1 The Making of the Corps

Battle of Bunker Hill, June 17, 1775,
by H. Charles McBarron
U.S. Army Center of Military History

The Revolutionary War

When Congress organized the Continental Army on June 16, 1775, it provided for a Chief Engineer and two assistants with the Grand Army and a Chief Engineer and two assistants in a separate department, should one be established. Colonel Richard Gridley of Massachusetts was an artillerist in that colony's militia and a veteran of decades of colonial warfare against the French, and thus one of the few patriots with experience in the design and construction of batteries and fortifications. Gridley became General George Washington's first Chief Engineer. Another native of Massachusetts, Rufus Putnam, who succeeded Gridley as Chief Engineer in 1776, was one of his assistants while the Army remained in Boston.

From the start, the predominantly defensive nature of the war convinced Washington he would need even more trained engineers, but he was continually frustrated in his efforts to find them. Qualified engineers were scarce because formal schooling in siegecraft, the erection of field fortifications, and technical

Society of American Military Engineers plaque honoring Col. Richard Gridley's actions at Breed's Hill

Washington takes command of the Continental Army at Cambridge, Mass., July 1775

National Archives

Louis Lebègue Duportail, Chief Engineer, 1777–1783 by Charles Willson Peale

Independence National Historical Park Collection

subjects was practically nonexistent in America at the time. In response to Washington's plea for more engineers, Congress turned to France, which was an enemy of Britain and the center of technical education in Europe. The French also had a long tradition of military engineering.

Beginning in 1776, Frenchmen began to arrive in America to serve as engineers. Before the end of 1777, Congress had promoted one of them, Louis Duportail, to brigadier general and Chief Engineer, a position he held for the duration of the war in spite of a period of capture and imprisonment by the British following the Battle of Charleston. Frenchmen, joined by other foreigners, dominated the ranks of the engineers throughout the war.

When Duportail took command of the engineers, he renewed the pressure begun by his predecessor to establish a permanent, separate, and distinct engineering branch of the Army. His proposal included a provision for companies of engineer troops, to be known as Sappers and Miners, with American officers. From their ranks would come the engineer officers to replace the French when they returned home.

On May 27, 1778, Congress finally authorized three companies of Sappers and Miners who were to receive instruction in erecting field works—the first step in technical education—and were to direct fatigue parties, repair damaged works, and erect new ones. Recruitment continued for more than two years, and the three companies were not activated until August 2, 1780. Meanwhile, on March 11, 1779, Congress passed a resolution that formed the engineers in the Continental Army into the Corps of Engineers that Duportail had sought.

Despite the shortage of engineers and the delay in forming companies of engineer troops, the Army's engineers made numerous contributions to the war. Engineer officers reconnoitered enemy positions and probable battlefields, wrote useful reports based on their observations, oversaw the construction of fortifications, and drew detailed maps for commanders. Congress relieved some of the mapping burden when it appointed Robert Erskine as

Boston Area Fortifications drawn by John Trumbull depicting American positions surrounding Boston in September 1775

John Trumbull, Autobiography, *1841*

Geographer of the Army in 1777. Erskine and his successor, Simeon DeWitt, employed several assistants, as did Thomas Hutchins, whom Congress appointed as Geographer for the Southern Army in 1780. Following this precedent, Congress would add Topographical Engineers to the Corps of Engineers in 1813 and create a Topographical Bureau in the Engineer Department in 1818.

Engineer officers often took action that helped achieve decisive results on the battlefield. One such incident occurred during the Siege of Boston. In February 1776, General Washington's council of war decided to draw the British out of Boston by erecting works on the unfortified Dorchester Heights. To achieve surprise, the Army needed to move quickly, but the ground was frozen more than a foot deep. Colonel Rufus Putnam, Washington's Chief Engineer at the time, offered an innovative solution to the problem. He recommended using chandeliers—wooden frames filled with bundles of sticks—to raise walls above ground. To the astonishment of the enemy, the Continentals erected the chandeliers overnight on March 4. When the British determined three days later that Dorchester Heights could not be taken, they found that their hold on Boston was no longer tenable and evacuated the city.

