

Historical Overview of Samuel Colt and Coltsville

The Invention and Adoption of the Colt Revolver

Samuel Colt, though not the first person to conceive of a multiple-shot pistol using a revolving cylinder magazine, perfected the revolver to the point that it became a practical weapon.¹ In 1836, he took out an American patent, supplemented by another patent three years later, which established an effective monopoly on revolvers until 1857. Colt manufactured his first revolver at Paterson, New Jersey, in 1836. That enterprise failed by 1842 because of an insufficient market and a firearm design that was complicated and expensive to produce. Colt's career as a gun manufacturer revived in 1847, when he received a contract from the U.S. Army to make revolvers for use in the Mexican War. Captain Samuel Walker of the Texas Rangers came to visit Samuel Colt in Hartford to suggest an improved revolver design. Colt fulfilled the first order by subcontracting with Eli Whitney's factory in Hamden, Connecticut. This contract provided him with the reputation and resources to establish his own pistol factory, first in rented space (not extant) in Hartford in 1849 and at his own plant six years later.

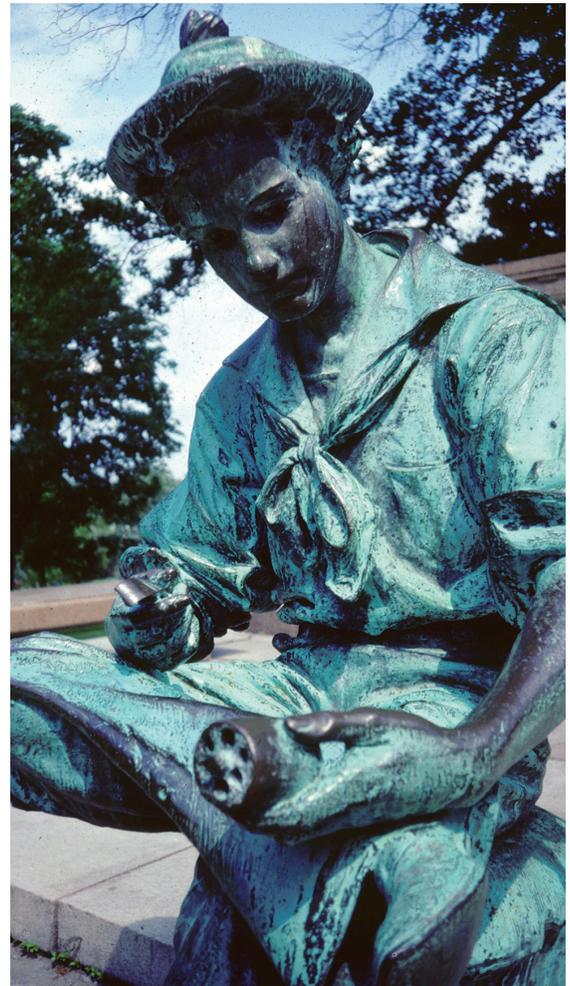
Colt's revolver first attained widespread notice when the Texas Rangers used it against Mexican soldiers in the Mexican War and American Indians during the 1840s. According to historian Walter Prescott Webb's *The Great Frontier*, American settlers were able to occupy the Great Plains because of major technological innovations, with the revolver being "the first mechanical adaptation to the needs of the country."² Historian Robert M. Utley wrote: "On the utility of Colt's product all agreed: a weapon that enabled a horseman to fire six shots without reloading had revolutionary implications."³ The Colt revolver became so commonplace that lower-case "colt" "became a generic term for revolver."⁴

Although historians argue that violence in the West was not as pervasive as popular movies and television suggest, the indisputable fact is that the Colt Fire Arms Company sold hundreds of thousands of revolvers both to the military and civilians. Most men on the Western frontier between the 1850s and the 1880s carried firearms, often a Colt revolver. Those who owned Colt revolvers included John Brown, Bat Masterson, Wyatt Earp, Billy the Kid, Jesse James, Wild Bill Hickock, and Theodore Roosevelt. Mark Twain carried a Colt Navy revolver during his sojourn in Nevada mining camps, remarking in *Roughing It* (1861) that he had "worn the thing in deference to popular sentiment, and in order that I might not, by its absence, be offensively conspicuous, and a subject of remark."⁵ With so many Colt revolvers in circulation, they became an outsized symbol that has lasted into current times. Cultural historian John Cawelti, in *The Six-Gun Mystique*, wrote that the cowboy hero with his Colt six-gun "seemed to reaffirm the traditional image of masculine strength, honor, and moral violence."⁶

Colt firearms have been used by the United States military in all conflicts since the Mexican War. During the Civil War, the United States government purchased 378,000 revolvers and 114,000 rifles from the Colt Fire Arms Company, with contracts exceeding \$4 million. Before the war started, Colt had sold "hundreds of thousands of his weapons to the South with a large discount," according to the *New York Times*.⁷

Precision Manufacturing

Coltsville's national importance in industrialization, during and beyond Samuel Colt's lifetime, is recognized among historians of economic and technological change who show that the firearms industry led the way in pursuing interchangeability of parts and mechanization of virtually all aspects of manufacturing. Historian Nathan Rosenberg wrote that "the making of firearms occupied a position of decisive importance in the development of specialized, precision machinery," and he identified the Colt Armory as the culmination of firearms manufacturing technology.⁸ In his inventory of Connecticut's industrial heritage (1981), Matthew W. Roth concluded:



In front of the Samuel Colt Memorial Statue, which depicts Colt in his prime, is a statue of Samuel Colt as a sailor boy devising the revolving bullet chamber of his pistol. J. Massey Rhind, sculptor, 1905-1906. Colt Park, Hartford, Connecticut. James C. O'Connell, National Park Service.



Colt's New Model Holster Pistol, .44 caliber, 1862. Wadsworth Atheneum Museum of Art. Bequest of Elizabeth Jarvis Colt. 1905.996.

*Samuel Colt and his armory claim a place of central importance in the nation's history. . . . Colt's manufacturing processes constitute a crucial episode in the development of metalworking technology. The work begun at Colt's in the 1850s under superintendent E. K. Root drew from prior experience in production of textile machinery, firearms and consumer hardware to create a synthesis of technique that provided the basis for metalworking innovations into the 20th century.*⁹

Eugene S. Ferguson, a leading historian of American technology, called the Samuel Colt armory “a showpiece of mechanization.”¹⁰ The specialized machinery, especially Root's drop presses, “found wide application in many other industries.” David Hounshell's comprehensive account of American manufacturing, *From the American System to Mass Production: The Development of Manufacturing Technology in the United States*, identified Samuel Colt's armories in Hartford and London as “the prime showplaces of American manufacturing technology” of the era.¹¹

Although it is difficult to isolate the achievements of individual companies and inventors in a prolonged process of gradual improvement, it is undeniable that Samuel Colt's armory contributed significantly to advances in precision manufacturing. Revolver parts required close tolerances and free-moving parts. If they were not made to precise specification, they could jam or cause an explosion. Colt and his successors brought together a host of innovative manufacturing techniques that allowed the nearly complete mechanization and standardization of parts for firearms production.

The foremost technological innovator at the Colt factory was Elisha K. Root, who managed the manufacturing processes at the plant between 1849 and his death in 1865. Root, who had originally developed advanced drop-forging techniques at the Collins ax factory in Collinsville, Connecticut, was the model for the inventive genius in Mark Twain's *A Connecticut Yankee in King Arthur's Court*. Root developed an automated drop forge that allowed machinery to do metalwork. His drop forge pressed a heavy weight onto a soft piece of hot iron that had been placed in a steel die, producing the shape of the part that was needed. Root used power-driven machines to perform the manufacturing functions at the Colt Fire Arms plant, creating a manufacturing process for making a revolver that had 450 integrated steps.¹² Joseph Wickham Roe, in *English and American Tool Builders*, wrote of Elisha Root: “He invented the best form of drop hammer then in use, machines for boring, rifling, making cartridges, stock turning, splining, etc., and worked out the whole system of jigs, fixtures, tools, and gauges. The credit for the revolver belongs to Colt; for the way they were made, mainly to Root.”¹³

The Colt Fire Arms Company was part of the precision manufacturing region in the Connecticut River Valley that developed the “American System of Manufacture,” which emphasized machine production of standardized parts and attracted great attention in Europe in the mid-19th century. The so-called “Precision Valley,” stretching from New Haven through Hartford in Connecticut to Springfield, Massachusetts, and Windsor, Vermont, contained the most advanced manufacturers in America during the 19th century and into the 20th century. Colt's production and quality control techniques incorporated “armory practices” developed at the Springfield Armory, 25 miles to the north, and such private factories as Robbins and Lawrence in Windsor, Vermont; Simeon North in Middletown, Connecticut; and Eli Whitney in Hamden, Connecticut. The synergy between gun makers and machine tool builders who supplied them with manufacturing equipment had ramifications far beyond firearms.

