed on the ground, with both sides unable to advance even a few miles without a major battle and thousands of casualties, planes became greatly valued for their role gathering intelligence on enemy positions. They also bombed enemy supplies behind the trench lines, in the manner of later attack aircraft. Large planes with a pilot and an observer were used to reconnoiter enemy positions and bomb their supply bases. These large and slow planes made easy targets for enemy fighter planes, who in turn were met by fighter escorts and spectacular aerial dogfights. Germany led the world in Zeppelins , and used these airships to make occasional bombing raids on military targets, London and other British cities, without great effect. Later in the war, Germany introduced long range strategic bombers. Damage was again minor but they forced the British air forces to maintain squadrons of fighters in England to defend against air attack, depriving the British Expeditionary Force of planes, equipment, and personnel badly needed on the Western front. The Allies made much smaller efforts in bombing the Central Powers. Tanks in World War I Although the concept of the tank had been suggested as early as the s, few authorities showed interest in them until the trench stalemate of World War I caused reconsideration. The British Royal Navy and French industrialists invented tanks. In Britain, a landships committee was formed, and teamed with the inventions committee, set out to develop a practical weapon. Based on the caterpillar track first invented in and perfected in the early s and the four-stroke gasoline powered internal combustion engine refined in the s , early World War One tanks were fitted with Maxim type guns or Lewis guns , armor plating, and caterpillar tracks configured to allow crossing of an 8-foot-wide 2. Early tanks were unreliable, breaking down often. Though at first they terrified the Germans, their use in the engagements of provided more opportunities for development than actual battle successes. It was also realized that new tactics had to be developed to best make use of this weapon. In particular, planners learned that tanks needed infantry support and massed formations to be effective. Once tanks could be fielded in the hundreds, as in the opening assault of the Battle of Cambrai in November , they began to show their potential. German artillerymen quickly learned how to counter them, in small numbers. Still, reliability was the primary weakness of tanks throughout the remainder of the war. In the Battle of Amiens , a major Entente counteroffensive near the end of the war, British forces went to field with tanks. After several days, only a few were still in commission, with those that suffered mechanical difficulties outnumbering those disabled by enemy fire. Despite rapidly increasing French production, their numbers remained too small to make more than a modest impact on the progress of the war in Germany used a few captured enemy tanks, and made a

few. Plan outlined the future use of massive tank formations in great offensives combined with ground attack aircraft. Regardless of their effects on World War I, tank technology and mechanized warfare had been launched and grew increasingly sophisticated in the years following the war. By World War II , the tank had evolved into a fearsome weapon and restored mobility. Naval warfare of World War I The years leading up to the war saw the use of improved metallurgical and mechanical techniques to produce larger ships with larger guns and, in reaction, more armor. The launching of HMS Dreadnought revolutionized battleship construction, leaving many ships obsolete before they were completed. However, even this high-technology navy entered the war with a mix of newer ships and obsolete older ones. The advantage was in long-range gunnery, and naval battles took place at far greater distances than before. The Battle of Jutland demonstrated the excellence of German ships and crews, but also showed that the High Seas Fleet was not big enough to challenge openly the British blockade of Germany. It was the only full-scale battle between fleets in the war. Having the largest surface fleet, the United Kingdom sought to press its advantage. British ships blockaded German ports, hunted down German and Austro-Hungarian ships wherever they might be on the high seas, and supported actions against German colonies. The German surface fleet was largely kept in the North Sea. This situation pushed Germany, in particular, to direct its resources to a new form of naval power: Naval mines were deployed in hundreds of thousands, or far greater numbers than in previous wars. Submarines proved surprisingly effective for this purpose. Influence mines were a new development but moored contact mines were the most numerous. They resembled those of the late 19th century, improved so they less often exploded while being laid. The Allies produced enough mines to build the North Sea Mine Barrage to help bottle the Germans into the North Sea , but it was too late to make much difference. Submarines[edit] World War I was the first conflict in which submarines were a serious weapon of war. In the years shortly before the war, the relatively sophisticated propulsion system of diesel power while surfaced and battery power while submerged was introduced. Their armament had similarly improved, but few were in service. Germany had already increased production, and quickly built up its U-boat fleet, both for action against British warships and for a counterblockade of the British Isles. The resulting U-boat Campaign World War I destroyed more enemy warships than the High Seas Fleet had, and hampered British war supplies as the more expensive surface fleet had not. The United Kingdom relied heavily on imports to feed its population and supply its war industry, and the German Navy hoped to blockade and starve Britain using U-boats to attack merchant ships. Lieutenant Otto Weddigen remarked of the second submarine attack of the Great War: These reports were absolutely untrue. U-9 was the only submarine on deck, and she flew the flag she still flies â€” the German naval ensign. They could not impose an effective blockade while acting under the restrictions of the prize rules and international law of the sea. They resorted to unrestricted submarine warfare , which cost Germany public sympathy in neutral countries and was a factor contributing to the American entry into World War I. This struggle between German submarines and British counter measures became known as the " First Battle of the Atlantic ". As German submarines became more numerous and effective, the British sought ways to protect their merchant ships. Consolidating merchant ships into convoys protected by one or more armed navy vessels was adopted later in the war. There was initially a great deal of debate about this approach, out of fear that it would provide German U-boats with a wealth of convenient targets. Thanks to the development of active and passive sonar devices, [7] coupled with increasingly deadly anti-submarine weapons , the convoy system reduced British losses to U-boats to a small fraction of their former level. Mobility[edit] Between late and early , the Western Front hardly moved. The beginning of the end for Germany was a huge German advance. In , when Russia surrendered after the October Revolution , Germany was able to move many troops to the Western Front and launch Operation Michael. Using new stormtrooper tactics developed by Oskar von Hutier , the Germans pushed forward some tens of kilometers from March to July These offensives showed that machine guns, barbed wire and trenches were not the only obstacles to mobile warfare. The Australian and Canadian divisions that spearheaded the attack managed to advance 13 kilometers on the first day alone. These battles marked the end of trench warfare on the Western Front and a return to mobile warfare. The sort of unit that now began to emerge combined cyclist infantry and machine guns mounted on motor cycle sidecars. These motor machine gun units had originated in [1]. In Berlin , Kaiser Wilhelm was told Germany had lost,