The next year, Lieutenant Colonel Thaddeus Kosciuszko, a native of Poland commissioned as an engineer officer in the Continental Army, placed obstructions that significantly impeded Burgoyne's advance toward Albany after the fall of Fort Ticonderoga. Later, Kosciuszko helped design the network of defenses at West Point, and in 1781 he was instrumental in enabling Nathaniel Greene's Southern Army to evade capture by the enemy.

During the difficult winter of 1777–1778, Washington followed Duportail's admonition to avoid general battle and instead wear down the British at Philadelphia while avoiding attack. "We should not forget that in war, to advance or retreat are neither honorable nor dishonorable; that

Thaddeus Kosciuszko by Charles Willson Peale

Independence National Historical Park Collection

The Camp at Valley Forge. A sketch in Duportail's hand showing the entrenchments he planned.

Historical Society of Pennsylvania

it is [at] the end of a Campaign that the Prize is given, and that Glory is his reward who has gained his end," Duportail noted in recommending that Washington keep his forces at Valley Forge. This strategy helped preserve the Army and compelled the British to evacuate Philadelphia the next summer.

The Corps of Engineers and its companies of Sappers and Miners enjoyed their finest hour in October 1781 at Yorktown, where Washington conducted a siege in the classical manner of Sebastien de Vauban, the great French master of siegecraft. Engineer officers, numbering thirteen in the combined French and American armies, performed crucial reconnaissance and, with the fifty men in the Sappers and Miners, planned and executed field works. In addition, the Sappers and Miners assembled fortification materials, erected gun platforms, transported cannon and ammunition, and cleared the way for the decisive infantry assault on Redoubt 10. After the battle, Washington cited Duportail for conduct that afforded "brilliant proofs of his military genius, and set the seal of his reputation."

When the Revolutionary War ended in 1783, a debate followed on the peacetime nature of the Army. Proposals regarding the engineers varied. They included merging the engineers with the artillerists and establishing an academy to provide training. Those who favored a centralized system of fortifications, which would need engineers to build and maintain them, believed that retaining an engineer presence in the Army was necessary. Two arguments in favor of retaining the engineers drew directly upon Revolutionary War experience. Without a permanent, trained Corps of Engineers, it was maintained, the new Nation would be forced to call on foreigners again in time of war. Moreover, as the Revolutionary War had demonstrated, it was extremely difficult to put together an effective technical organization in a short time. But Congress did not approve a peacetime Army, and with that decision went any hope of retaining the Corps of Engineers. By the end of 1783, the Corps and its companies of Sappers and Miners had mustered out of service.

British defenses and the American and French siege works at Yorktown drawn by Col. Gouvion of the Corps of Engineers, October 29, 1781
National Archives

Congress Recognized a Revolutionary War Engineer as a Hero for His Role in Taking Stony Point in July 1779