The Colt Company played a major role in disseminating precision technology throughout American industry. Merritt Roe Smith is one of several historians of technology who demonstrate that technical innovations developed by firearms manufacturers, particularly the Colt Fire Arms Company, “spread to technically related industries and by the late 1850s could be found in factories making sewing machines, pocket watches, railroad equipment, wagons, hand tools. From these beginnings it was only a matter of time before the new technology found applications in the production of typewriters, agricultural implements, bicycles, gramophones, cameras, automobiles, and a host of products associated with the mass production industries of the twentieth century.”¹⁴ Hartford companies specialized in manufacturing sewing machines, typewriters, bicycles, automobiles, and machine tools. The precision manufacturing technology developed there spread to factories across the country during the latter 19th century.

The National Park Service’s *Connecticut River Valley Special Reconnaissance Study* (1998) found that precision manufacturing created a distinctive, highly-advanced industrial region in the Connecticut River Valley:

*Precision manufacturing is associated with a distinctive social and architectural landscape, paralleling but different from the complexes formed by the textile industry elsewhere in New England, or the heavy industry of Pennsylvania. The higher skill level and consequent higher earnings of many workers in the precision trades seems to have encouraged the development of more prosperous, stable communities. There was a prestige associated with arms-making, particularly in manufacturing the weapons used in national defense.*¹⁵

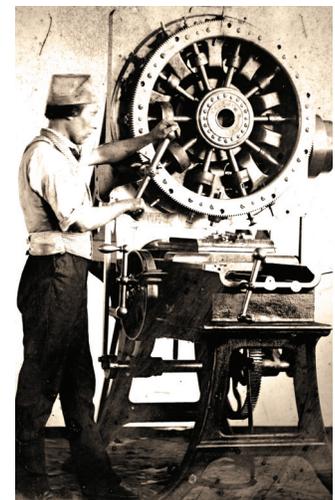
Connecticut River Valley manufacturers constantly exchanged technological solutions and skilled workers moved from company to company. Developments in arms-making were adapted to manufacture other metal products. William Hosley, in *Colt: The Making of an American Legend* (1996), wrote that the Connecticut River Valley’s evolution into a “Precision Valley” in the 1850s occurred because of a “coalescence of creativity and capital that made the river towns of Connecticut, Massachusetts, Vermont, and New Hampshire what California’s Silicon Valley is today, the vanguard of an internationally significant, technology-based transformation.”¹⁶

The Colt armory became known as the acme of precision manufacturing, in part because the company gave tours and arranged for favorable publicity. Mark Twain visited the Colt armory in 1868 and wrote an admiring account:

*It comprises a great range of tall brick buildings, and on every floor is a dense wilderness of strange iron machines. . . a tangled forest of rods, bars, pulleys, wheels, and all the imaginable and unimaginable forms of mechanism. . . It must have required more brains to invent all those things than would serve to stock 50 Senates like ours.*¹⁷

When the U.S. Census Bureau published a detailed report on the nation’s firearms industry in 1880, it featured the Colt armory as a leader in precision manufacturing and described and pictured several Elisha Root innovations, including drop forging (four-fold screw-drop & crank-drop), the edging or jiggig machine, double turret lathe, and Colt chucking lathe.¹⁸

Another indicator of the Colt Company’s leading role in manufacturing technology was its choice by the Russian government as manufacturer of rifles in the late 1860s. Russia arranged to have 30,000 Colt-Berdan rifles made at the Colt factory. They also used Colt’s Hartford factory as the model for the Czar’s own armory and tested their armory machinery in Hartford before shipping it to Russia.¹⁹ The business of arms manufacture fluctuates greatly, affected by external political forces. When the firearms business slowed at Colt’s, usually between wars, the company manufactured products other than firearms under its own brand name. It also manufactured products contracted for by other companies and rented space to other manufacturers. Often these businesses drew upon the skilled workforce and technological innovations of the Colt Fire Arms plant. Most touted their manufacturing address as “Colt’s Armory” in their advertisements, trading on the company’s reputation for reliability and precision manufacture. The prototype for the 18,000-part Paige typesetter, which Mark Twain lost a fortune investing in, was made at the Colt factory. Successful Colt-made products included Baxter Portable steam engines; Noark electrical equipment, such as switchboxes; Morrison and Charter Oak sewing machines; Universal printing presses; Thorne’s



Right: At the time of the Civil War, the Colt factory used 450 mechanized steps in the process of manufacturing a revolver. This revolver frame jigging machine was designed and patented by Samuel Colt to cut the exterior and interior surfaces of a frame. Photo ca. 1857. Museum of Connecticut History.

These workers are using a deburring machine to remove burrs and sharp edges from the components of pistols.
Photo ca. 1857. Museum of Connecticut History.



typesetting machines; Federal adding machines; Charter Oak and Archimedean lawn mowers; Autosan commercial dishwashers; and Railway Alarm ticket punches for trains and streetcars. The Colt Plastics division, which operated between 1920 and 1955, manufactured firearm grips, electric plugs and outlets under the name “ColtRock,” buttons, costume jewelry, and other consumer products.²⁰

One of the methods that Samuel Colt used to promote innovation and manage workflow was to provide “inside contractors” space in his factory. He would contract with these engineers to produce certain gun parts, but would allow them to take in business from other companies and employ their own workers. Many important manufacturing innovators got their start at the Colt Fire Arms factory and moved on to establish their own businesses. They included rifle-maker Christopher Spencer; machine-tool manufacturers Francis Pratt and Amos Whitney; George A. Fairfield, later Superintendent of the Weed Sewing Machine Company and the Hartford Machine Screw Company; steam engine innovator Charles B. Richards, who became chair of the Department of Mechanical Engineering at the Yale University Sheffield Scientific School; William Mason, master mechanic for the Winchester and Remington rifle companies; Henry Leland, automobile engineer and founder of the Cadillac and Lincoln automobile companies; William Gleason, founder of bevel gear industry and The Gleason Works, in Rochester, NY.²¹ Benjamin B. Hotchkiss, a former master mechanic at the Colt plant, designed and manufactured a machine gun that was adopted by the French Army in 1897.²² Matthew Roth, in *Connecticut: An Inventory of Historic Engineering and Industrial Sites*, summarizes by saying that “Graduate apprentices or workmen from Colt and Pratt & Whitney worked throughout Connecticut’s metals industries, bringing with them knowledge of machine construction in such areas as bearings, clutches, drive linkages, gearing and lubrication.”²³

In a broader sense, the Colt Fire Arms Company illustrates the major phases of development of urban industrial districts, as described in the “American Labor History Draft Theme Study.” The most relevant section of this theme study, “American Manufacture: Sites of Production and Conflict,” explains that urban industrial development proceeded through the following stages: the early innovations in precision metal-working and standardized parts production, the rise of diversified urban manufacturing centers in the mid-19th century, the development of a military-industrial complex in World War II, and deindustrialization of the late 20th century.²⁴

Samuel Colt’s Business Achievements

In addition to the contributions to the “American System of Manufacture” made by his company, Samuel Colt was notable for his organizational and marketing achievements. He made skillful use of the patent system to consolidate a monopoly position for 20 years. He demonstrated the axiom that inventions only become adopted when they are successfully marketed. Colt created a powerful brand name out of his own surname, making “Colt” nearly synonymous with the revolver.²⁵ Felicia Johnson Deyrup, in *Arms Makers of the Connecticut Valley*, wrote, that more than any other arms maker, Samuel Colt realized the importance of stimulating demand through aggressive sales promotion.²⁶

He was an indefatigable and sometimes unscrupulous promoter of his wares, marshaling his colorful personality, appearances before government officials, and major exhibitions in an all-out effort to create a brand name to market his revolvers. Combined with a high-quality product and his company’s demonstrated ability to produce it in quantity, Colt’s promotional activities assured success. Like other 19th-century entrepreneurs, Colt made ample use of testimonials, such as those from Captain Samuel Walker of the Texas Rangers and the crowned heads of Europe and Asia. Colt

regularly sent specially engraved presentation versions of his revolvers to government officials, military heroes, titled nobility, and anyone else who might praise his wares and influence their purchase. After his death, the Colt Fire Arms Company continued this practice.

Samuel Colt generated a great deal of favorable publicity when he participated in the 1851 Crystal Palace Exhibition in London, where his revolvers awed visitors. He addressed the British Parliament and the British Institute of Civil Engineers, delivering a paper entitled “On the Application of Machinery to the Manufacture of Rotating Chambered Breech Firearms and the Peculiarities of the Arms.” These appearances cemented Colt’s reputation, and that of the “American System of Manufacture” in England. After a Parliamentary board toured Connecticut Valley factories, including Colt’s, in 1853, the British government furnished its armory at Enfield almost entirely with American machinery. From 1853 to 1857, Colt established one of the first significant American factories abroad, operating a large factory in London, which supplied the British military during the Crimean War. He formed license agreements abroad, which forestalled potential copyists and brought in revenue that otherwise would have been lost. Colt traveled widely in Europe in the 1850s, cultivating contacts in the governments of all major countries, including Russia, where he was presented to Czar Nicholas I and became a major provider of arms to the Russian government during the Crimean War. He also provided firearms to their adversaries, the British and the Turks, prefiguring the rise of America’s international weapons industry.



Catlin the Artist Shooting Buffalos with Colt's Revolving Pistol.
George Catlin, 1855.
Wadsworth Atheneum Museum of Art. The Ella Gallup Summer and Mary Catlin Summer Collection Fund, 2005.2.1.