and must now surrender. Advances continued but political developments inside Germany compelled Germany to sign an armistice on November 11, The war was over, but a new mobility-driven form of warfare was beginning to emerge; one that would be mastered by the defeated Germans and deployed in as their blitzkrieg , or "lightning warfare", embodying all they had learned in Small arms[edit] French machine gunners defend a ruined cathedral, late in the war Infantry weapons for major powers were mainly bolt action rifles, capable of firing ten or more rounds per minute. German soldiers carried Gewehr 98 rifle in 8mm mauser, while the British carried the Short Magazine Leeâ€"Enfield rifle. The machine gun was useful in stationary battle but was not practical for easy movement through battlefields, and therefore forced soldiers to face enemy machine guns without machine guns of their own. Before the war, the French Army studied the question of a light machine gun but had made none for use. At the start of hostilities, France quickly turned an existing prototype the "CS" for Chauchat and Sutter into the lightweight Chauchat M automatic rifle with a high rate of fire. Besides its use by the French, the first American units to arrive in France used it in and Hastily mass-manufactured under desperate wartime pressures, the weapon developed a reputation for unreliability. The Lewis gun was the first true light machine gun that could in theory be operated by one man, though in practice the bulky ammo pans required an entire section of men to keep the gun operating. Grenades[edit] Grenades proved to be effective weapons in the trenches. When the war started, grenades were few and poor. Hand grenades were used and improved throughout the war. Contact fuzes became less common, replaced by time fuzes. The British entered the war with the long-handled impact detonating "Grenade, Hand No 1". An improvised hand grenade was developed in Australia for use by ANZAC troops called the Double Cylinder "jam tin" which consisted of a tin filled with dynamite or guncotton , packed round with scrap metal or stones. To ignite, at the top of the tin there was a Bickford safety fuse connecting the detonator, which was lit by either the user, or a second person. Its improved fusing system relied on the soldier removing a pin and while holding down a lever on the side of the grenade. When the grenade was thrown the safety lever would automatically release, igniting the grenades internal fuse which would burn down until the grenade detonated.