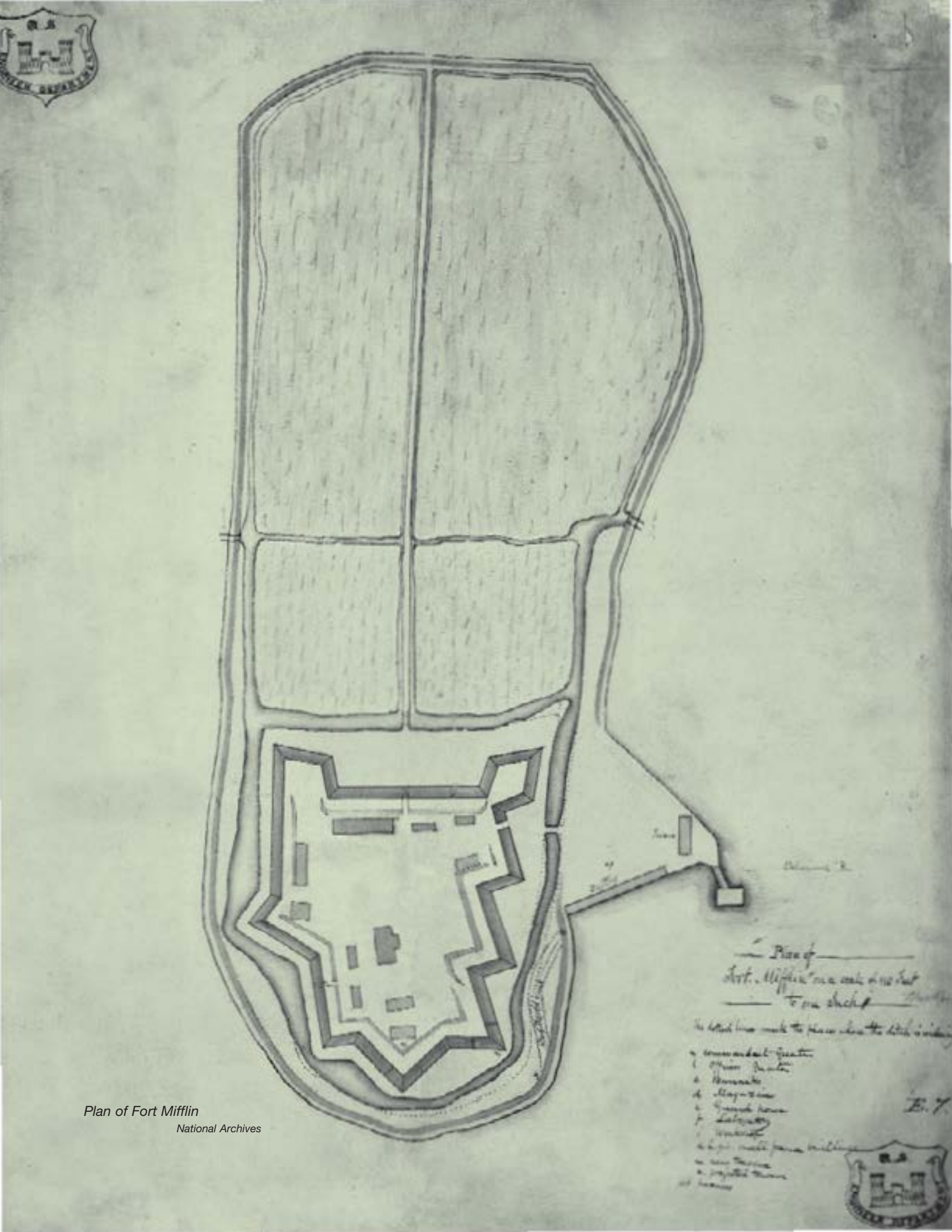
On June 1, 1779, the British captured Stony Point, New York, on the western side of the Hudson River, and Verplanck's Point directly across the river to the east. Possession of the forts brought a key part of the river under enemy control and threatened the American position less than fifteen miles to the north at West Point. After reinforcing Stony Point, the British commander regarded it as a "little Gibraltar."

Recognizing the danger, General George Washington planned a daring surprise assault. On the night of July 15–16, Lieutenant Colonel François de Fleury, an engineer in command of a battalion in the 1st Regiment of Brigadier General Anthony Wayne's Corps of Light Infantry, led one of two simultaneous attacks on Stony Point. In the hour after midnight, the twenty-nine-year-old de Fleury single-handedly struck the colors of the British 17th Regiment of Foot. Invaders and defenders engaged in furious hand-to-hand combat. The whole encounter was brief. At 2 a.m., Wayne triumphantly wrote Washington, "The fort and garrison…are ours. Our officers and men behaved like men who are determined to be free."

A few days later, Washington abandoned the fort for lack of resources. The British quickly reoccupied the site, temporarily making it stronger than ever. But reinforcements never arrived, so the Redcoats gave up the position for good in October. Stony Point was a timely boost to American morale. It was, according to one historian, "a successful attack upon British regulars in a fortified position, with the bayonet alone," resulting in "an achievement unparalleled up to that time." It also marked the last major battle of the war in the north.