Samuel Colt was a master of public relations. In 1855, he hired noted artist George Catlin to paint pictures of himself on Western adventures using a Colt revolver.

Samuel Colt’s pioneering efforts at marketing resulted from the need to generate business during the lulls between warfare and military contracts. Using his flair for publicity, Colt targeted individual consumers and arranged to have descriptions of his revolver and factory widely published in newspapers and magazines. One of his bolder strokes was to commission artist George Catlin to produce a series of ten paintings and six mass-market lithographic prints illustrating Catlin’s adventures in the West using Colt’s firearms. Colt even used the exotic architectural features of his mansion Armsmead and the blue onion dome surmounting his factory to help brand his enterprise. Because of its symbolic value, Elizabeth Colt had the blue dome rebuilt after the East Armory burned in 1864. Betsy Hunter Bradley, in *The Works: The Industrial Architecture of the United States*, called Colt’s blue onion dome “one of the most distinctive interpretations of the industrial building tower. . . . The presence of the tower can best be accounted for by the pragmatism and profit motive that drove the design of industrial buildings.”²⁷ At a time when mass marketing and advertising were in their infant stages, Samuel Colt led the way by making his exploits virtually synonymous with the firearms he was selling.

Arms factory was one of the first to abandon the hollow square layout for the H form in order to obtain more natural light on the factory floor. The armory's new layout also shortened the lines of travel between operations and provided separate work rooms.²⁹

The factory reconstruction entailed installation of Porter-Allen engines to run the machinery. These were the first large scale direct-connected high-speed engines in the country. Originally seen as a radical departure, these engines entered widespread use between the 1870s and the first decade of the 20th century.³⁰

In the decades after Samuel Colt's death, the Colt Fire Arms Company maintained a competitive edge in small arms manufacture by pursuing a deliberate business strategy to stress innovation, both by internal product development and by attracting outside inventors, and to develop close ties with the U.S. military, particularly with the Springfield Armory. The company hosted regular visits from Springfield Armory officers inspecting ordnance work being done for the federal government.³¹ During this period, the Army Ordnance Department designed rifles and cannon, but turned to the private sector for handguns and machine guns. By remaining in the forefront in development of both types of weapons, Colt Fire Arms retained a strong position in dealing with the Army.

The Colt factory's reputation for technological innovation helped to attract weapons pioneers such as Richard Jordan Gatling and John M. Browning to manufacture their machine guns. Although they operated independently as inventors, they chose the Colt Company for machining, testing, and mass production of their designs. With most inventions, the key to their realization is not simply an innovative design; it has to be manufactured at a superior level of quality, in large quantities, at a reasonable cost. Colt Fire Arms was not the only company manufacturing innovative small arms in the late 19th and early 20th centuries, but gun designers such as Gatling and Browning believed it was the largest and most technologically advanced.

When the U.S. Army officially adopted the Gatling gun, the world's first effective machine gun, in 1866, inventor Richard Gatling arranged for the Colt Company to manufacture the weapon. Gatling located his small research company in the Colt Fire Arms factory, which made 25 models of the Gatling gun until it became obsolete around 1911.

Similarly, when John M. Browning, a prolific mechanical genius who accumulated 128 patents on 80 different firearms, undertook to develop a machine gun, he went to Colt Fire Arms because the company had been manufacturing Gatling guns and he believed it had the most extensive experience dealing with the federal government.³² Although Browning designed weapons that were manufactured by other companies, he maintained space for research and development at the Colt plant because of its advanced capacity for designing and producing firearms.³³ Browning had a particularly close relationship with the long-time Colt Fire Arms production manager Fred Moore. Colt historian Ellsworth S. Grant summarizes by saying that Browning, "the foremost living perfecter of firearms," had "his longest and last association with Colt's—one that extended over a period of nearly thirty years."³⁴

Colt Fire Arms and Browning originally sold the Colt Model 1895 Automatic Machine Gun, the first fully automatic weapon purchased by the United States military, to the U.S. Navy, which used it in the Spanish-American War and the Chinese Boxer Rebellion.³⁵ The U.S. Army started purchasing this model a decade later. As for the Colt .45 Browning Automatic Pistol, Colt Fire Arms convinced the U.S. Army to adopt the automatic pistol as its official sidearm in 1911. Because of its reliability, the Army used this legendary handgun (M1911) through the Korean War.³⁶

World War I brought a surge of prosperity to the Colt Fire Arms Company. The company supplied .45 caliber automatic Browning pistols to Russia and Great Britain both openly and secretly through Canada before the United States entered the war in 1917. As a result, sales grew from \$2.2 million in 1914 to \$10 million in 1916, while employment increased from 1,056 to 2,400. The company had its most profitable year in 1916, when it netted \$6,346,000 in earnings.³⁷

During the war the machine gun became the defining weapon of trench warfare and the source of much of its horror. Historian John Ellis, in *The Social History of the Machine Gun*, attributes the industrialization of warfare that occurred with World War I to the development of the machine gun.

He argues that Americans, in contrast to Europeans, who began the war with a romantic devotion to individual initiative and only grudgingly adopted the machine gun and the tactical adjustments it demanded, developed this lethal technology because of their “faith in the unlimited potential of machines.” This attitude was prevalent at the Colt Fire Arms Company, where its long-standing experience manufacturing the machine guns of Gatling and Browning placed it in a leadership position during the war.³⁸

Despite the intellectual predisposition of Americans to accept the machine gun and the leading role of American inventors, backed by the Colt Company, in developing it, the U.S. Army entered World War I woefully ill-equipped with these weapons. When the U.S. declared war in 1917 the Army possessed only 1,300 relatively modern machine guns, and the first American troops arriving on the Western Front had to be equipped with French armament, much of it of inferior quality.³⁹

As one of the only two armories in the United States capable of producing machine guns, with the Army’s Rock Island Arsenal, the Colt Fire Arms Company became vital in the nation’s forced military buildup. In December 1916, the U.S. Government contracted with Colt Fire Arms to supply 4,000 Maxim-Vickers machine guns, based on the model originally designed by Hiram S. Maxim and used by the British Army in World War I. Soon after the declaration of war, John Browning set up shop at the Colt Fire Arms factory, completing the design of a heavy machine gun and a light automatic rifle, both .30 caliber, and making constant improvements in manufacturing techniques. The first of Browning’s automatic rifles (BARs) reached the front in July 1918. At the close of the war, Browning successfully tested the .50 caliber machine gun, which was an essential infantry weapon through World War II and the Korean War.

During World War I, Colt Fire Arms manufactured 487,700 Browning automatic pistols (96% of those weapons manufactured), 151,700 Colt revolvers (50% of all Colt revolvers), 10,000 .30 caliber Browning Automatic Rifles (17% of all Browning Automatic Rifles), and 13,000 Maxim-Vickers machine guns (100% of all Maxim-Vickers machine guns) for the U.S. Army and allied armies. The U.S. Army was responsible for procuring automatic pistols, revolvers, and machine guns for both the Navy and the Marine Corps during World War I and World War II.⁴⁰ In addition, the Colt Company completed 41,000 machine guns, 43,000 automatic rifles, and 150,000 M1911 pistols under contract with several other arms manufacturers.⁴¹ With Colt Fire Arms patents, production drawings, machine tools, and management supervision, Westinghouse manufactured the M1917 Browning machine gun, Winchester made the M1918 Browning Automatic Rifle, and Remington produced the Colt M1911 pistol. Satisfactory fulfillment of these contracts entailed the transfer of innumerable examples of unwritten “shop practice” that expanded on mechanical drawings, a demanding process. Since no single corporation had all the necessary production capacity, this kind of enforced sharing was critical to the war effort.⁴²

To fill the extraordinary demands of the war, the Colt plant underwent a major expansion in 1916, adding the South and North Armories, the Machine Shop, and several smaller structures. This expansion effectively doubled the capacity of the plant. The World War I additions were constructed by Aberthaw Construction Company, an innovator in the construction of concrete factories. The Colt Fire Arms Company’s wartime employment peaked at 10,000 in 1918, when the company’s revenues reached \$32 million. Over the course of the war it shipped a total of \$66 million worth of munitions and earned \$21.5 million.⁴⁴

Wartime experience confirmed the rapidly increasing importance of military aircraft. The Colt company, characteristically, was determined to retain its leadership position in this promising technology. During the war the Colt Fire Arms Company converted some of the Maxim-Vickers machine guns to use on airplanes, as it was the only weapon that could be synchronized to fire between propeller blades. Following the characteristic course of weapons development, the success of this offensive weapon created the demand to counterbalance it, and the U.S. Army and Colt Fire Arms placed a high priority on developing an anti-aircraft gun to fill the gap between the machine gun and artillery. In 1921, John Browning successfully tested a .37 mm anti-aircraft cannon, his last invention, at the Colt factory. Testifying to the unrivaled capabilities of the Colt armory and his special relationship with it when the U.S. Army contracted to develop the cannon, Browning told his colleague Fred Moore, “Well, we’d better make this model at Colt. It’s getting too big for our shop out West. I’ll go up to Hartford with you from Washington, and we can start the drawing.”⁴²

According to the U.S. Ordnance Department official history, after Browning's death, "Colt's Patent Fire Arms Company pushed forward work upon a .37 mm."⁴⁷

Between the wars, when military orders were intermittent and small, the Colt Company maintained and updated the technological capacity to research, develop, and produce advanced weapons, whether they were handguns or machine guns. The company improved the ballistic and cooling characteristics of the .30 mm Browning machine guns and adapted them for use in airplanes as well as improving and standardizing the .50 mm Browning machine gun.⁴⁸ With employment reduced to a base of about 1,000, Colt continued manufacturing firearms for the military and private markets. It was the sole manufacturer of Government-model Browning automatic pistols between the wars, making approximately 150,000. The company also was the sole manufacturer of Thompson submachine guns (designed by John T. Thompson) for the military and police forces. Prohibition-era gangsters gave the Thompson considerable notoriety, and in 1934 the federal government severely restricted civilian ownership of "tommy" guns and other fully automatic weapons. Colt Fire Arms also continued to manufacture the Browning Automatic Rifle for police use and export.

