HISTORY OF AMERICAN TECHNOLOGY. pdf

1: Agriculture in the Classroom

The technological and industrial history of the United States describes the United States' emergence as one of the most technologically advanced nations in the world. The availability of land and literate labor, the absence of a landed aristocracy, the prestige of entrepreneurship, the diversity of climate and a large easily accessed upscale and literate free market all contributed to America.

The chief new sources of power were theâ€¦ General considerations Essentially, techniques are methods of creating new tools and products of tools, and the capacity for constructing such artifacts is a determining characteristic of humanlike species. Other species make artifacts: But these attributes are the result of patterns of instinctive behaviour and cannot be varied to suit rapidly changing circumstances. Humanity, in contrast with other species, does not possess highly developed instinctive reactions but does have the capacity to think systematically and creatively about techniques. Humans can thus innovate and consciously modify the environment in a way no other species has achieved. An ape may on occasion use a stick to beat bananas from a tree, but a man can fashion the stick into a cutting tool and remove a whole bunch of bananas. Somewhere in the transition between the two, the hominid, the first manlike species, emerges. By virtue of his nature as a toolmaker, man is therefore a technologist from the beginning, and the history of technology encompasses the whole evolution of humankind. In using rational faculties to devise techniques and modify the environment, humankind has attacked problems other than those of survival and the production of wealth with which the term technology is usually associated today. The technique of language, for example, involves the manipulation of sounds and symbols in a meaningful way, and similarly the techniques of artistic and ritual creativity represent other aspects of the technological incentive. This article does not deal with these cultural and religious techniques, but it is valuable to establish their relationship at the outset because the history of technology reveals a profound interaction between the incentives and opportunities of technological innovation on the one hand and the sociocultural conditions of the human group within which they occur on the other. Social involvement in technological advances An awareness of this interaction is important in surveying the development of technology through successive civilizations. To simplify the relationship as much as possible, there are three points at which there must be some social involvement in technological innovation: In default of any of these factors it is unlikely that a technological innovation will be widely adopted or be successful. The sense of social need must be strongly felt, or people will not be prepared to devote resources to a technological innovation. The thing needed may be a more efficient cutting tool, a more powerful lifting device, a laboursaving machine , or a means of utilizing new fuels or a new source of energy. Or, because military needs have always provided a stimulus to technological innovation, it may take the form of a requirement for better weapons. In modern societies, needs have been generated by advertising. Whatever the source of social need, it is essential that enough people be conscious of it to provide a market for an artifact or commodity that can meet the need. Social resources are similarly an indispensable prerequisite to a successful innovation. Many inventions have foundered because the social resources vital for their realizationâ€"the capital, materials, and skilled personnelâ€"were not available. The notebooks of Leonardo da Vinci are full of ideas for helicopters, submarines, and airplanes, but few of these reached even the model stage because resources of one sort or another were lacking. The resource of capital involves the existence of surplus productivity and an organization capable of directing the available wealth into channels in which the inventor can use it. The resource of materials involves the availability of appropriate metallurgical, ceramic, plastic , or textile substances that can perform whatever functions a new invention requires of them. The resource of skilled personnel implies the presence of technicians capable of constructing new artifacts and devising novel processes. A society, in short, has to be well primed with suitable resources in order to sustain technological innovation. A sympathetic social ethos implies an environment receptive to new ideas, one in which the dominant social groups are prepared to consider innovation seriously. Such receptivity may be limited to specific fields of innovationâ€"for example, improvements in weapons or in navigational techniquesâ€"or it may take the form of a more generalized attitude of inquiry, as was the case among the industrial middle classes in Britain during the 18th century, who were willing to cultivate new ideas and inventors, the breeders of such ideas. Whatever the psychological basis of inventive genius, there can be no doubt that the existence of socially important groups willing to encourage inventors and to use their ideas has been a crucial factor in the history of technology. Social conditions are thus of the utmost importance in the development of new techniques, some of which will be considered below in more detail. It is worthwhile, however, to register another explanatory note. This concerns the rationality of technology. It has already been observed that technology involves the application of reason to techniques, and in the 20th century it came to be regarded as almost axiomatic that technology is a rational activity stemming from the traditions of modern science. Nevertheless, it should be observed that technology, in the sense in which the term is being used here, is much older than science, and also that techniques have tended to ossify over centuries of practice or to become diverted into such para-rational exercises as alchemy. The modern philosophy of progress cannot be read back into the history of technology; for most of its long existence technology has been virtually stagnant, mysterious, and even irrational. It is not fanciful to see some lingering fragments of this powerful technological tradition in the modern world, and there is more than an element of irrationality in the contemporary dilemma of a highly technological society contemplating the likelihood that it will use its sophisticated techniques in order to accomplish its own destruction. On the other hand it is impossible to deny that there is a progressive element in technology, as it is clear from the most elementary survey that the acquisition of techniques is a cumulative matter, in which each generation inherits a stock of techniques on which it can build if it chooses and if social conditions permit. Over a long period of time the history of technology inevitably highlights the moments of innovation that show this cumulative quality as some societies advance, stage by stage, from comparatively primitive to more sophisticated techniques. But although this development has occurred and is still going on, it is not intrinsic to the nature of technology that such a process of accumulation should occur, and it has certainly not been an inevitable development. The fact that many societies have remained stagnant for long periods of time, even at quite developed stages of technological evolution, and that some have actually regressed and lost the accumulated techniques passed on to them, demonstrates the ambiguous nature of technology and the critical importance of its relationship with other social factors. Modes of technological transmission Another aspect of the cumulative character of technology that will require further investigation is the manner of transmission of technological innovations. This is an elusive problem, and it is necessary to accept the phenomenon of simultaneous or parallel invention in cases in which there is insufficient evidence to show the transmission of ideas in one direction or another. The mechanics of their transmission have been enormously improved in recent centuries by the printing press and other means of communication and also by the increased facility with which travelers visit the sources of innovation and carry ideas back to their own homes. Traditionally, however, the major mode of transmission has been the movement of artifacts and craftsmen. Trade in artifacts has ensured their widespread distribution and encouraged imitation. Even more important, the migration of craftsmenâ€”whether the itinerant metalworkers of early civilizations or the German rocket engineers whose expert knowledge was acquired by both the Soviet Union and the United States after World War IIâ€”has promoted the spread of new technologies. The evidence for such processes of technological transmission is a reminder that the material for the study of the history of technology comes from a variety of sources. Much of it relies, like any historical examination, on documentary matter, although this is sparse for the early civilizations because of the general lack of interest in technology on the part of scribes and chroniclers. For these societies, therefore, and for the many millennia of earlier unrecorded history in which slow but substantial technological advances were made, it is necessary to rely heavily upon archaeological evidence. The historian of technology must be prepared to use all these sources, and to call upon the skills of the archaeologist, the engineer, the architect, and other