Storming of Stony Point depicted in a nineteenth century lithograph

In recognition of the bold, decisive action at Stony Point, Congress awarded a gold medal to Wayne and silver medals to de Fleury and Major John Stewart, who commanded a battalion in the 2d Regiment of Wayne's corps. Congress noted that de Fleury and Stewart "exhibited a bright example to their brother soldiers, and merit in a particular manner the approbation and acknowledgment of the United States." De Fleury, one of several French engineers to volunteer for service in the Continental Army, was the only foreigner so honored during the Revolutionary War.



Plan of Fort Mifflin

National Archives

Artillerists and Engineers, 1783–1802

After the American Revolution, there was strong opposition to the establishment of a large, permanent, national army. Indeed, at one point in the summer of 1784, the surviving U.S. military establishment consisted solely of an infantry regiment and a company of artillery stationed at West Point, New York; however, Congress soon approved the formation of an additional line unit, the 1st American Regiment, to construct forts and protect surveying parties on the new western frontier.

When a strengthened federal government under the new U.S. Constitution was launched in 1789, Secretary of War Henry Knox recommended "a small corps of well-disciplined and well-informed artillerists and engineers." Nevertheless, no engineers served in the U.S. Army until March 1794, when war with Britain threatened. Suddenly there was an acute need to upgrade neglected coastal fortifications and construct new ones. At that time, Congress authorized President Washington to appoint temporary engineers to direct the fortification of key harbors. Among those named were Major Pierre L'Enfant and Major Stephen Rochefontaine, veterans of the Revolutionary War Corps of Engineers.

Portrait of Henry Knox by James Harvey Young, 1873

U.S. Army Center of Military History

Seizing the opportunity, Knox again urged Congress to approve the plan he and others such as L'Enfant and Duportail had earlier advanced. A corps combining artillerists and engineers, he argued, would provide the additional trained troops now needed to garrison the coastal fortifications. The new corps was to be commanded by a lieutenant colonel

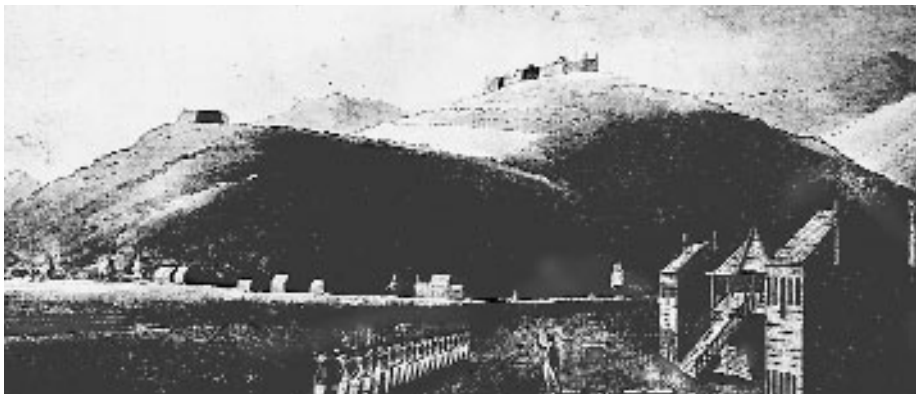
Only known authentic likeness of Pierre Charles L'Enfant. Silhouette by Sara DeHart, c. 1785.
Diplomatic Reception Room, U.S. Department of State

and to have four battalions, each commanded by a major and consisting of four companies.

Heeding this advice, on May 9, 1794, Congress established a single Corps of Artillerists and Engineers, consisting of one regiment. This action returned engineers to the ranks of the Army for the first time in more than ten years and ensured that an engineering presence, established with the appointment of the Army's first Chief Engineer in 1775, would continue in the new U.S. Army.

Although international tensions eased in the latter half of 1794 and jeopardized the whole effort, Congress resolved to continue a seacoast defense program. By the end of the year, there were single-company garrisons of artillerists and engineers at Fort Jay (New York); Fort Mifflin (Philadelphia); Fort Whetstone, later McHenry (Baltimore); and Fort Johnson (Charleston). The following February, Rochefontaine was commissioned a lieutenant colonel and took command of the Corps. At the same time, a school to train U.S. Army officers took shape at West Point, New York.