Despite meager arms purchases by the U.S. Army and the onset of economic depression, the Colt Fire Arms Company weathered the 1930s, and even maintained a dividend (though achieved in part by drawing on accumulated surpluses). It also endured the devastating Connecticut River flood of 1936, after which a new dike was built. Company executives continued the tradition of paternalism, apparently retaining older employees and keeping more employees on the payroll than were strictly needed, though a strike in 1934 eroded these traditions.

Determined to avoid a repeat of the humiliating experience of World War I, when the U.S. was unable to properly arm its soldiers, the Ordnance Department expended some of its limited resources to study and plan for wartime production. Colt Fire Arms Company was a key partner in this effort. As the owner of Browning military weapons patents, it worked with the Ordnance Department to improve the ballistic, cooling, and rate of-fire characteristics of .30 and .50 caliber Browning machine guns.⁴⁹ Under contract with the Ordnance Department, the Colt Fire Arms Company made production studies of these guns and helped prepare descriptions of their manufacture.⁵⁰

During World War II, another major buildup occurred at the Colt Fire Arms Company, and the plant became an important component of the "Arsenal of Democracy," which has been described in the "National Historic Landmark Draft Theme Study: World War II and the American Home Front." The theme study finds that "Most historians agree that World War II was won as surely on the American home front as it was on the battlefield."⁵¹ The remarkable ability to manufacture vast amounts of weapons and military supplies gave the United States and its allies a decisive edge in the war. The "Home Front" Theme Study has identified "places associated with production," including ordnance plants, as property types worthy of preservation and interpretation.

The Colt Fire Arms Company was the only company that had maintained an active capability to make machine guns during the interwar years. It held the patents on the .30 mm and .50 mm Browning machine guns, which had been adopted as standard by the U.S. armed services.⁵² The .50 caliber was especially valuable because it could be converted to tank, aircraft, or anti-aircraft use. Colt Fire Arms was the sole existing source for the .37 mm Browning anti-aircraft gun. The classic Colt M1911 pistol was also the standard military pistol, though handguns received a lower priority in wartime production. In the fall of 1939, during the so-called "phony war," the British had agreed to finance an expansion of the Colt plant to produce Browning machine guns, but these plans were overtaken by the swift German successes in the West in the spring of 1940.⁵³ Alarmed by this "Blitzkrieg," the U.S. in July 1940 appropriated \$50 million for small arms and ammunition, and Colt Fire Arms received a portion of this order.⁵⁴

In 1939, the Colt Fire Arms Company plant employed 2,600 workers. Employment grew to 7,000 in 1941 and peaked at 16,000 in 1944, when satellite Colt plants were opened in the Hartford area. Colt's production in World War II included 575,600 Colt .45 caliber automatic Browning pistols (31% of those manufactured), 38,000 .30 caliber Browning aircraft machine guns (5%), and 240,600 .50 caliber Browning machine guns (13%).⁵⁵ These weapons continued to be used by the United States Army, Navy, and Marine Corps, and the armies of other countries for decades after World

War II. The company's production of 37-mm guns, both aircraft and anti-aircraft, was essential. Under intense pressure from Ordnance officers, Colt Fire Arms produced more than 6,000 of these machine guns for mounting on U.S. warplanes in the desperate year of 1942.⁵⁶

The U.S. Army licensed the patents for Colt-model automatic handguns, rifles, and machine guns and contracted with several other large corporations to manufacture them because the demand was greater than the Colt Fire Arms Company could fill on its own. The Colt Fire Arms Company, serving as a workshop for firearms design and production, provided the original designs and machine tools to other corporations. According to the *New York Times*, "The century-old Colt Company not only is producing the world's fastest machine gun in larger quantities and greater quality but is assisting half a dozen other potential producers to get underway."⁵⁷ General Motors received a contract to manufacture .50 caliber Browning machine guns.⁵⁸ Other companies included General Motors subsidiaries, Frigidaire, AC Spark Plug, Saginaw Gear Works, and Brown Light Works, as well as Buffalo Arms Company, Ithaca Gun Company, Kelsey Hays Wheel, Singer, Savage Arms Company, and Union Switch & Signal Company.

The Colt Fire Arms Company received the Army-Navy "E" award for production, but this honor concealed underlying problems. Despite initial advantages such as the long-standing partnership with the Army and long-standing experience in production, the company's performance in World War II was somewhat disappointing, especially when compared to its brilliant achievements in the previous war. Even while the Colt Fire Arms Company was producing weapons at a prodigious rate to support the war effort, it contrived to lose money beginning in 1943. The subsequent decline was foreshadowed by these wartime troubles.

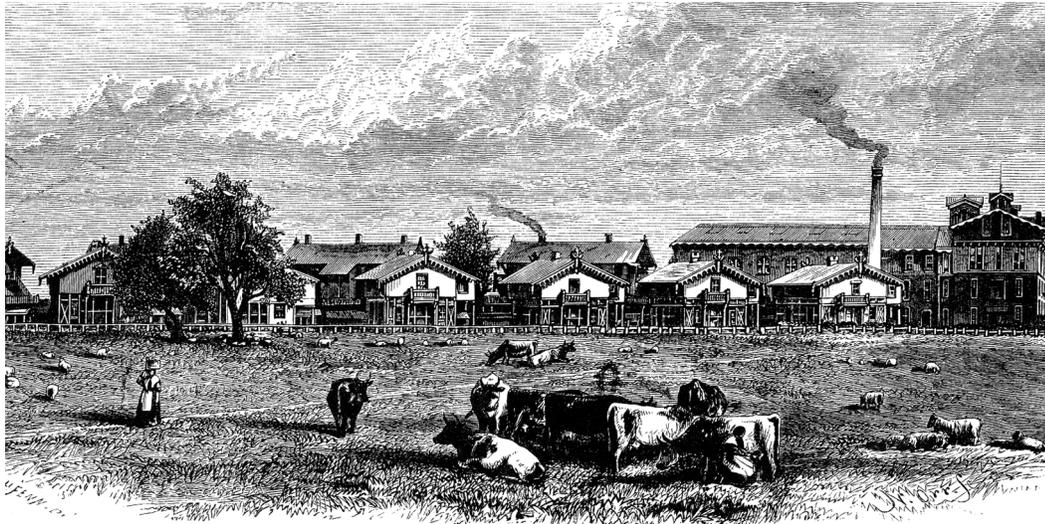
It appears that the deeply rooted corporate culture that had brought success to Colt Fire Arms Company in the past began to work to its detriment. Traditional paternalism became inadequate in a time of increasing labor militancy, and the company had difficulty managing its greatly expanded workforce. Some of the manufacturing equipment and techniques tended to be outmoded, and the Colt Fire Arms customary stress on precision workmanship became increasingly out of place in a war that emphasized quantity and shortcuts.⁵⁹ Newcomers to weapons manufacture, unencumbered by accumulated precedent, were actually often at an advantage.⁶⁰

By 1946, military orders had ceased and the number of Colt Fire Arms Company employees plunged below 1,000. Demolition of some Colt armory buildings began in 1947. The company struggled and was bought out by the conglomerate Penn-Texas in 1955. The main plant moved to West Hartford, but production of the Colt AR-15 and M-16 automatic rifles, introduced in 1960 and used by the American military since the Vietnam War, took place in the Machine Shop of the historic plant. The Colt Fire Arms Company finally abandoned its remaining operations at the Coltsville plant in 1993 and now all of its operations are headquartered in West Hartford. The Hartford area maintains a connection to the great age of precision manufacturing through the presence of the Colt Fire Arms Company and many independent machine shops. Most prominent among today's heirs of precision manufacturing is Pratt & Whitney Aircraft, which was spawned by Pratt & Whitney Machine Tools, which in turn grew out of the Colt Fire Arms factory.