specialists as appropriate. Technology in the ancient world The beginningsâ€”Stone Age technology to c. Animals occasionally use natural tools such as sticks or stones, and the creatures that became human doubtless did the same for hundreds of millennia before the first giant step of fashioning their own tools. Even then it was an interminable time before they put such toolmaking on a regular basis, and still more aeons passed as they arrived at the successive stages of standardizing their simple stone choppers and pounders and of manufacturing themâ€"that is, providing sites and assigning specialists to the work. A degree of specialization in toolmaking was achieved by the time of the Neanderthals 70, bce ; more-advanced tools, requiring assemblage of head and haft, were produced by Cro-Magnons perhaps as early as 35, bce ; while the application of mechanical principles was achieved by pottery-making Neolithic New Stone Age; bce and Metal Age peoples about bce. Earliest communities For all except approximately the past 10, years, humans lived almost entirely in small nomadic communities dependent for survival on their skills in gathering food, hunting and fishing, and avoiding predators. It is reasonable to suppose that most of these communities developed in tropical latitudes, especially in Africa, where climatic conditions are most favourable to a creature with such poor bodily protection as humans have. It is also reasonable to suppose that tribes moved out thence into the subtropical regions and eventually into the landmass of Eurasia, although their colonization of this region must have been severely limited by the successive periods of glaciation, which rendered large parts of it inhospitable and even uninhabitable, even though humankind has shown remarkable versatility in adapting to such unfavourable conditions. The Neolithic Revolution Toward the end of the last ice age , some 15, to 20, years ago, a few of the communities that were most favoured by geography and climate began to make the transition from the long period of Paleolithic , or Old Stone Age , savagery to a more settled way of life depending on animal husbandry and agriculture. This period of transition, the Neolithic Period , or New Stone Age, led eventually to a marked rise in population, to a growth in the size of communities, and to the beginnings of town life. It is sometimes referred to as the Neolithic Revolution because the speed of technological innovation increased so greatly and human social and political organization underwent a corresponding increase in complexity. To understand the beginnings of technology, it is thus necessary to survey developments from the Old Stone Age through the New Stone Age down to the emergence of the first urban civilizations about bce. Stone The material that gives its name and a technological unity to these periods of prehistory is stone. Though it may be assumed that primitive humans used other materials such as wood, bone, fur, leaves, and grasses before they mastered the use of stone, apart from bone antlers, presumably used as picks in flint mines and elsewhere, and other fragments of bone implements , none of these has survived. The stone tools of early humans, on the other hand, have survived in surprising abundance, and over the many millennia of prehistory important advances in technique were made in the use of stone. Stones became tools only when they were shaped deliberately for specific purposes, and, for this to be done efficiently, suitable hard and fine-grained stones had to be found and means devised for shaping them and particularly for putting a cutting edge on them. Flint became a very popular stone for this purpose, although fine sandstones and certain volcanic rocks were also widely used. There is much Paleolithic evidence of skill in flaking and polishing stones to make scraping and cutting tools. These early tools were held in the hand, but gradually ways of protecting the hand from sharp edges on the stone, at first by wrapping one end in fur or grass or setting it in a wooden handle, were devised. Much later the technique of fixing the stone head to a haft converted these hand tools into more versatile tools and weapons. With the widening mastery of the material world in the Neolithic Period, other substances were brought into service, such as clay for pottery and brick, and increasing competence in handling textile raw materials led to the creation of the first woven fabrics to take the place of animal skins. About the same time, curiosity about the behaviour of metallic oxides in the presence of fire promoted one of the most significant technological innovations of all time and marked the succession from the Stone Age to the Metal Age. Power The use of fire was another basic technique mastered at some unknown time in the Old Stone Age. The discovery that fire could be tamed and controlled and the further discovery that a fire could be generated by persistent friction between two dry wooden surfaces were momentous. Fire was the most important contribution of prehistory to power technology, although little power was obtained directly from fire except as defense against wild animals. For the most part, prehistoric communities remained completely dependent upon manpower, but, in making the transition to a more settled pattern of life in the New Stone Age, they began to derive some power from animals that had been domesticated. It also seems likely that by the end of prehistoric times the sail had emerged as a means of harnessing the wind for small boats, beginning a long sequence of developments in marine transport. Tools and weapons The basic tools of prehistoric peoples were determined by the materials at their disposal. But once they had acquired the techniques of working stone, they were resourceful in devising tools and weapons with points and barbs. Thus, the stone-headed spear, the harpoon, and the arrow all came into widespread use. The spear was given increased impetus by the spear-thrower, a notched pole that gave a sling effect. The ingenuity of these primitive hunters is also shown in their slings, throwing-sticks the boomerang of the Australian Aborigines is a remarkable surviving example , blowguns, bird snares, fish and animal traps, and nets. These tools did not evolve uniformly, as each primitive community developed only those instruments that were most suitable for its own specialized purposes, but all were in use by the end of the Stone Age. In addition, the Neolithic Revolution had contributed some important new tools that were not primarily concerned with hunting. It is not possible to be sure when these significant devices were invented, but their presence in the early urban civilizations suggests some continuity with the late Neolithic Period. The drill and the lathe, on the other hand, were derived from the bow and had the effect of spinning the drill piece or the workpiece first in one direction and then in the other. Developments in food production brought further refinements in tools. The processes of food production in Paleolithic times were simple, consisting of gathering, hunting , and fishing. If these methods proved inadequate to sustain a community, it moved to better hunting grounds or perished. With the onset of the Neolithic Revolution, new food-producing skills were devised to serve the needs of agriculture and animal husbandry. Digging sticks and the first crude plows, stone sickles, querns that ground grain by friction between two stones and, most complicated of all, irrigation techniques for keeping the ground watered and fertileâ€”all these became well established in the great subtropical river valleys of Egypt and Mesopotamia in the millennia before bce. Building techniques Prehistoric building techniques also underwent significant developments in the Neolithic Revolution. Nothing is known of the building ability of Paleolithic peoples beyond what can be inferred from a few fragments of stone shelters, but in the New Stone Age some impressive structures were erected, primarily tombs and burial mounds and other religious edifices, but also, toward the end of the period, domestic housing in which sun-dried brick was first used. In northern Europe, where the Neolithic transformation began later than around the eastern Mediterranean and lasted longer, huge stone monuments, of which Stonehenge in England is the outstanding example, still bear eloquent testimony to the technical skill, not to mention the imagination and mathematical competence, of the later Stone Age societies. Manufacturing Manufacturing industry had its origin in the New Stone Age, with the application of techniques for grinding corn, baking clay, spinning and weaving textiles, and also, it seems likely, for dyeing, fermenting, and distilling. Some evidence for all these processes can be derived from archaeological findings, and some of them at least were developing into specialized crafts by the time the first urban civilizations appeared. In the same way, the early metalworkers were beginning to acquire the techniques of extracting and working the softer metals, gold, silver, copper, and tin, that were to make their successors a select class of craftsmen. All these incipient fields of specialization, moreover, implied developing trade between different communities and regions, and again the archaeological evidence of the transfer of manufactured products in the later Stone Age is impressive. Flint arrowheads of particular types, for example, can be found widely dispersed over Europe, and the implication of a common locus of manufacture for each is strong. Such transmission suggests improving facilities for transport and communication.