In 1798, war with France appeared likely, so Congress added a second regiment to the Corps. By the time Thomas Jefferson became president in 1801, it had become clear that the united Corps was not producing the desired well-educated, scientific body of engineer officers. In 1802, a thrifty Congress again reduced the military establishment and separated the artillerists and engineers. The united corps, which so many Revolutionary War engineers had supported, was thus short-lived; however, an Army engineering branch would emerge from the peacetime reduction. On March 16, 1802, Congress permanently established a separate U.S. Army Corps of Engineers and the U.S. Military Academy at West Point as the Nation's first engineering school.



Parade Field at West Point, c. 1790
U.S. Military Academy Library

French Engineers Defended Early Capital City

At the end of the Revolutionary War, General George Washington recommended retaining a regular, standing force to garrison forts and one or more academies to provide Americans with engineering and military training. Otherwise he predicted that domestic security in the future would depend entirely on the assistance of foreigners.

Oil painting of Fort Mifflin c. 1872 by Brig. Gen. Seth Eastman

Architect of the Capitol Collection

Congress failed to act on his recommendation. As president in 1794 he faced the prospect of renewed war with Britain. Coastal forts lay in disrepair, and America's tiny Army lacked artillerists and engineers. Congress quickly appropriated funds to fortify nearly twenty ports and harbors and created a combined Corps of Artillerists and Engineers.

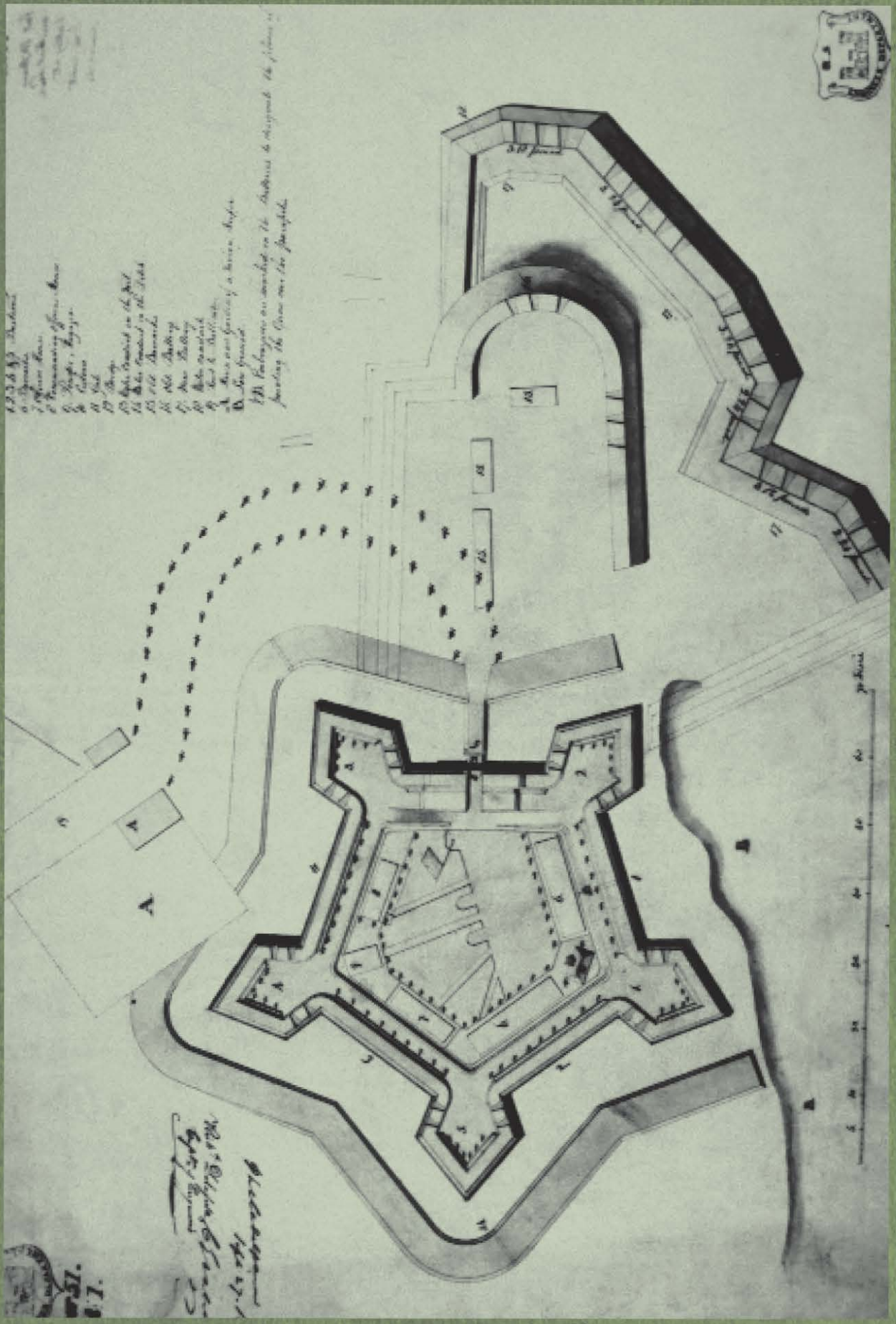
Few native-born Americans were available to plan and oversee the required defenses, but Secretary of War Henry Knox knew that some one dozen Frenchmen, who had either served in the French or Continental armies during the Revolution, were in the United States. Most had returned to France after the Revolution but fled in the wake of the French Revolution's Reign of Terror. They found their way back to the United States either directly or by way of Santo Domingo. Knox employed seven of these Frenchmen as "temporary engineers" without military rank to supervise the new work. Each was assigned a section of the Atlantic coastline.