Chapter 3 : World War II for Kids: Technology

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This is the nd installment in the series. However, the new Italian commander, Armando Diazâ€”determined not to repeat the dramatic failures of his disgraced predecessor, Luigi Cadornaâ€”delayed until it became clear that the Allies were about to win the war on the Western Front, leaving Italy little time to stake its own claims. Ending the war with Habsburg troops still deep inside Italian borders would give Britain and France a perfect excuse to ignore Italian demands in the postwar settlement. To justify annexing formerly Austrian territory, Italy would have to conquer at least some of it. According to the plan finalized on October 12, a total of 33 divisions, including British and French units, would attack all along the Italian front. Erik Sass While the Allies enjoyed major advantages in manpower, artillery, and air power, the offensive got off to a moderately disastrous startâ€”all too typically for the Italian frontâ€”due to a combination of inclement weather and poor leadership. The natural obstacles included a seasonal downpour that raised the Piave River to dangerous levels, making crossing the river even more dangerous than usual, as during the Austrian attack at the Second Battle of Piave. Even worse, Diaz failed to implement new tactics, sending the attacking infantry over in regularly spaced lines regardless of terrainâ€”a recipe for bloody defeats in many previous battles on the Italian front as well as in other theaters during the First World War. Instead of launching simultaneous attacks, the Fourth Army would attack the Austrian positions on Mount Grappa on October 24, , in advance of the main offensive across the Piaveâ€”hopefully outflanking defenders further east. However, after a punishing artillery bombardment, several British divisions in the Tenth Army finally managed to secure a bridgehead across the Piave as the river began to subside on the morning of October 27, forcing the battered Habsburg defenders to abandon their positions. This immediately triggered a general retreat by their neighboring units, now at risk of being outflanked. Erik Sass The retreat swiftly turned into a rout, followed by the total collapse of the remaining Habsburg forces. Tens of thousands of troops mutinied and demanded that they be allowed to return to their various homelands in the disintegrating Austro-Hungarian Empire to protect their families and property in case of widespread civil disorder top and below, Italian troops advancing. We have now heard that the whole 39th Regiment refused point-blank to go out to training, and demanded to be returned home to Hungary. This mutinous mood is spreading fast, and the soldiers of the whole of one company, ordered to proceed to the Front, refused to obey. He promised that all the men would maintain strict discipline, but that they would not go the front. We attempted all manner of persuasion, promising that if the war did not end within a week, we would ourselves go home with them. And indeed, the soldiers were as good as their word and duly mutinied. They gathered in groups to talk, to listen, to argue, to try to understand what was happening and, most important of all, to try to guess what would happen to them. What were the practical consequences of losing a war? What effect would it have on the combatants, on the people at home, on the Empire? The questions were many, the answers few. Finally, the officers dismissed the men, who were now more confused than ever. What did the vote mean? Why was it taken? What was the motive of the officers taking it? The men talked far into the night. It managed to bungle the surrender. On November 3, , Italian and Austro-Hungarian representatives agreed to an armistice whose conditions included the withdrawal of all Austro-Hungarian troops to an armistice line extending beyond the pre-war border in many placesâ€”putting Italian boots on the ground in Habsburg territory, as the Italian government had hoped. However, Austro-Hungarian officials neglected to tell their troops that the armistice would only take effect after 24 hours; as a result, the Italians continued advancing and capturing Habsburg troops who had already thrown down their weapons, thinking the fighting was over above, Habsburg POWs. Why, then, did the Italians continue their offensive? Had no one told them that the war was over? After the war the Italians were allowed to keep Trieste, but not the rest of the Adriatic coast, fueling the grievances of ultra-nationalists like Benito Mussolini , who felt that Italy had been robbed by its own allies. Whatever their feelings about the collapse of the empire they had been born in, the end of the war probably brought relief for most Habsburg soldiers who

escaped captivity. They streamed back to their ethnic homelandsâ€”now in the process of becoming new nation-states, including independent republics in Austria, Hungary, and Czechoslovakiaâ€”by the tens of thousands. However, the return journey remained perilous, as noted by Reiter, who had a surprisingly pleasant end of the war: I myself, in the company of one of my friends, rode happily on bicycles through the Alps for about 10 days, in glorious autumn weather, until we eventually came upon a train and were able to get seats to our home town. Most historians date the beginning of the German Revolution of to October 27, , with an uprising by sailors in the northern ports of Kiel and Wilhelmshaven, who mutinied rather than carry out a suicidal, purely symbolic last-minute attack by the German High Seas Fleet against superior Allied navies. The mutinies spread swiftly over the next few days, and by November 3 had assumed the character of a rebellion, as thousands of civilian residents of Kiel took to the streets in solidarity with the sailors, resulting in a number of deaths as police broke up the protests. On November 5 the national Social Democratic Party called for a general strike in support of the sailors. Germany faced a long period of political chaos, defined by internecine conflict approaching civil war between far-right and far-left paramilitaries. Georges Connes, a French POW held captive in eastern Germany, described the sudden reversal of roles within the ranks of the German military at the prison camp: When he appeared, as if it was an agreed upon signal; The entire station crew hurried out, throwing down the imperial insignia and saluting the republic â€¦ Still with revolvers in hand and followed by several men, the sailor went up to the command post, where officers appear to have shown no resistance. Herbert Sulzbach, a German officer, wrote in his diary on November 3, Richard Derby, an American division surgeon, described the renewed American attack in the Argonne: Every ravine within seven kilometers of the Front belched fire. The roads are soft after 24 hours of rain. The French are firing into the area with the vilest low-trajectory guns you could imagine, and at quite irregular intervals they put down sweeping fire with these heavy-caliber guns on all roads in the rear area. First, and not the least of the obstacles confronting us, was the problem of crossing the intervening canal, not by any means a simple matter in the face of enemy machine-gun fire, and his general determined resistance to our advance. As soon as our object was perceived, the Germans opened a raking fire on us, and took a heavy toll, as rafts were swamped, and wounded men drowned in the canalâ€¦ The price we paid was heavy, and dear, but we got over in the end. In the distance a particular expanse of land looked like a turnip field, but when we drew near we found the objects were not turnips. There the tragic, lifeless corpses lay, the price of our advance â€¦ The German dead were dragged unceremoniously from the road to the pavements for us to proceed. Their faces are lurid, amber-colored, and the bodies stiff like waxworks models. How cheap human life can become. Guy Bowerman, an American ambulance driver, was shaken by an encounter with a badly wounded German, whose leg was amputated without anesthesia in a small cottage on October 31, Never in my life have I seen anything which could compare to the pain and anguish in the face and every muscle of the body of that German. As we lifted him into the ambulance his huddled body expressed far better than words hisâ€”I know not whatâ€”could I describe what I saw there I would be a writerâ€”I only know that I saw something trajic [sic]â€”more than trajic something I cannot put into words.