2: A Social History of American Technology - Ruth Schwartz Cowan - Google Books

Despite this American history has rarely been told from the perspective of the history of technology. A Social History of American Technology fills this gap by surveying the history of American technology from the tools used by the earliest native inhabitants to the technological systems -- cars and computers, aircraft and antibiotics -- we are.

New Technology in American History Timeline created by jamesandcolin Jan 1, Lighting Rod The classic story of Benjamin Franklin finding electricity by traveling outside in a rainstorm is actually true, and he invented the lightning rod after to attract the electri bolts that he witnessed in the storm. This was important because it led to more inventions that harnessed the power of electricity. This invention allowed for multiple spindles to create cotton threads at once. This was important because it inpired cotton gins and helped the textile mills of early America. This machine seperated the cotton stims and seeds from the actual cotton, making hand seperating unneccessary. This was important because it revolutionized slave labor at the time, shortening the time it took for cotton to be sellable after it was picked. This increased plantation profits greatly. Jan 1, Steamboat Robert Fulton created the steamboat in This was an important invention because it made travel and trade extremely easy, increasing the uoput of the US immensely. Jan 1, The Telegraph Samuel Morse invented the telegraph as a useful means of communicating quickly through wires. These "talking wires" were used as safety devices on railcars. The first news was transmitted through telegraph in from Baltimore to Washington. Jan 1, The Bessemer Process Henry Bessemer invents a process for producing steel efficiently and cheaply. He utilized a blast of air in a decarbonization process to create the steel from iron. This was an important invention and technological advancement because it helped made stronger rails for railroads, helped build skyscrapers, and contributed to making stronger metal structures and machines. Many former machines were produced but this machine helped make writing much more efficient and organized. The patent was sold to Remington and Sons and was commercially produced as the Sholes and Glidden Typewriter. This increased safety and efficiency and was a huge improvement to the rail system. Previously reverse steam engines were used, but as rail cars grew in size and speed they could no longer be stopped at a resonable distance. These brakes used compressed air to squeeze brake shoes against the wheels. Gidden in , it solved the problem of building fences on the treeless prairy for farmers. It will later be used as a means of security and many other means of fencing. Jan 1, The Telephone The telephone was invented by Alexander Graham Bell as a means of verbally communicating electronically. He created a nationwide movement with the invention. A giant communication network was created and many were hired as operators and switchboard managers. Boys were orgiginally hired many were surprised by their foul language. Jan 1, The Phonograph Record Player Thomas Edison invented the phongraph a year before the lightbulb and created a new sound revolution. This led to a movement of recording and playing music, and the Grammys were named after the phonograph brand "Gramaphone. His final and most effective method was a design where the meat was packed tightly against the bottom of a insulated and ventilated car. The ice mixture was held at the top of the car and the cold air flowed naturally downward. He used a combination of a vacuumed glass bulb with an incandescent gas and a carbon filament to create a lightbulb. After trying times he eventually created a long lasting light. Some of the first lights lasted 13 hours. He eventually merged with a british inventor to create Thorn Lighting Co. This was important because it was a new way to light up streets and homes. This invention led to vertical growth. Improvements consisted chiefly in the use of better-grade materials to provide lighter draft and greater durability. The twine binder was used to tie the top of a shock of wheat together for easier handling and transport. Jan 1, The Cash Register This invention helped businesses all across the nation by creating a money storage and counting system. John Ritty and James Ritty coinvented this machine in the s. The first register was entirely mechanical withouth a receipt roll. Jan 1, "Combine" or combined reaper-thresher The combine was a combined reaper-thresher that was drawn by 20 to 40 horses. It allowed for rapid harvesting of many kinds of wheat. Sprague created the first electric railway in the US in Electric trolleys were used on the Richmond Union Passenger Railway. Sprague used a third wheel that conducted electricity into the motor car, powering the train. This was important because it led to a new type of transportation. Jan 1, Basketball Invented by James Naismith, designed as an active indoor sport that could be played in the winter months. It spread rapidly and enjoyed enourmous popularity in the next century. Jan 1, Self Operating Machinegun Though this gun was created in , it was not commercially successful until American Hiram Maxim built the first self powered machine gun, as previous versions required hand cranking. This was important because it was a large part of trench warfare, reigning death on advancing troops with rapid fire. Both the US and Russia used this gun effectively. Jan 1, Assembly Line Used globally around the world, an assembly line is a manufacturing process in which interchangeable parts are added to a product in a sequential manner in order to create a finished product more quickly than with older methods. Primitive assembly line production was used in by Ransom Eli Olds, an early car-maker. Henry Ford used the first conveyor belt-based assembly-line in his car factory in â€" in the Highland Park, Michigan plant. Jan 1, Air conditioning Air conditioning is the cooling and de-humidification of indoor air for thermal comfort. Jan 1, The First Airplane The fabulously famous American Wright brothers invented the first powered glider named the "Flyer" in After several tries with manned gliders they created a pound flying machine. This was one of the most important inventions because it allowed for immense strategy on the battlefield. They were first used in WWI and