The Creation of Coltsville

For nearly a century, the Colt Fire Arms Company was a national leader in small arms production and precision manufacturing. The industrial district known as Coltsville that Samuel Colt developed around his factory was an important example of a mid-19th-century planned urban industrial district. It expresses his assumptions about proper industrial design and is noteworthy because it represents a stage between the largely spontaneous villages that grew up around New England's water-powered textile mills and the (much less common) examples of totally planned industrial towns, such as Lowell, Massachusetts, and, later, Pullman, Illinois. The model industrial community created by Samuel and Elizabeth Colt included housing, recreation, and spiritual comfort. Coltsville's layout and individual features revealed the paternalistic and hierarchical attitudes that guided them, though the Colts' brand of paternalism was relatively benign. The Colts did not project stringent social control and moral supervision, mainly because the Colt Company was geographically integrated with the rest of Hartford and provided housing for only a fraction of its employees.⁶¹

Earlier in the 19th century, hundreds of textile mill communities had sprung up around water privileges in New England. In most of them there was no pre-existing settlement, so the entrepreneurs had to provide housing for their employees. Unlike them, Coltsville was developed as a neighborhood within an existing city. It represented the “metropolitan path to industrialization” described in the “American Labor History Draft Theme Study.” This study has identified the old walking cities that were involved in diverse industrial production as meriting attention, particularly since many of these industrial districts have disappeared due to urban renewal and deindustrialization.⁶² In contrast to the single-industry communities that arose in many parts of the country, particularly the New England textile towns, the “metropolitan” industrial centers produced numerous, synergistic industries. Hartford offers a good example of this: its first major industry—gun-making—spun off manufacturers of machine tools, sewing machines, typewriters, bicycles, automobiles, and aircraft engines.



View of “Potsdam” cottages and willow ware factory (no longer extant) on Curcombe Street. The cottages were named after “Potsdam” because they were designed in a German style that might appeal to willow ware workers Colt was recruiting from Germany. *Henry Barnard, Armsmear, 1866.*

In the early 1850s, Samuel Colt, after manufacturing his pistols in space leased from others, decided to create his own industrial settlement in the South Meadows section of Hartford, a sparsely developed area prone to flooding from the nearby Little River and Connecticut River. Since the South Meadows had not been considered buildable, Colt was able to purchase the land at a low price. He set about building a large, steam-powered factory, housing and social facilities for workers, and his own mansion Armsmear.

In order to make South Meadows secure for development, Colt built a dike along the bank of the Connecticut River. The dike and the first armory buildings were completed in 1855. Colt laid out a grid of streets, using romanticized names that recalled Hartford’s origins. Street names commemorated the Native American occupancy and the Dutch presence, when the Connecticut River formed the eastern boundary of New Netherlands. Coltsville was connected to the rest of Hartford by the first omnibus and streetcar lines in the city. It was an integral part of Hartford, helping to spawn factories across the city, including Pratt & Whitney machine tools, Pope bicycles and automobiles, Royal typewriters, Underwood typewriters, and Atlantic screws. With its precision manufacturing and the emerging insurance industry, Hartford was one of the wealthiest American cities per capita by the early 20th century.

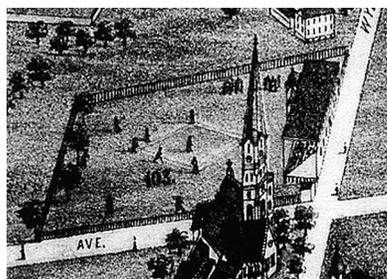
Soon after the armory was completed, Samuel Colt added 20 six/eight-family houses (10 of which survive) on Huyshope and Van Block Avenues to attract and retain skilled workers in a competitive labor market. Initially machinists, toolmakers, and other craftsmen lived there, but by the 1880s the blocks were primarily occupied by the families of unskilled laborers. The more affluent employees found better housing opportunities elsewhere in the city.⁶³ Colt’s housing for workers was dissimilar from the boardinghouses built in New England textile cities like Lowell and Lawrence, Massachusetts, which were originally designed to exert paternalistic social control over the single young farm girls, who were the original employees. The growth of Colt’s enterprise meant that only a small proportion of employees could be housed on company property. Samuel Colt’s paternalistic vision of a self-contained industrial community gradually faded as Hartford became a complex industrial city with a wide array of employers.



“Potsdam” cottages today. Some of the other “Potsdam” cottages now have modern siding. *James C. O’Connell, National Park Service.*



An integral element of Samuel Colt's industrial community was the Colt Willow Ware Manufacturing Company, established in 1859 to make use of the willow trees that were planted to stabilize the earthworks of the dike. This subsidiary employed about 120 people, who made baskets, wicker furniture, picture frames, and similar items from willow trees. Colt hoped that the wives and children of his pistol makers would find useful employment at the willow ware factory. The "Potsdam" cottages (nine of the original 10 survive) were designed in a "Carpenter Gothic" style reminiscent of Germanic styles to make them attractive to the German willow workers Colt recruited to staff the factory. The willow ware complex also included several eighteen-family tenements, which have been demolished. The willow ware factory building itself was never rebuilt after a fire in 1873. Even before the willow ware operation was discontinued, armory workers occupied some of the cottages.⁶⁴



In 1876, the Hartford Dark Blues baseball team became a charter member of the National League.

After one season, the franchise moved to Brooklyn and later became known as the Dodgers.

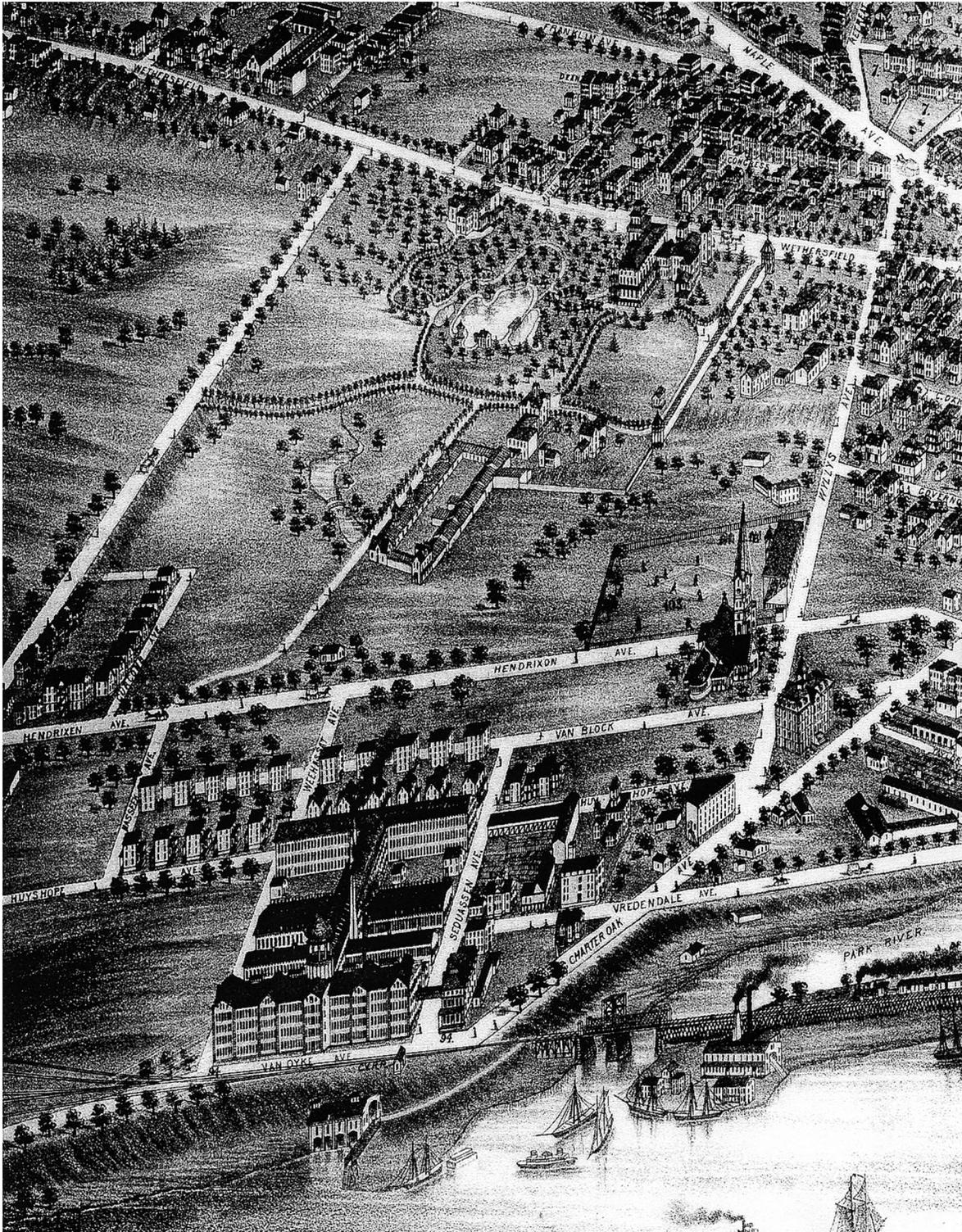
This close-up of the "Bird's-Eye View" shows the playing field on the left and the grandstand on the right. From *The City of Hartford, Connecticut, 1877*. Connecticut Historical Society.