Chapter 4 : Tanks: World of Tanks media, best videos and artwork

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French Hotchkiss H light tank of In the interwar period tanks underwent further mechanical development. In terms of tactics, J. Liddell Hart held a more moderate view that all arms â€" cavalry, infantry and artillery â€" should be mechanized and work together. The British formed the all-arms Experimental Mechanized Force to test the use of tanks with supporting forces. In the Second World War only Germany would initially put the theory into practice on a large scale, and it was their superior tactics and French blunders, not superior weapons, that made the "blitzkrieg" so successful in May The primary lesson learned from this war was that machine gun armed tanks had to be equipped with cannon, with the associated armour inherent to modern tanks. The five-month-long war between the Soviet Union and the Japanese 6th Army at Khalkhin Gol Nomonhan in brought home some lessons[which? In this conflict, the Soviets fielded over two thousand tanks, to the around 73 cannon armed tanks deployed by the Japanese, [35] the major difference being that Japanese armour were equipped with diesel engines as opposed to the Russian tanks equipped with petrol engines. In August , Soviet General Georgy Zhukov used the combined force of tanks and airpower at Nomonhan against the Japanese 6th Army; [38] Heinz Guderian , a tactical theoretician who was heavily involved in the formation of the first independent German tank force, said "Where tanks are, the front is", and this concept became a reality in World War II. Armoured forces proved capable of tactical victory in an unprecedentedly short amount of time, yet new anti-tank weaponry showed that the tank was not invulnerable. During the Invasion of Poland, tanks performed in a more traditional role in close cooperation with infantry units, but in the Battle of France deep independent armoured penetrations were executed by the Germans, a technique later called blitzkrieg. Blitzkrieg used innovative combined arms tactics and radios in all of the tanks to provide a level of tactical flexibility and power that surpassed that of the Allied armour. The French Army , with tanks equal or superior to the German tanks in both quality and quantity, employed a linear defensive strategy in which the armoured cavalry units were made subservient to the needs of the infantry armies to cover their entrenchment in Belgium. In accordance with blitzkrieg methods, German tanks bypassed enemy strongpoints and could radio for close air support to destroy them, or leave them to the infantry. A related development, motorized infantry , allowed some of the troops to keep up with the tanks and create highly mobile combined arms forces. The North African Campaign also provided an important battleground for tanks, as the flat, desolate terrain with relatively few obstacles or urban environments was ideal for conducting mobile armoured warfare. However, this battlefield also showed the importance of logistics , especially in an armoured force, as the principal warring armies, the German Afrika Korps and the British Eighth Army , often outpaced their supply trains in repeated attacks and counter-attacks on each other, resulting in complete stalemate. Battle of Kursk was the largest tank battle ever fought, with each side deploying nearly 3, tanks. In doing so, the Wehrmacht denied the infantry and other support arms the production priorities that they needed to remain equal partners with the increasingly sophisticated tanks, in turn violating the principle of combined arms they had pioneered. Sherman tanks joining the U. A compromise all round, the Sherman was reliable and formed a large part of the Anglo-American ground forces, but in a tank-versus-tank battle was no match for the Panther or Tiger. Tank hulls [46] were modified to produce flame tanks , mobile rocket artillery , and combat engineering vehicles for tasks including mine-clearing and bridging. The firepower and low cost of these vehicles made them attractive but as manufacturing techniques improved and larger turret rings made larger tank guns feasible, the gun turret was recognised as the most effective mounting for the main gun to allow movement in a different direction from firing, enhancing tactical flexibility. Tank design during the Cold War built on this foundation and included improvements to fire control , gyroscopic gun stabilisation, communications primarily radio and crew comfort and saw the

introduction of laser rangefinders and infrared night vision equipment. Armour technology progressed in an ongoing race against improvements in anti-tank weapons , especially antitank guided missiles like the TOW. Play media news report about tank warfare on the Golan Medium tanks of World War II, evolved into the main battle tank MBT of the Cold War and took over the majority of tank roles on the battlefield. This gradual transition occurred in the s and s due to anti-tank guided missiles , sabot ammunition and high explosive anti-tank warheads. For the same reason many upgraded post-World War II tanks and their derivatives for example, the T and T remain in active service around the world, and even an obsolete tank may be the most formidable weapon on battlefields in many parts of the world. The T, for example, has seen action in no fewer than 32 conflicts. In these wars the U. Proxy wars were studied by Western and Soviet military analysts and provided a contribution to the Cold War tank development process.