brought a new era of flight to the world. In French pilots put deflector plates on the propeller of the plane, allowing a machinegun to fire from the front. This allowed arial fights to take place. This was an important invention because it changed the course of warfare and brought about Air Forces on both sides of WWI. The base for most of the ideas was the Holt tractor enging and build, with large wheels to traverse rough groud. The large wheels were too flimsy and eventually the British created the first passing tank using the treads that are used currently. The first operational tank was used, with mounted machineguns, in WWI in the battle of Somme. Sufferers from the gas began bleeding from burns and bean to choke as they inhaled the fumes. Chlorine and tear gas was used by both sides from the beginning of the war. Chlorine gas was combated by clothes soaked in bicarbonate from soda held over the mouth and nose. This was an important part of battle because it caused huge casualties Jan 1, Aircraft Carriers Homemade carriers had been previously created in WWI but not to the large scale that they were used in WWII. The Washington Naval Treaty of affected the building of these giant fleet leaders and eventually sparked the building of modern carriers. Though no one can be attributed the building of the first carrier, they were still important in WWII, leading massive air to land and carrier to carrier attacks. This synthetic rubber could be created in a factory, a much needed boost to the US supply of much needed rubber during the war. This technological advancement was so important because limited amounts of rubber could have crippled the US war effort as it was needed for war supplies. The project was led by Dr. Oppenheimer along with physicists from around the world. They succesfully tested their first bomb in Alamogordo, New Mexico in The "Shooting Star" and the "Fireball" were the first operational ones, both of which were formidable foes in the air. Although these advancements came late in the war, they were still affective for years to come. Other companies followed suit and soon after modern day credit cards were common place among rich families. This was important because it started new consumerism in the s with new ways to purchase and a booming economy of materialistic americans. This bomb would eventually become times as powerful as the atomic bombs dropped in WWII. Jan 1, "The Pill" The Pill, an oral contraceptive, was invented in This came at a time when mothers and women were becoming more independent, calling for birth control and abortion. This was important to American history because it gave women an alternative to abortion and brought birth rates down as women gained more control of their bodies. Jan 1, Car and Home Air conditioners Although air condition had been around since ancient times, electrical air conditioning in homes and cars was not prominent in America until after WWII. The first US car to boast this new invention was the Nash Ambassador. This was important because it was an importan part of the suburb movement as it became prominent in white suburbs. This fertilizer was developed by many companies at the same time and this type of fertilizer became prominent in the 60s. Also a mechanical harvester that was primarily for tomatoes was created. These inventions were important because production of foood and grain skyrocketed. Using fertilizer eventually led to a movement of environmentalists against its use. The Apollo 11 trip landed three astronauts on the moon in This program was a huge step in the technological world as the US space program then rivaled the Soviet Sputnik program. Agent Orange was a defoliator also used in Vietnam. This eliminated plants by poisoning them. These were important because they led to many cases of birth defects and deaths in Vienam.

3: Science and technology in the United States - Wikipedia

A Social History of American Technology, Second Edition, tells the story of American technology from the tools used by its earliest inhabitants to the technological systems--cars and computers, aircraft and antibiotics--that we are familiar with today.

Even troops who were far from the line of fire had to protect themselves by building elaborate trenches and other fortifications. This was inefficient and dangerous. By , however, there was another option: The most famous of these guns, the Spencer carbine, could fire seven shots in 30 seconds. Like many other Civil War technologies, these weapons were available to Northern troops but not Southern ones: Southern factories had neither the equipment nor the know-how to produce them. For their part, Confederate sailors tried to sink these ironclads with submarines. The first of these, the Confederate C. Hunley, was a metal tube that was 40 feet long, 4 feet across, and held an 8-man crew. In , the Hunley sank the Union blockade ship Housatonic off the coast of Charleston but was itself wrecked in the process. The Railroad More important than these advanced weapons were larger-scale technological innovations such as the railroad. Once again, the Union had the advantage. Southern tracks, by contrast, were not standardized, so people and goods frequently had to switch cars as they traveledâ€”an expensive and inefficient system. Union officials used railroads to move troops and supplies from one place to another. They also used thousands of soldiers to keep tracks and trains safe from Confederate attack. The Telegraph Abraham Lincoln was the first president who was able to communicate on the spot with his officers on the battlefield. The White House telegraph office enabled him to monitor battlefield reports, lead real-time strategy meetings and deliver orders to his men. Here, as well, the Confederate army was at a disadvantage: They lacked the technological and industrial ability to conduct such a large-scale communication campaign. In , the Union Army established the U. Military Telegraph Corps, led by a young railroad man named Andrew Carnegie. The next year alone, the U. As a result, the images of the Civil War are not action snapshots: They are portraits and landscapes. It was not until the 20th century that photographers were able to take non-posed pictures on the battlefield. Technological innovation had an enormous impact on the way people fought the Civil War and on the way they remember it. Many of these inventions have played important roles in military and civilian life ever since.