Samuel Colt believed that it was important to create a stable community for his workers, a community which expressed the social hierarchy of owners, managers, and workers. It was especially important to provide amenities for the skilled workers he was trying to attract, many of whom were recruited from Germany. He provided varied recreational and educational facilities for his employees.⁶⁵ Charter Oak Hall (no longer extant) contained reading rooms, classes in art and music, and an auditorium for lectures, entertainments, and dances. Colt created a German beer garden and sponsored militia companies—Colt's Armory Guards and Colt's Rifle Regiment. The Colt Band was a fixture at parades and civic events in Hartford through World War II. The company also sponsored baseball teams, an Armory Glee Club, an Armory Dramatic Association, and Mechanics Balls. On July 4th, Colt sponsored fireworks displays and picnics on the grounds of his estate, which later became Colt Park. On the Colt-owned property now occupied by the Caldwell Colt Memorial Parish House, the Hartford Dark Blues baseball team played as a charter member of the National League in 1876. The baseball field, which was used during the 1870s, included one of the nation's first wooden grandstands. Colt factory workers were often spectators at these early major league baseball games.

Mrs. Elizabeth Colt, the daughter of a prominent Episcopal minister, endowed the Coltsville neighborhood with an Episcopal church, combining paternalism with her sustained effort to perpetuate a carefully controlled version of her husband's memory. The Episcopalian denomination was the church of many of Hartford's leading families. Colt historian Ellsworth S. Grant observes that "To be an Episcopalian was to reach the pinnacle of social success . . . closer to those who composed the power structure of the city and to their wives who dictated social behavior, like Mrs. Samuel Colt."⁶⁶ Her Church of the Good Shepherd reinforced the social status of the owners while expressing the importance of religion as an influence in an industrial community. As Grant notes, "As long as Mrs. Colt lived it was a sensible idea for Colt executives to belong to the Church of the Good Shepherd."⁶⁷ Despite the elite status of the Episcopal Church, the Church of the Good Shepherd was attended by a cross-section of company executives and workers, growing continuously from its founding in the 1860s until well into the 20th century.⁶⁸ As further expression of her concern about the religious and social welfare of working people, Mrs. Colt built the Caldwell Colt Memorial Parish House to provide such amenities as a kindergarten, Sunday School, library, sewing room, cooking school, gymnasium, pool tables, and bowling alleys (in addition to serving the purposes of commemorating her son).⁶⁹ The church and parish house are located two blocks northwest of the factory complex.

Samuel and Elizabeth Colt built an elaborate mansion several blocks from the industrial complex in 1857 and called it Armsmear. Samuel Colt himself was responsible for the overall design, working with local architect Octavius Jordan. Armsmear featured Italianate and Moorish decoration.⁷⁰ Next to P.T. Barnum's Iranistan in Bridgeport, Connecticut, Colt's Armsmear was considered the "most exotic house . . . incorporating some Eastern features" anywhere in America before the Civil War.⁷¹ After Samuel's death, Armsmear was home to Elizabeth Colt and her brother Richard Jarvis, who served as president of the company until it was sold to New York investors in 1901. Samuel and Elizabeth's son Caldwell Colt also lived there, though his contributions to the company's management were small. A second large Italianate villa house on the grounds of Armsmear was built to house Samuel Colt's brother James. James Colt was Samuel's close associate in his early dealings. James Colt left the company when the two brothers fell out in 1859. During the 1880s Elizabeth Colt built four houses, two of which remain, on the southern edge of the estate, fronting on Wethersfield Avenue, for armory managers and their families and the rector of the Church of the Good Shepherd.



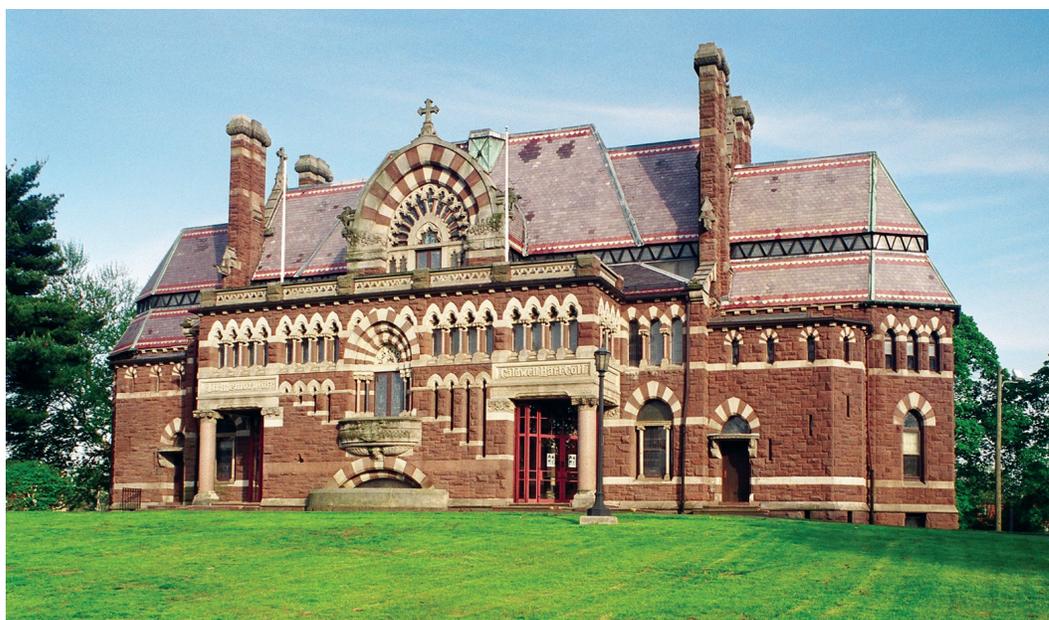


As originally designed, the Colt estate grounds, now Colt Park, illustrated the hierarchical nature of the Coltsville community, as conceived by Samuel and Elizabeth Colt. The estate grounds, designed by landscape architecture pioneers Robert Morris Copeland and H.W. S. Cleveland, originally included ponds, outdoor sculpture, a huge greenhouse, and gardens and bowers. In the typical New England textile village, the owners and managers lived on a hill overlooking the factory. Samuel Colt adopted and expanded upon this layout, placing the real and symbolic separation of the estate grounds between his ornate home and the factory that was the source of his wealth. Other company managers lived on the hill, from where they were able to oversee the industrial operation in both senses of the word. The Colts' elaborate landscaped buffer zone was reminiscent of Leo Marx's insight about the "machine in the garden," in which early American industrialists attempted to mitigate the negative impacts of manufacturing (in a deliberate effort to avoid the British experience of industrial squalor) by placing their factories in attractive natural surroundings.

"Bird's-Eye View" of Coltsville. Note the ball field where the Hartford Dark Blues are playing, next to the Church of the Good Shepherd. From *The City of Hartford, Connecticut, 1877*. Connecticut Historical Society.

The Caldwell Colt Memorial Parish House still serves as a community center. It was designed by Edward Tuckerman Potter in 1896.

*James C. O'Connell,
National Park Service.*



By the time of Elizabeth Colt's death in 1905, it was a widespread belief that open space relieved the harmful effects of urban industrial life, so she bequeathed her estate's grounds to the city as a public park. Today, athletic fields and structures have replaced Colt garden structures and plantings, yet the contemporary Colt Park still represents the open space that was between Armsmear and the other splendid residences on Wethersfield Avenue and the industrial zone. The Armsmear gardener's cottage and a large stable still stand behind the main house in Colt Park.

The "American Labor History Draft Theme Study" describes the importance of understanding the work and social lives of manufacturing workers. At Coltsville, the skilled workforce was relatively well paid and the Colt Company provided such benefits as housing and social activities for workers. According to historian David Nelson, gun makers held a leading place in the ranks of industrial workers, especially compared with workers in iron and steel, textiles, and shoe-making: "precision-machinery manufacturers had established what even by twentieth-century standards were reasonably attractive and healthy working conditions."⁷² Felicia Deyrup called armory workers like those at Colt Fire Arms a "favored class."⁷³ The highly skilled workforce developed at the Colt Fire Arms Company factory helped create the labor pool that staffed many other industrial enterprises in Hartford during the latter 19th and early 20th centuries.

The "American Labor History Draft Theme Study" also describes how immigrants and minorities found occupational niches in certain industries. Notably, Germans and Irish in the 19th century and African-Americans from the South in the 20th found job opportunities in Hartford at the Colt Fire Arms Company plant. The factory relied on Irish immigrants to serve as skilled blacksmiths as well as unskilled labor. So many Irish men were employed by Colt that in 1859 a second Catholic parish was founded in the south end of the city.⁷⁴ When African-Americans migrated from the South to Hartford during World War II, one of their primary destinations was a job in the Colt Fire Arms Company factory.⁷⁵

The institutions and memorials that Elizabeth Colt built in honor of her husband and her son Caldwell were important elements of Coltsville. Elizabeth Colt was devoted to celebrating her husband as one of America's industrial giants. The Colts felt that the Hartford community, Samuel's home town, had been hostile to his enterprises, and they wanted to trumpet his success. In pious Victorian fashion, Elizabeth Colt memorialized her husband's accomplishments by commissioning the Church of the Good Shepherd (1869). Designed by architect Edward Tuckerman Potter, who also designed the Mark Twain House in Hartford, the church has stonework depicting revolvers and bullet moulds and a stained-glass window portraying Samuel Colt as Joseph serving as the Egyptian pharaoh's steward. Mrs. Colt later commissioned the Colt Memorial Statue (1905) in Colt Park, which depicts the rise of Colt from a cabin boy whittling a model revolver to a confident titan of industry. After her son Caldwell died in Florida in 1894, Mrs. Colt commissioned Edward Tuckerman Potter to design the Caldwell Colt Memorial House (1896) as a parish and community hall.