Chapter 5 : Tank Technology of WWI

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Its design can be drawn back to the eighteenth century. Sponsored Links Rather, a number of gradual technological developments brought the development of the tank as we know it closer until its eventual form was unveiled out of necessity by the British army - or rather, navy, since its initial deployment in World War One was, perhaps surprisingly, overseen by the Royal Navy. Evolution of the Tank A brief history lesson is in order. The caterpillar track, upon which the tank travelled, was designed in its crudest form in by Richard Edgeworth. Thus even in the s the development of the tank seemed tantalisingly close - except that its development dimmed until the turn of the century. With the development of the internal combustion engine by Nikolaus August Otto a tractor was constructed in the U. Next up was Frederick Simms. It boasted an engine by Daimler, a bullet-proof casing and armed with two revolving machine guns developed by Hiram Maxim. Offered to the British army it was - as had the machine gun before it - dismissed as of little use. Lombard of Penobscot County, Maine, produced and sold the first engine with crawler tracks in May A British army officer, Colonel Ernest Swinton , and the Secretary of the Committee for Imperial Defence, Maurice Hankey , remained enthusiastic about what they believed to be the enormous potential of the tank, not least in breaking through enemy trench defences. David Lloyd George who achieved the highest office by the end of the year and the current First Lord of the Admiralty, Winston Churchill who had to wait another 25 years before he finally became Prime Minister, in the next world war. During the demonstration the tractor successfully demonstrated its ability to cut through a barbed wire entanglement. Both Churchill and Lloyd George came away impressed by its potential. The name of the committee was derived from the fact that, at least initially, the tank was seen an extension of sea-going warships - hence, a landship. The Birth of the Landship - or Tank Together the Landships Committee and the Inventions Committee, working with Colonel Swinton, agreed to go ahead with the design of the new weapon, which at that time remained nameless. Swinton laid down certain key criteria that he argued must be part of the finished design. The tank must boast a minimum speed of four miles per hour, be able to climb a five foot high obstacle, successfully span a five foot trench, and - critically - be immune to the effects of small-arms fire. Furthermore, it should possess two machine guns, have a range of twenty miles and be maintained by a crew of ten men. Weighing some 14 tons and bearing 12 feet long track frames, the tank could carry three people in cramped conditions. In the event its top speed was three miles per hour on level ground, two miles per hour on rough terrain actual battlefield conditions in fact. This handicap was however soon remedied under the energetic enthusiasm of Colonel Swinton. The Role of the Royal Navy The tank was in many ways merely an extension of the principle of the armoured car. Armoured cars were popular on the Western Front at the start of the war, since at that stage it was very much a war of movement. Their use only dwindled with the onset of static trench warfare, when their utility was questionable. The navy had deployed squadrons of armoured cars to protect Allied airstrips in Belgium against enemy attack. Production of the Tank The first combat tank was ready by January and was demonstrated to a high-powered audience. Meanwhile the French, who were aware of British tank experimentation, proceeded with their own independent designs, although they remained somewhat sceptical as to its potential; their focus at the time was firmly on the production of ever more battlefield artillery. He managed to persuade the French Commander in Chief, Joseph Joffre , of the battlefield potential of the tank as an aid to the infantry. Chaumond tanks was placed, although they were not used until April History was made on 15 September when Captain H. Mortimore guided a D1 tank into action at the notorious Delville Wood. Shortly afterwards thirty-six tanks led the way in an attack at Flers. Although the attack was itself successful - the sudden appearance of the new weapon stunned their German opponents - these early tanks proved notoriously unreliable. In part this was because the British, under Commander in Chief Sir Douglas Haig , deployed them before they were truly battle ready in an attempt to break the trench stalemate. They often broke down and became ditched - i. Conditions for the tank crews were also far from ideal. The heat generated inside the tank was tremendous and