4: A History of American Technology | Artifact by Artifact

The American effort to bring home German rocket technology in Operation Paperclip, and the bringing of German rocket scientist Wernher von Braun (who would later sit at the head of a NASA center) stand out in particular.

Search this exhibition America on the Move America on the Move explores the role of transportation in American history. Visit communities wrestling with the changes that new transportation networks brought. See cities change, suburbs expand, and farms and factories become part of regional, national, and international economies. Meet people as they travel for work and pleasure, and as they move to new homes. Americans Adopt the Auto While the other sections of the exhibit investigate a certain period in a certain era, Americans Adopt the Auto examines how Americans across the country began to use the automobile from its inception in the late 19th century until the current s. From the first drivers across muddy roads to solar-powered vehicles going down the highway, explore the way America adopted the automobile. Browse by topic, object type, date, or place. Learning Resources America on the Move has a variety of learning resources availble for people visiting the museum, school groups interested in activities when visiting, of supplements for in-classroom learning. About America on the Move replaces exhibits of road and rail transportation and civil engineering installed when the National Museum of American History opened as the Museum of History and Technology in These early exhibits were, for the most part, displays of artifacts chosen for their technological interest. Their labels described technological change. They were mostly devoid of human stories. We wanted our new exhibits to be just as popular. But we wanted to engage a wider audience, an audience that has come to expect more from museums than objects in cases. We would not do an exhibit about cars and trains, or even a transportation history exhibit. It would be an exhibit about transportation in American history. Our exhibit would be about people and events. Who rode on the vehicles? What did they carry? Where did they go? How did they change the country? And why those things happened the way they did, and why it mattered, and still matters. We decided to examine four areas in which transportation shaped American history: And we focused on big themes of American history: Exhibits are complex enterprises. They combine many elements, serve many purposes, meet many needs. We hope America on the Move does that.

5: history of technology | Summary & Facts | www.enganchecubano.com

A History of American Technology Artifact by Artifact. Skip to content. Current Exhibit. Contributors; Images Sources; Exhibit. Contributors; Image Sources; About;.