The memorials also represent Elizabeth Colt's role as a leading philanthropist. During his lifetime, Samuel Colt contributed to the establishment of Hartford Hospital and proposed to establish a technical college in Hartford, but he died before his vision was realized. After Samuel Colt died, Elizabeth Colt became a civic leader in Hartford, organizing and providing financial support for many social welfare causes and leading an 1878 effort to consolidate all local charities into a single coordinated charity. Elizabeth Colt served as President of the Soldiers Aid Society during the Civil War, the Hartford Arts Society, The Union for Home Work (a pioneering social service agency), and the Connecticut Society of Colonial Dames. In her final bequest, she donated Armsmear to become a retirement home for women; the grounds of the estate for a public park; and her art collection to the Wadsworth Atheneum Museum of Art along with funds to build a museum wing to house her collection. When she died, the *Hartford Courant* wrote of Elizabeth Colt: "What she has done for this community is incalculable . . . She was the First Woman of Connecticut."



Armsmear, south elevation, ca. 1870. *Museum of Connecticut History*.

After Elizabeth Colt's death, the Colt Fire Arms Company, then owned by a limited partnership, continued to sponsor social activities for workers, including the Colt Band, sports teams, and company picnics. Nevertheless, corporate paternalism was in decline. Coltsville became more integrated into the economy and urban landscape of Greater Hartford, exemplifying the "metropolitan path to industrialization" described in the "American Labor History Draft Theme Study." The focus of Coltsville was the factory complex, which underwent a massive expansion during World War I to support the arms buildup. Up through World War II, the Colt Fire Arms Company remained one of the nation's leading small arms producers and was a vital contributor to United States military efforts. The historic factory complex remains: the site of innovative arms-making and American precision manufacturing in the latter 19th and early 20th centuries.

Endnotes

- ¹ Elisha Collier, of Boston, designed a flintlock revolver with a rotating chamber breech in 1818, but it had to be rotated manually. Colt developed a cocking hammer, which caused the chamber to rotate when it was cocked. Harold Evans, *They Made America, From The Steam Engine to the Search Engine: Two Centuries of Innovators* (New York: Little, Brown and Company, 2004), p. 61.
- ² Walter Prescott Webb, *The Great Frontier* (Austin, TX: University of Texas Press, 1964), p. 245.
- ³ Robert M. Utley, *Frontiersman in Blue: The United States Army and the Indian, 1866-1890* (New York: Macmillan Publishing Company, Inc., 1967), pp. 26-27.
- ⁴ Robert Hendrickson, *The Facts on File Encyclopedia of Word and Phrase Origins*, 3rd ed. (New York: Checkmark Books, 2004), p. 166.
- ⁵ Roger D. McGrath, *Gunfighters, Highwaymen, and Vigilantes: Violence on the Frontier* (Berkeley, CA: University of California Press, 1984), p. 5.
- ⁶ John Cawelti, *The Six-Gun Mystique*, 2nd ed. (Bowling Green, OH: Bowling Green University Popular Press, 1984), p. 86.
- ⁷ "A Revolving Patriot," *New York Times*, April 26, 1861.
- ⁸ Nathan Rosenberg, *Perspectives in Technology* (New York: Cambridge University Press, 1976), p. 19.
- ⁹ Matthew W. Roth, *Connecticut: An Inventory of Historic Engineering and Industrial Sites* (Washington, D.C.: Society for Industrial Archeology and Historic American Engineering Record, 1981), p. 50.
- ¹⁰ Eugene S. Ferguson, "History and Historiography," *Yankee Enterprise: The Rise of the American System of Manufactures*, ed. Otto Mayr and Robert C. Post (Washington, D.C.: Smithsonian Institution Press, 1981), pp. 3-4. Ferguson explained that there was a distinction between "interchangeable parts" and "mechanized production." Industry did not achieve complete interchangeability of parts until the 20th century. Ferguson explained: "Most of the parts of a Colt revolver were interchangeable, but the hand fitting in its final assembly was inevitable, given the practical impossibility of making at any reasonable cost parts that would fit very snugly and at the same time be interchangeable." Ferguson, p. 4.
- ¹¹ David Hounshell, *From the American System to Mass Production: The Development of Manufacturing Technology in the United States* (Baltimore: Johns Hopkins University Press, 1984), p. 49. Hounshell points out that "uniformity [or interchangeability of parts] would be an effect, not an absolute goal, of mechanization" and that Samuel Colt did not attain complete mechanization of manufacturing processes, since that goal was not cost-effective. Despite the fact that Colt workers filed and fitted certain gun parts during the manufacturing process, Hounshell argues that "The lack of interchangeability of revolver parts by no means precludes characterizing Colt's production technology as embodying the American system of arms manufacture."
- ¹² Jack Kelly, "'The Most Perfect Weapon,'" *Invention & Technology*, Fall, 2004, p. 25. Historian Donald R. Hoke has written that "Root probably was not the first to conceive of the system as a system, or to engage in system thinking, but he was probably one of the earliest to do so and one of the most influential," Donald R. Hoke, *Ingenious Yankees: The Rise of the American System of Manufactures in the Private Sector* (New York: Columbia University Press, 1990), p. 122.
- ¹³ Joseph Wickham Roe, *English and American Tool Builders* (New Haven: Yale University Press, 1916), p. 169.
- ¹⁴ Merritt Roe Smith, "Army Ordinance and the 'American System' of Manufacturing, 1815-1861," *Military Enterprise and Technological Change: Perspectives on the American Experience*, ed. Merritt Roe Smith, (Cambridge, MA: MIT Press, 1985), p. 78. According to David Hounshell, the Singer Sewing Machine Company adopted the American system of manufactures piecemeal between 1863 and 1873 "only after a Yankee mechanic and a local machinist [Andrew R. Arnold and Lebbeus B. Miller] were hired who knew a little about how things were done at the Colt Armory." David Hounshell, "The System: Theory and Practice," Mayr and Post, p. 136.
- ¹⁵ National Park Service, *Connecticut River Valley Special Resource Reconnaissance Study* (Boston: National Park Service Northeast Region, 1998), p. 31.
- ¹⁶ William Hosley, *Colt: The Making of an American Legend* (Amherst, MA: University of Massachusetts Press, 1996), p. 34. Business historian Michael Best provides a case study describing how the Connecticut Valley precision manufacturing district was the cradle of the "American System of Manufacture." Michael Best, *The New Competition: Institutions of Industrial Restructuring* (Cambridge, MA: Harvard University Press, 1990), pp. 29-45.
- ¹⁷ Quoted in Ellsworth S. Grant, *Yankee Dreamers and Doers: The Story of Connecticut Manufacturing* (Hartford: Connecticut Historical Society & Fenwick Productions, 1974), p. 245. Mark Twain lived in Hartford between 1874 and 1891. Here he raised a family and wrote such classics as *Tom Sawyer*, *Huckleberry Finn*, *The Prince and the Pauper*, *Life on the Mississippi*, and *A Connecticut Yankee in King Arthur's Court*. The Twain house, a 19-room Victorian gingerbread mansion, is part of the Mark Twain Museum Center.
- ¹⁸ Charles H. Fitch, "Report on the Manufactures of Interchangeable Mechanism," U.S. Census Office, *Report of the Manufactures of the United States at the Tenth Census*, Washington, D.C.: Government Printing Office, 1883, pp. 611-645.
- ¹⁹ Joseph Bradley, *Guns for the Tsar* (DeKalb, IL: University of Northern Illinois Press, 1990), passim.
- ²⁰ Colt Fire Arms Company manufactured Baxter portable steam engines between 1868 and 1898. Louis C. Hunter, *A History of Industrial Power in the United States, 1780-1930—Volume Two: Steam Power* (Charlottesville, VA: University Press of Virginia, 1985), pp. 494-496. Colt Fire Arms Company manufactured "Universal" printing presses between 1873 and 1902. Fred Williams, "The Great Colt's Armory War," *Type and Press*, Winter, 1983.
- ²¹ Roe, pp. 174-179.
- ²² Geoffrey Perret, *A Country Made by War* (New York: Random House, 1989), p. 306.
- ²³ Roth, p. xxi.
- ²⁴ "American Labor History Draft Theme Study," pp. 41-74.
- ²⁵ News accounts and popular literature are full of stories emphasizing the "Colt" brand name when mentioning revolvers. *The New York Times* May 15, 1865 account of the capture of Confederate President Jefferson Davis by Union troops described how Davis "yielded promptly to the persuasions of Colt's revolvers, without compelling the men to fire." The far-flung presence of Colt revolvers and Brownings is described in Mikhail Bulgakov's Russian novel set in the Russian Civil War, *The White Guard*: "The Colt Automatic that had belonged to Nai-Turs and Alyosha's Browning were thoroughly greased with engine oil and paraffin." Mikhail Bulgakov, *The White Guard* (New York: McGraw-Hill Book Co., 1971), p. 194.