fumes often nearly choked the men inside. Nevertheless the first tank operators proved their mettle by operating under what amounted to appalling conditions. The first battle honour awarded to a tank operator went to Private A. In April the French deployed tanks in their Aisne Offensive along the Chemin-des-Dames; unfortunately however they did not distinguish themselves in this battle, once again proving highly unreliable more so than the early British models. They promptly sank in the mire and were entirely without benefit. Tank Successes In what many regard as the first truly successful demonstration of the potential of the tank, the entire British Tank Corps consisting of tanks saw action at the Battle of Cambrai on 20 November although the French can lay claim to its earlier successful use at Malmaison. In a sweepingly successful start to the battle twelve miles of the German front was breached, with the capture of 10, German prisoners, guns and machine guns. Unfortunately for the British this enormous initial success was effectively cancelled out in German counter-attacks because the British did not possess sufficient infantry troops to exploit the breach they had created. Nevertheless the successful use of tanks at Cambrai restored dwindling faith in tank development. It also acted as a stimulus to the curiously hesitant German army, who had expressed continuing doubts as to the battlefield value of the tank. They too began to hasten production of their own models, although they never pretended enthusiasm for their cause. Tank Corps adopted the use of French Renault tanks, light six-ton vehicles designed for close infantry support. Around of these were used in action at St. Successful in driving back the British and Australians this encounter was to become famous as the site of the first tank versus tank engagement. Click here for a memoir of that encounter. An Aid to the Infantry On 4 July the tank was used in a manner that helped to fashion the method in which it was deployed in future battles. General John Monash , commander of the Australian Corps, launched an attack at Le Hamel by unleashing a co-ordinated barrage of tanks, artillery and warplanes, all designed to clear a path for advancing infantry. Monash saw no point in attempting to gain ground by using infantry to storm enemy machine gun positions. Rather he believed in using technology to facilitate a relatively uneventful infantry advance, with tanks at their head. His view vindicated, Monash achieved victory at Le Hamel in just 93 minutes. Other commanders took note. Tanks were increasingly used during the Allied advance of summer During the French attack at Soissons from July no fewer than Schneiders, St Chamonds and Renaults were deployed to support combined French and American infantry. However tank deployment on the grand scale was reached on 8 August , when Allied tanks assisted an Allied 20 mile advance on the Western Front. Tank Numbers By the time the war drew to a close the British, the first to use them, had produced some 2, tanks. The French produced rather more, 3, The Germans, never convinced of its merits, and despite their record for technological innovation, produced just With the French tanks proving more serviceable than their British equivalents they continued to be used beyond wartime. The French Renault F. The Italians produced the Fiat and the U. Tank design continued to improve beyond the war and the tank, which helped to make trench warfare redundant, restored movement to the battlefield. Its widespread use continues to the present day.

Chapter 6 : Tank - Wikipedia

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See Article History Tank, any heavily armed and armoured combat vehicle that moves on two endless metal chains called tracks. Tanks are essentially weapon platforms that make the weapons mounted in them more effective by their cross-country mobility and by the protection they provide for their crews. Weapons mounted in tanks have ranged from single rifle-calibre machine guns to, in recent years, long-barreled guns of or mm 4. This article discusses the development of tanks from the beginning of the 20th century to the present. For articles on related military platforms, see amphibious assault vehicle and armoured vehicle. Earliest developments The use of vehicles for fighting dates to the 2nd millennium bce, when horse-drawn war chariots were used in the Middle East by the Egyptians, Hittites, and others as mobile platforms for combat with bows and arrows. The concept of protected vehicles can be traced back through the wheeled siege towers and battering rams of the Middle Ages to similar devices used by the Assyrians in the 9th century bce. The two ideas began to merge in the battle cars proposed in by Guido da Vigevano, in by Leonardo da Vinci , and by others, down to James Cowen, who took out a patent in England in for an armed, wheeled, armoured vehicle based on the steam tractor. Under cover from archers, a storming party crossing the drawbridge of a medieval siege tower brought to a castle wall. Hogg But it was only at the beginning of the 20th century that armoured fighting vehicles began to take practical form. By then the basis for them had become available with the appearance of the traction engine and the automobile. The first motor vehicle used as a weapon carrier was a powered quadricycle on which F. Simms mounted a machine gun in in England. The inevitable next step was a vehicle that was both armed and armoured. Such a vehicle was constructed to the order of Vickers, Sons and Maxim Ltd. To complete the evolution of the basic elements of the modern armoured fighting vehicle , it remained only to adopt tracks as an alternative to wheels. This became inevitable with the appearance of the tracked agricultural tractor, but there was no incentive for this until after the outbreak of World War I. A tracked armoured vehicle was proposed in France as early as but failed to arouse the interest of military authorities, as did a similar proposal made in England in Three years later a design for a tracked armoured vehicle was rejected by the Austro-Hungarian and then by the German general staffs, and in the British War Office turned down yet another design. Its opening stage of mobile warfare accelerated the development of armoured cars, numbers of which were quickly improvised in Belgium, France, and Britain. The ensuing trench warfare , which ended the usefulness of armoured cars, brought forth new proposals for tracked armoured vehicles. Most of these resulted from attempts to make armoured cars capable of moving off roads, over broken ground, and through barbed wire. The first tracked armoured vehicle was improvised in July , in Britain, by mounting an armoured car body on a Killen-Strait tractor. Churchill , resulted in the formation of an Admiralty Landships Committee. Designed to cross wide trenches, it was accepted by the British Army , which ordered tanks of this type called Mark I in February Like the very first British tank, the first French tank the Schneider amounted to an armoured box on a tractor chassis; were ordered in February But French tanks were not used until April , whereas British tanks were first sent into action on Sept. Only 49 were available and their success was limited, but on Nov. These tanks, however, were too slow and had too short an operating range to exploit the breakthrough. In consequence, demand grew for a lighter, faster type of tank, and in the ton Medium A appeared with a speed of 8 miles 13 km per hour and a range of 80 miles km. After , however, the most widely used tank was the French Renault F. Most French tanks survived into the postwar period; these were the Renault F. Moreover, the Renault F. The only other country to produce tanks by the end of the war was Germany , which built about Aware of the need for more powerful vehicles, if only for leading infantry assaults, the French army took the lead in developing well-armed tanks. The original French Schneider and Saint-Chamond tanks already had mm guns, while the heavier British tanks were at best armed with mm guns. After the war the French built 10 ton 2C tanks with the first turret-mounted mm guns and