Agricultural history of the United States In the 17th century, Pilgrims , Puritans , and Quakers fleeing religious persecution in Europe brought with them plowshares , guns , and domesticated animals like cows and pigs. These immigrants and other European colonists initially farmed subsistence crops like corn , wheat , rye , and oats as well as rendering potash and maple syrup for trade. Early American farmers were not self-sufficient; they relied upon other farmers, specialized craftsman, and merchants to provide tools, process their harvests, and bring them to market. American artisans developed a more relaxed less regulated version of the Old World apprenticeship system for educating and employing the next generation. Despite the fact that mercantilist , export-heavy economy impaired the emergence of a robust self-sustaining economy, craftsman and merchants developed a growing interdependence on each other for their trades. Silver working[edit] Colonial Virginia provided a potential market of rich plantations. At least 19 silversmiths worked in Williamsburg between and The best-known were James Eddy â€” and his brother-in-law William Wadill, also an engraver. Most planters, however, purchased English-made silver. The most prosperous were merchant-artisans, with a business outlook and high status. Most craftsmen were laboring artisans who either operated small shops or, more often, did piecework for the merchant artisans. The small market meant there was no steady or well-paid employment; many lived in constant debt. Silver and other metal mines were scarcer in North America than in Europe, and colonial craftsmen had no consistent source of materials with which to work. The purity of these sources was not regulated, nor was there an organized supply chain through which to obtain silver. As demand for silver increased and large-scale manufacturing techniques emerged, silver products became much more standardized. For special-order objects that would likely only be made once, silversmiths generally used lost-wax casting , in which a sculpted object was carved out of wax, an investment casting was made, and the wax was melted away. The molds produced in this manner could only be used once, which made them inconvenient for standard objects like handles and buckles. Permanent mold casting , an industrial casting technique focused on high-volume production, allowed smiths to reuse molds to make exact replicas of the most commonly used items they sold. In creating these molds and developing standardized manufacturing processes, silversmiths could begin delegating some work to apprentices and journeymen. These changes, in tandem with new techniques and requirements defined by changing social standards, led to the introduction of new manufacturing techniques in Colonial America that preceded and anticipated the industrial revolution. Late in the colonial era a few silversmiths expanded operations with manufacturing techniques and changing business practices They hired assistants, subcontracted out piecework and standardized output. The coexistence of the craft and industrial production styles prior to the industrial revolution is an example of proto-industrialization. Factories and mills[edit] In the mids, Oliver Evans invented an automated flour mill that included a grain elevator and hopper boy. By the turn of the century, Evans also developed one of the first high-pressure steam engines and began establishing a network of machine workshops to manufacture and repair these popular inventions. In , the widow of Nathanael Greene recruited Eli Whitney to develop a machine to separate the seeds of short fibered cotton from the fibers. The resulting cotton gin could be made with basic carpentry skills but reduced the necessary labor by a factor of 50 and generated huge profits for cotton growers in the South. Between and , new industrial tools that rapidly increased the quality and efficiency of manufacturing emerged. Simeon North suggested using division of labor to increase the speed with which a complete pistol could be manufactured which led to the development of a milling machine in In , Thomas Blanchard created a lathe that could reliably cut irregular shapes, like those needed for arms manufacture. By , Captain John H. Hall had developed a system using machine tools , division of labor, and an unskilled workforce to produce a breech-loading rifle â€”a process that came to be known as " Armory practice " in the U. The textile industry , which had previously relied upon labor-intensive production methods, was also rife with potential for mechanization. In the late 18th century, the English textile industry had adopted the spinning jenny , water frame , and spinning mule which greatly improved the efficiency and quality of textile manufacture, but were closely guarded by the British government which forbade their export or the emigration of those who were familiar with the technology. The Beverly Cotton Manufactory was the first cotton mill in the United States, but it relied on horse power. Samuel Slater , an apprentice in one of the largest textile factories in England, immigrated to the United States in upon learning that American states were paying bounties to British expatriates with a knowledge of textile machinery. At nearly the same time as the canal was completed, Francis Cabot Lowell and a consortium of businessmen set up the clothing mills in Waltham, Massachusetts making use of water power from the Charles River with the concept of housing together production of feedstocks complete consumer processes so raw materials entered, and dyed fabrics or clothing left. For a few decades, it seemed that every lock along the canal had mills and water wheels. In , Boston Manufacturing Company built a major expansion in East Chelmsford, which was soon incorporated as Lowell, Massachusetts â€” which came to dominate the cloth production and clothing industry for decades. Slater went on to build several more cotton and wool mills throughout New England , but when faced with a labor shortage, resorted to building housing, shops, and churches for the workers and their families adjacent to his factories. Lowell looms were managed by specialized employees, many of the employed were unmarried young women " Lowell Mill Girls " , and owned by a corporation. The corporation also looked out for the health and well being of the young women, including their spiritual health, and the hundreds of women employed by it culturally established the pattern of a young woman going off to work a few years and saving monies before returning home to school and marriage. It created an independent breed of women uncommon in most of the world. Turnpikes and canals[edit] A lock on the Erie Canal. USA canals circa Highways in the USA circa Even as the country grew even larger with the admission of Kentucky , Tennessee , and Ohio by , the only means of transportation between these landlocked western states and their coastal neighbors was by foot, pack animal, or ship. Recognizing the success of Roman roads in unifying that empire, political and business leaders in the United States began to construct roads and canals to connect the disparate parts of the nation. Nevertheless, the road became a primary overland conduit through Appalachian Mountains and was the gateway for thousands of antebellum westward-bound settlers. Numerous canal companies had also been chartered; but of all the canals projected, only three had been completed when the War of began: It remained for New York to usher in a new era in internal communication by authorizing in the construction of the Erie Canal. This bold bid for Western trade alarmed the merchants of Philadelphia, particularly as the completion of the national road threatened to divert much of their traffic to Baltimore. In , the legislature of Pennsylvania grappled with the problem by projecting a series of canals which were to connect its great seaport with Pittsburgh on the west and with Lake Erie and the upper Susquehanna on the north. Like the turnpikes, the early canals were constructed, owned, and operated by private joint-stock companies but later gave way to larger projects funded by the states. The Erie Canal , proposed by Governor of New York De Witt Clinton , was the first canal project undertaken as a public good to be financed at the public risk through the issuance of bonds. The success of the Erie Canal spawned a boom of other canal-building around the country: But the only contribution of the national government to internal improvements during the Jeffersonian era was an appropriation in of two percent of the net proceeds of the sales of public lands in Ohio for the construction of a national road, with the consent of the states through which it should pass. Because this appropriation was to be met by the moneys paid by the National Bank to the government, the bill was commonly referred to as the "Bonus Bill". But on the day before he left office, President Madison vetoed the bill because it was unconstitutional. The policy of internal improvements by federal aid was thus wrecked on the constitutional scruples of the last of the Virginia dynasty. Having less regard for consistency, the House of Representatives recorded its conviction, by close votes, that Congress could appropriate money to construct roads and canals, but had not the power to construct them. In , a bill to authorize the collection of tolls on the Cumberland Road had been vetoed by the President. In an elaborate essay, Monroe set forth his views on the constitutional aspects of a policy of internal improvements. Congress might appropriate money, he admitted, but it might not undertake the actual construction of national works nor assume jurisdiction over them. For the moment, the drift toward a larger participation of the national government in internal improvements was stayed. Two years later, Congress authorized the President to institute surveys for such roads and canals as he believed to be needed for commerce and military defense. No one pleaded more eloquently for a larger conception of the functions of the national government than Henry Clay. He called the attention of his hearers to provisions made for coast surveys and lighthouses on the Atlantic seaboard and deplored the neglect of the interior of the country. Of the other presidential candidates, Jackson voted in the Senate for the general survey bill; and Adams left no doubt in the public mind that he did not reflect the narrow views of his section on this issue. Crawford felt the constitutional scruples which were everywhere being voiced in the South, and followed the old expedient of advocating a constitutional amendment to sanction national internal improvements. President Jefferson had recommended many of these in for Congress to consider for creation of necessary amendments to the Constitution. Adams seemed oblivious to the limitations of the Constitution. In March , the general assembly declared that all the principles of the earlier resolutions applied "with full force against the powers assumed by Congress" in passing acts to protect manufacturers and to further internal improvements. That the administration would meet with opposition in Congress was a foregone conclusion. Despite the new efficiencies introduced by the turnpikes and canals, travel along these routes was still time-consuming and expensive. The idea of integrating a steam boiler and propulsion system can be first attributed to John Fitch and James Rumsey who both filed for patents or state monopolies on steamboats in the late s. However, these first steamboats were complicated, heavy, and expensive. It would be almost 20 years until Robert R. Livingston contracted a civil engineer named Robert Fulton to develop an economical steamboat. By , steamboat services had been established on all the Atlantic tidal rivers and Chesapeake Bay. The shallow-bottomed boats were also ideally suited navigating the Mississippi and Ohio Rivers and the number of boats on these rivers increased from 17 boats to boats between and Livingston and Fulton had obtained monopoly rights to operate a steamboat service within the state of New York, but Thomas Gibbons, who operated a competing New Jersey ferry service, was enjoined from entering New York waters under the terms of the monopoly. In , the Supreme Court ruled in Gibbons v. Ogden that Congress could regulate commerce and transportation under the Commerce Clause which compelled the state of New York to allow steamboat services from other states. Because the physics and metallurgy of boilers were poorly understood, steamboats were prone to boiler explosions that killed hundreds of people between the s and s.