- ²⁶ Felicia Johnson Deyrup, *Arms Makers of the Connecticut Valley: A Regional Study of the Economic Development of the Arms Industry, 1798-1870* (York, PA: George Shumway, Publisher, 1970), p. 124.
- ²⁷ Betsy Hunter Bradley, *The Works: The Industrial Architecture of the United States* (New York: Oxford University Press, 1999), p. 119.
- ²⁸ Mark Snell, *From First to Last: The Life of Major General William B. Franklin* (New York: Fordham University Press, 2002), p. 339. Sara Wermiel, *The Fireproof Building: Technology and Public Safety in the Nineteenth-Century American City* (Baltimore: Johns Hopkins University Press, 2000), pp. 154-156. It should be emphasized that this fireproof technology only made these buildings somewhat more fire retardant.
- ²⁹ Daniel Nelson, *Managers and Workers: Origins of the New Factory System in the United States, 1880-1920* (Madison, WI: University of Wisconsin Press, 1975), p. 21.
- ³⁰ Hunter, pp. 450-472.
- ³¹ A sampling of official U.S. Army Ordnance Department staff assignments published in the *New York Times* between 1890 and World War I mentions that Army officers stationed at the Springfield Armory were making inspections at the Colt factory. *New York Times*, June 23, 1891; August 6, 1892; August 21, 1898; October 26, 1898; January 29, 1903; April 2, 1904; February 9, 1908; December 31, 1910; March 20, 1912; February 26, 1913.
- ³² John Browning [Jr.] and Curt Gentry, *John M. Browning, American Gunmaker* (Garden City, NY: Doubleday & Company, 1964), p. 150. Before working with Colt Fire Arms, John Browning worked with Winchester Repeating Arms on designing repeating rifles and shotguns. In the 20th century, he also maintained a relationship with the Belgian arms manufacturer Fabrique National.
- ³³ *Ibid.*, pp. 117, 169, 196.
- ³⁴ Ellsworth Grant, *The Colt Legacy: The Colt Armory in Hartford, 1855-1980* (Providence, RI: Mowbray Company, 1982), pp. 94, 97.
- ³⁵ George B. Johnson and Hans Bert Lockhoven, *International Armament*, Vol. II (Cologne, Germany: International Small Arms Publishers, 1965), pp. 289, 412.
- ³⁶ *Ibid.*, p. 162.
- ³⁷ Grant, pp. 221-222.
- ³⁸ John Ellis, *The Social History of the Machine Gun* (Baltimore: The Johns Hopkins University Press, 1986), p. 23.
- ³⁹ Roger Ford, *The Grim Reaper* (New York: Sarpedon, 1996), p. 71.
- ⁴⁰ U.S. Navy Department Bureau of Ordnance, *Navy Ordnance Activities. World War I, 1917-1918* (Washington, DC: Government Printing Office, 1920), p. 71; Buford Rowland and William B. Boyd, *U.S. Navy Bureau of Ordnance in World War II* (Washington, DC: Government Printing office, 1953), p. 332.
- ⁴¹ Charles W. Clawson, *Colt .45 Service Pistols: Models of 1911 and 1911A1* (n.p.: Charles W. Clawson, 1991), p. 212; Ian V. Hogg, and John Walter, *Pistols of the World*, 4th edition (Iola, WI: Krause Publications, 2004), pp. 76, 292; Dolf L. Goldsmith, *The Grand Old Lady of No Man's Land: The Vickers Machinegun* (Coburn, ON: Collector Grade Publications, 1994), pp. 225-226; James L. Ballou, *Rock in a Hard Place: The Browning Automatic Rifle* (Coburn, ON: Collector Grade Publications, 2000), p. 62. According an article "Vickers Gun Wins Board's Award," *New York Times*, Nov. 11, 1916, "The Colt company has been selling practically its entire output of Vickers guns to the Entente Allies since the war began."
- ⁴² Johnson and Lockhoven, pp. 289, 440.
- ⁴³ According to an article "Colts to Increase Plant," *New York Times*, June 30, 1915, the Colt Fire Arms Company "has decided to double its plant to fill huge war orders for machine guns." Amy E. Slaton, *Reinforced Concrete and the Modernization of American Building, 1900-1930* (Baltimore: The Johns Hopkins University Press, 2001), pp. 160-161.
- ⁴⁴ Grant, p. 103.
- ⁴⁵ *Ibid.*, p. 94.
- ⁴⁶ Browning and Gentry, p. 212.
- ⁴⁷ Constance McLaughlin Green, Harry C. Thomson, and Peter C. Roots, *The Ordnance Department: Planning Munitions for War* (Washington, DC: Department of the Army, Office of the Chief of Military History, 1955), p. 407.
- ⁴⁸ *Ibid.*, p. 178.
- ⁴⁹ *Ibid.*, p. 423.
- ⁵⁰ Harry C. Thomson and Lida Mayo, *The United States Army in World War II: The Technical Services; The Ordnance Department: Procurement and Supply* (Washington, DC: U.S. Army Center of Military History, 1960), pp. 26, 156, 179.
- ⁵¹ National Historic Landmarks Survey, "National Historic Landmark Draft Theme Study: World War II and the American Home Front" (Washington, DC: National Park Service, 2004), p. 2.
- ⁵² Johnson and Lockhoven, Vol. II, p. 433.
- ⁵³ Thomson and Mayo, p. 159.
- ⁵⁴ *Ibid.*, p. 27.
- ⁵⁵ Clawson, p. 344; Goldsmith, p. 407; Ballou, pp. 55-68.
- ⁵⁶ Thomson and Mayo, p. 80.
- ⁵⁷ "Huge New Industry for Machine Guns," *New York Times*, March 7, 1941.
- ⁵⁸ Eliot Janeway, *The Struggle for Survival: A Chronicle of Economic Mobilization in World War II* (New Haven: Yale University Press, 1951), pp. 213-214.
- ⁵⁹ Grant, p. 159. Ellsworth Grant's book mentioned that the Colt Fire Arms Company was in the "incipient stage of its downfall" by 1943. Grant, p. 162.
- ⁶⁰ Thomson and Mayo, pp. 78, 80, 181.
- ⁶¹ Industrial paternalism was strongest in communities that were small and isolated and less so in urban settings. Margaret Crawford, *Building the Workingman's Paradise: The Design of American Company Towns* (New York: Verso, 1995), p. 31.
- ⁶² "American Labor History Draft Theme Study," pp. 18, 49.
- ⁶³ Social composition of the housing derived from listing in the 1880 manuscript census schedules for Hartford, microfilm, Connecticut State Library.
- ⁶⁴ City directory listings in 1869, for example, include four willow-ware workers and five pistol makers, as well as four laborers and a silver-plater who probably worked at the armory as well. *Geer's Hartford City Directory for 1869-70* (Hartford: Elihu Geer, 1869).
- ⁶⁵ Jack Rohan, *Yankee Arms Maker* (New York: Harper & Brothers, 1935), p. 184.
- ⁶⁶ Grant, p. 83.
- ⁶⁷ *Ibid.*, p. 83.

- ⁶⁸ The Church of the Good Shepherd parish began as a mission of St. John's Episcopal Church on Main Street and operated out of Charter Oak Hall until the church was completed in 1869. Church records indicate a broad range of members from the Colt family and General William B. Franklin to pistol makers, printers, lumbermen, bookkeepers, and painters living in company housing to other persons living in the general area. "Church of the Good Shepherd Baptisms, Burials, Communicants and Marriages, 1865-1876," pp. 14-22. Episcopal Church Records, Connecticut Diocese Archives, Hartford, CT. The occupations of members have been identified by cross-referencing with the 1865 *Hartford City Directory*. Parish records show that the number of parish families grew steadily from 150 families in 1869 to 375 families in 1924.
- ⁶⁹ Hosley, p. 209.
- ⁷⁰ *Ibid.*, p. 138.
- ⁷¹ Clive Aslett, *The American Country House* (New Haven: Yale University Press, 1990), p. 30.
- ⁷² David Nelson, "The American System and the American Worker," eds. Otto Mayr and Robert C. Post, *Yankee Enterprise: The Rise of the American System of Manufacturers* (Washington, DC: Smithsonian Institution, 1981), p. 173. Nelson argued that the "American system" produced a new, more highly organized labor force and conditions of work: "The manufacturer who introduced the American system installed more than a series of machines and a system of machine production; he also made fundamental decisions regarding the treatment of his labor force, his relations with his subordinates, and, ultimately, his conception of social progress." Nelson, p. 173.
- ⁷³ Deyrup, pp. 163-164.
- ⁷⁴ Bruce Clouette, "Getting Their Share: The Irish and Italian Immigrants of Hartford, Connecticut," unpublished Ph.D. diss., University of Connecticut, 1992.
- ⁷⁵ "Semi-Skilled Negroes Find More Jobs Open," *New York Times*, May 3, 1942.
- ⁷⁶ *Hartford Courant*, August 24, 1905.