continued to develop mm-gun tanks, notably the ton Char B of Katowice; Silesian uprisingsFrench tanks and soldiers in the streets of Katowice Kattowitz , Upper Silesia, during one of the Silesian uprisings, â€" In the meantime, Britain took the lead, technically and tactically, in developing the mobility of tanks. Even before World War I had ended, work had started on the Medium D with a maximum speed of 20 miles 32 km per hour. Between and the British Army ordered of the new Vickers Medium tanks. They were virtually the only tanks the British Army had until the early s and the only tanks to be produced in quantity anywhere in the world during the mids. Mobile tanks were intended for the role performed earlier by horse cavalry , while slower but more heavily armoured tanks provided infantry support. Before this division into mobile and slow tanks had crystallized, several different designs were tried. The British Independent tank of , with five turrets, started a trend toward multi-turreted heavy tanks. Another trendsetter was a small turretless tankette, originated in Britain by Maj. Giffard le Quesne Martel and John Carden in the mids, and a slightly heavier, turreted, two-man light tank. The number of light tanks grew rapidly after , as several countries started to produce armoured vehicles. The Soviet Union was by far the most important producer; on a much smaller scale Poland, Czechoslovakia, and Japan entered the field in â€" Concurrently, tank production started up again in France and Italy. As tank production grew and spread among nations, the value of light tanks armed only with machine guns decreased, and heavier models armed with to mm guns for fighting other tanks began to displace them. An early example was the Vickers-Armstrong six-ton model of , copied on a large scale in the Soviet Union as the T The most successful example was the BT, also built in large numbers in the Soviet Union. Christie, who in built an experimental model capable of This enabled them to move over broken ground faster than tanks with the earlier types of suspension. Although they were relatively well-armed and mobile, tanks of the T and BT type were lightly armoured plates 10 to 15 mm thick and were not, therefore, suitable for close infantry support. This was clearly demonstrated in during the civil war in Spain , where T and BT tanks were used by the Republican forces. Even before this time, it had become clear that tanks that moved at the slow pace of the infantry and were therefore exposed to the full effect of antitank guns had to be thickly armoured. This realization led in the mids to such infantry tanks as the French R with mm armour and the British A. III also required support from more heavily armed tanks if they were to engage in fighting of any intensity. The need for tanks with more powerful mm guns was clearly recognized in Germany, leading in to the design of the Pz. The problem was realized less clearly in the Soviet Union, even though the T and T multi-turret tanks with mm guns were first built there in â€" But the Russians recognized more quickly than others the need for the next step, which was to replace all the light-medium tanks armed with to mm guns by medium tanks armed with or mm guns. Thus, in , while the Germans were still developing the Pz. III from a mm to a mm version, the Russians were already concentrating on the T medium tank with a mm gun. Other armies were farther behind in producing well-armed tanks on the eve of World War II. All but 80 of the 1, tanks that Britain had produced between and were still armed only with machine guns. The United States had only about machine-gun-armed light tanks. Most of the 2, tanks produced in Japan were equally lightly armed. By comparison, France had a more powerful tank forceâ€"2, modern tanks, of which, however, only were the Char B, armed with mm guns. World War II The most effective tank force proved to be the German, composed in of 3, vehicles, including Pz. What made the German panzers so formidable was that, instead of being divided between various infantry and cavalry tank units, they were all concentrated and used in massed formations in the panzer divisions. The successes of the panzer divisions during the first two years of World War II led the major armies to reorganize most of their tanks into similar formations; this resulted in a dramatic increase in production. The campaigns of â€"41, in which armoured forces played an important role, also intensified the technical development of tanks and other armoured vehicles. IV and Soviet T were rearmed in with longer-barreled, higher-velocity guns; soon afterward these began to be displaced by more powerfully armed tanks. In the Germans introduced the Panther medium tank with a long mm gun having a muzzle velocity of metres 3, feet per second, compared with metres 1, feet per second for the original Pz. IV and metres 2, feet per second for its version. The ton Panther weighed almost twice as much as its predecessor and was correspondingly better armoured. Germany also introduced the still more powerful Tiger tank, armed with an mm gun. To oppose it, the Russians brought out the JS, or Stalin, heavy tank, which appeared in