6: The Machine in America

The history of American agriculture () covers the period from the first English settlers to the modern day. Below are detailed timelines covering farm machinery and technology, transportation, life on the farm, farmers and the land, and crops and livestock.

Early American science[edit] Franklin, one of the first early American scientists. In the early decades of its history, the United States was relatively isolated from Europe and also rather poor. Benjamin Franklin conducted a series of experiments that deepened human understanding of electricity. Among other things, he proved what had been suspected but never before shown: Franklin also invented such conveniences as bifocal eyeglasses. Franklin also conceived the mid-room furnace, the "Franklin Stove. It took David R. After leaving office, he retired to his Virginia plantation, Monticello, and helped spearhead the University of Virginia. Myers , Florida , February 11, Like Franklin and Jefferson, most American scientists of the late 18th century were involved in the struggle to win American independence and forge a new nation. These scientists included the astronomer David Rittenhouse , the medical scientist Benjamin Rush , and the natural historian Charles Willson Peale. After the war, Rittenhouse designed road and canal systems for the state of Pennsylvania. He later returned to studying the stars and planets and gained a worldwide reputation in that field. By introducing new medical treatments, he made the Pennsylvania Hospital in Philadelphia an example of medical enlightenment, and after his military service, Rush established the first free clinic in the United States. Peale excavated the bones of an ancient mastodon near West Point, New York ; he spent three months assembling the skeleton, and then displayed it in his museum. The Peale Museum started an American tradition of making the knowledge of science interesting and available to the general public. A notable early immigrant was the British chemist Joseph Priestley , who was driven from his homeland because of his dissenting politics. Priestley, who went to the United States in , was the first of thousands of talented scientists who emigrated in search of a free, creative environment. Alexander Graham Bell , who arrived from Scotland by way of Canada in , developed and patented the telephone and related inventions. Charles Steinmetz , who came from Germany in , developed new alternating-current electrical systems at General Electric Company , [6] and Vladimir Zworykin , an immigrant from Russia in arrived in the States bringing his knowledge of x-rays and cathode ray tubes and later won his first patent on a television system he invented. The Serbian Nikola Tesla went to the United States in , and would later adapted the principle of rotating magnetic field in the development of an alternating current induction motor and polyphase system for the generation, transmission, distribution and use of electrical power. Many of these emigrants were Jewish scientists, fearing the repercussions of anti-Semitism, especially in Germany and Italy, and sought sanctuary in the United States. Roosevelt to pursue the pivotal Manhattan Project. Their scientific contributions, combined with Allied resources and facilities helped establish the United States during World War II as an unrivaled scientific juggernaut. While President Harry S. Truman refused to provide sanctuary to ideologically committed members of the Nazi party, the Office of Strategic Services introduced Operation Paperclip , conducted under the Joint Intelligence Objectives Agency. This program covertly offered otherwise ineligible intellectuals and technicians white-washed dossiers, biographies, and employment. Ex-Nazi scientists overseen by the JIOA had been employed by the US military since the defeat of the Nazi regime in Project Overcast, but Operation Paperclip ventured to systematically allocate German nuclear and aerospace research and scientists to military and civilian posts, beginning in August In the first phases of Operation Paperclip, these recruits mostly included aerospace engineers from the German V-2 combat rocket program, experts in aerospace medicine and synthetic fuels. Perhaps the most influential of these was Wernher Von Braun , who had worked on the Aggregate rockets the first rocket program to reach outer space , and chief designer of the V-2 rocket program. Space and Rocket Center In the post-war era the US was left in a position of unchallenged scientific leadership, being one of the few industrial countries not ravaged by war. Additionally, science and technology were seen to have greatly added to the Allied war victory, and were seen as absolutely crucial in the Cold War era. This enthusiasm simultaneously rejuvenated American industry, and celebrated Yankee ingenuity, instilling a zealous nationwide investment in "Big Science" and state-of-the-art government funded facilities and programs. This state patronage presented appealing careers to the intelligentsia, and further consolidated the scientific preeminence of the United States. As a result, the US government became, for the first time, the largest single supporter of basic and applied scientific research. By the mids the research facilities in the US were second to none, and scientists were drawn to the US for this reason alone. The changing pattern can be seen in the winners of the Nobel Prize in physics and chemistry. During the first half-century of Nobel Prizes â€” from to â€” American winners were in a distinct minority in the science categories. Since , Americans have won approximately half of the Nobel Prizes awarded in the sciences. The American Brain Gain continued throughout the Cold War , as tensions steadily escalated in the Eastern Bloc , resulting in a steady trickle of defectors, refugees and emigrants. Most of them were young, well-qualified, educated professionals or skilled workers [16] - the intelligentsia - exacerbating human capital flight in the GDR to the benefit of Western countries, including the United States. American applied science[edit] Men of Progress, representing 19 contemporary American inventors, During the 19th century, Britain , France , and Germany were at the forefront of new ideas in science and mathematics. This tradition had been born of necessity. Because Americans lived so far from the well-springs of Western science and manufacturing, they often had to figure out their own ways of doing things. When Americans combined theoretical knowledge with " Yankee ingenuity ", the result was a flow of important inventions. The great American inventors include Robert Fulton the steamboat ; Samuel Morse the telegraph ; Eli Whitney the cotton gin ; Cyrus McCormick the reaper ; and Thomas Alva Edison , the most fertile of them all, with more than a thousand inventions credited to his name. Edison was not always the first to devise a scientific application, but he was frequently the one to bring an idea to a practical finish. For example, the British engineer Joseph Swan built an incandescent electric lamp in , almost 20 years before Edison. Edison followed up his improvement of the light bulb with the development of electrical generating systems. Within 30 years, his inventions had introduced electric lighting into millions of homes. Howard Hughes with his Boeing in the s Another landmark application of scientific ideas to practical uses was the innovation of the brothers Wilbur and Orville Wright. In the s they became fascinated with accounts of German glider experiments and began their own investigation into the principles of flight. Combining