armed with a mm gun. Its muzzle velocity was lower than that of the German mm guns, however, and it weighed only 46 tons. At about the same time the T was rearmed with an mm gun. IV foreground and Pz. III background tanks, Army photograph In contrast to the breakthrough role of the earlier heavy tanks, the Tiger and JS tanks functioned chiefly to support basic medium tanks by destroying enemy tanks at long range. German and Soviet armies also developed other heavy vehicles for this purpose, such as the mm-gun Jagdtiger and the mm-gun ISU, which in effect were turretless tanks. In addition, all armies developed lightly armoured self-propelled antitank guns. Army developed a specialized category of tank destroyers that resembled self-propelled guns in being relatively lightly armoured but that, like tanks, had rotating turrets. The turretless-tank type of vehicle originated with the Sturmgeschutz, or assault gun, introduced by the German army for infantry support but subsequently transformed into more versatile vehicles particularly suited for destroying enemy tanks. No such vehicles were produced in Britain or the United States. Throughout the war, however, the British Army retained a specialized category of infantry tanks, such as the Churchill , and of cruiser tanks, such as the Crusader and Cromwell. The former were well-armoured and the latter were fast, but none was well-armed compared with German and Soviet tanks. As a result, during and British armoured divisions were mostly equipped with U. British Churchill flamethrower tank in France, Production of the M4 began in and eventually 49, were built, making it the principal tank of U. Successful when first introduced, it was by no longer adequately armed and should have been replaced by a new medium tank. Army, like the British, adhered to the fallacious doctrine that armoured divisions should confine themselves to exploitation of infantry breakthroughs and did not, therefore, need powerfully armed tanks. Only toward the end of the war did the U. Army introduce a few M26 Pershing heavy tanks with a mm gun comparable to that of the original German Tiger.

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I have amassed a rather large library of books and files on tanks and AFV's over the past few years. Most are written either from the perspective of the historian, delving into the history and use of tanks in general, or from the perspective of the modeler, providing details of specific vehicles.

Major advances in weaponry, communications, and industry by both sides impacted the way the war was fought and, eventually, the outcome in the war. Hitler utilized tanks in his fast moving Panzer divisions. They enabled him to quickly take over much of Europe using a tactic called Blitzkrieg, meaning "lightning war. Whoever had control of the air, often won the battle on the ground. Different types of planes were developed for specific tasks. There were small, fast fighter planes designed for air-to-air combat, large bombers that could drop huge bombs on enemy targets, planes designed to land and take off from aircraft carriers, and large transport planes used to deliver supplies and soldiers. Other important advances in aircraft included the first military helicopters and the first jet-powered fighter planes. Imperial War Museum Radar - Radar was a new technology developed right before the war. It used radio waves to detect enemy aircraft. The British were the first to employ radar and it helped them to fight off the Germans in the Battle of Britain. Aircraft carriers became the most important ships in the navy. They were able to launch air attacks from anywhere in the ocean. The Germans invented the long range flying bomb called the V-1 as well as a rocket bomb called the V The Allies developed a bouncing bomb that would bounce across the water and explode once it hit a dam. Other specialized bombs included bunker busters and cluster bombs. This bomb caused a massive explosion by using nuclear reactions. The Germans used a machine called the Enigma Machine to code and decode their messages. However, the Allied scientists were able to crack the code giving them an advantage in battle. Propaganda New technology was also used to disperse propaganda. Inventions like motion pictures, the radio, and the microphone were all used by governments to broadcast their messages to the people. Technology was used to formulate precise rations food given to soldiers to make sure they got the right amount of nutrition and energy. New medicines were developed during the war including advances in antibiotics, surgical techniques, and blood transfusions. Some of the first electronic computers were developed in order to help break enemy codes. Activities Take a ten question quiz about this page.

Chapter 8 : First World calendrierdelascience.com - Weapons of War: Tanks

Introduction The development of Tank Technology was important to the outcome of World War I. The presence of British tanks from to was a radical era in which the newest of technologies were being ushered onto the battlefield.

Chapter 9 : Technology of Tanks: Vols : Richard M. Ogorkiewicz :

The first M1 tank was produced in , the M1A1 in and the M1A2 in The first M1 Abrams battle tanks were delivered to the US Army in In all 3, M1 tanks were produced for the US Army, 4, M1A1 tanks were built for the US Army, for the US Marines and co-produced with Egypt.