scientific knowledge and mechanical skills, the Wright brothers built and flew several gliders. Then, on December 17, , they successfully flew the first heavier-than-air, mechanically propelled airplane. An American invention that was barely noticed in went on to usher in the Information Age. In that year John Bardeen , William Shockley , and Walter Brattain of Bell Laboratories drew upon highly sophisticated principles of quantum physics to invent the transistor , a small substitute for the bulky vacuum tube. This, and a device invented 10 years later, the integrated circuit , made it possible to package enormous amounts of electronics into tiny containers. As a result, book-sized computers of today can outperform room-sized computers of the s, and there has been a revolution in the way people live â€” in how they work, study, conduct business, and engage in research. The concepts that led to the splitting of the atom were developed by the scientists of many countries, but the conversion of these ideas into the reality of nuclear fission was accomplished in the United States in the early s, both by many Americans but also aided tremendously by the influx of European intellectuals fleeing the growing conflagration sparked by Adolf Hitler and Benito Mussolini in Europe. American academics worked hard to find positions at laboratories and universities for their European colleagues. The Space Shuttle takes off on a manned mission to space. After German physicists split a uranium nucleus in , a number of scientists concluded that a nuclear chain reaction was feasible and possible. Roosevelt warned that this breakthrough would permit the construction of "extremely powerful bombs. The project bore fruit when the first such bomb was exploded in New Mexico on July 16, The development of the bomb and its use against Japan in August initiated the Atomic Age , a time of anxiety over weapons of mass destruction that has lasted through the Cold War and down to the anti-proliferation efforts of today. Even so, the Atomic Age has also been characterized by peaceful uses of nuclear power , as in the advances in nuclear power and nuclear medicine. A visual example of a 24 satellite GPS constellation in motion with the earth rotating. Along with the production of the atomic bomb, World War II also began an era known as " Big Science " with increased government patronage of scientific research. The advantage of a scientifically and technologically sophisticated country became all too apparent during wartime, and in the ideological Cold War to follow the importance of scientific strength in even peacetime applications became too much for the government to any more leave to philanthropy and private industry alone. This increased expenditure on scientific research and education propelled the United States to the forefront of the international scientific communityâ€"an amazing feat for a country which only a few decades before still had to send its most promising students to Europe for extensive scientific education. The first US commercial nuclear power plant started operation in Illinois in At the time, the future for nuclear energy in the United States looked bright. But opponents criticized the safety of power plants and questioned whether safe disposal of nuclear waste could be assured. The cost of building a nuclear power plant escalated, and other, more economical sources of power began to look more appealing. During the s and s, plans for several nuclear plants were cancelled, and the future of nuclear power remains in a state of uncertainty in the United States. Meanwhile, American scientists have been experimenting with other renewable energy , including solar power. Although solar power generation is still not economical in much of the United States, recent developments might make it more affordable. All Things Digital conference D5 in For the past 80 years, the United States has been integral in fundamental advances in telecommunications and technology. The net effect of the many changes from the census: By the s, the company name had been changed to International Business Machines, and IBM dominated business computing. It caused many of their competitors to either merge or go bankrupt, leaving IBM in an even more dominant position. American Robert Goddard was one of the first scientists to experiment with rocket propulsion systems. Front and center is the flight spare for the first Mars rover, Sojourner, which landed on Mars in as part of the Mars Pathfinder Project. On the right is a test rover for the Mars Science Laboratory, which landed Curiosity on Mars in As Allied forces advanced during World War II, both the American and Russian forces searched for top German scientists who could be claimed as spoils for their country. The American effort to bring home German rocket technology in Operation Paperclip , and the bringing of German rocket scientist Wernher von Braun who would later sit at the head of a NASA center stand out in particular. Expendable rockets provided the means for launching artificial satellites , as well as manned spacecraft. The first manned space flights were made in early , first by Soviet cosmonaut Yuri Gagarin and then by American astronaut Alan Shepard. From those first tentative steps, to the Apollo program landing on the Moon and the partially reusable Space Shuttle , the American space program brought forth a breathtaking display of applied science. Communications satellites transmit computer data, telephone calls, and radio and television broadcasts. Weather satellites furnish the data necessary to provide early warnings of severe storms. Global positioning satellites were first developed in the US starting around , and became fully operational by Interplanetary probes and space telescopes began a golden age of planetary science and advanced a wide variety of astronomical work. Medicine and health care[edit] Thomas Hunt Morgan won the Nobel Prize in Physiology or Medicine in for discoveries elucidating the role that the chromosome plays in heredity. Gene therapy using an adenovirus vector. In some cases, the adenovirus will insert the new gene into a cell. If the treatment is successful, the new gene will make a functional protein to treat a disease. The private sector has been the focal point for biomedical research in the United States , and has played a key role in this achievement. The goal of NIH research is knowledge that helps prevent, detect, diagnose, and treat disease and disability.

7: Civil War Technology - HISTORY

This course will consider the ways in which technology, broadly defined, has contributed to the building of American society from colonial times to the present. This course has three primary goals: to train students to ask critical questions of both technology and the broader American culture of which it is a part; to provide an historical perspective with which to frame and address such.

8: America on the Move | National Museum of American History

HISTORY OF AMERICAN TECHNOLOGY. pdf

The classic story of Benjamin Franklin finding electricity by traveling outside in a rainstorm is actually true, and he invented the lightning rod after to attract the electri bolts that he witnessed in the storm.

9: Technology in American History | Science, Technology, and Society | MIT OpenCourseWare

A Social History of American Technology fills this gap by surveying the history of American technology from the tools used by the earliest native inhabitants to the technological systems -- cars and computers, aircraft and antibiotics -- we are familiar with today.

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