Greatest attention and funding focused on Philadelphia, the Nation's temporary capital (1790–1800). Initially Knox assigned Pierre L'Enfant to oversee improvements at Mud Island (later Fort Mifflin) just below the capital city. After service as an engineer in the Revolutionary War, L'Enfant returned briefly to France in 1783 but took up residence in the United States in 1784. Later he designed the city of Washington.

Convinced that Fort Mifflin provided inadequate protection for a capital city, L'Enfant embarked on an ambitious plan of improvements. He quickly exhausted the available funds and antagonized state officials in the process. Within a year Knox replaced him with another Frenchman and Revolutionary War veteran, Stephen Rochefontaine. More improvements and additional funding followed.

A "quasi" war with France in 1798 led Congress to strengthen the Corps of Artillerists and Engineers and appropriate more funds to defend American shipping, the coastline, and harbors. As Rochefontaine was also commander of the artillerists and engineers, Lewis Tousard, another Frenchman, took over at Fort Mifflin. Once again he got the job because no American possessed the technical qualifications.

Nearly half the funds expended on American forts between 1794 and 1800 went to Fort Mifflin. The experience of having the Nation's defenses planned and executed by foreigners finally convinced Congress to establish a military academy and create a separate Corps of Engineers.



Plan of Fort McHenry by Capt. Richard Delafield, September 1836
National Archives

Engineers in the War of 1812

After the American Revolution, engineer officers did not see formal combat again until the War of 1812. During the years immediately preceding that conflict, engineer officers had worked full time constructing permanent defenses along the Atlantic Coast. The War Department had been debating with the engineers over their desire for command responsibility since 1802. Jonathan Williams, the first superintendent of West Point, had even resigned his position over the issue.

The Corps of Engineers remained small in numbers. When war broke out in June 1812, the Corps' actual strength was only seventeen officers and nineteen enlisted men. (Although Congress had authorized 22 officers and 113 enlisted men for the Corps in April 1812, full strength was not approached until 1815.) West Point graduates dominated the list of engineer officers, and for them the War of 1812 would be their first experience in combat.

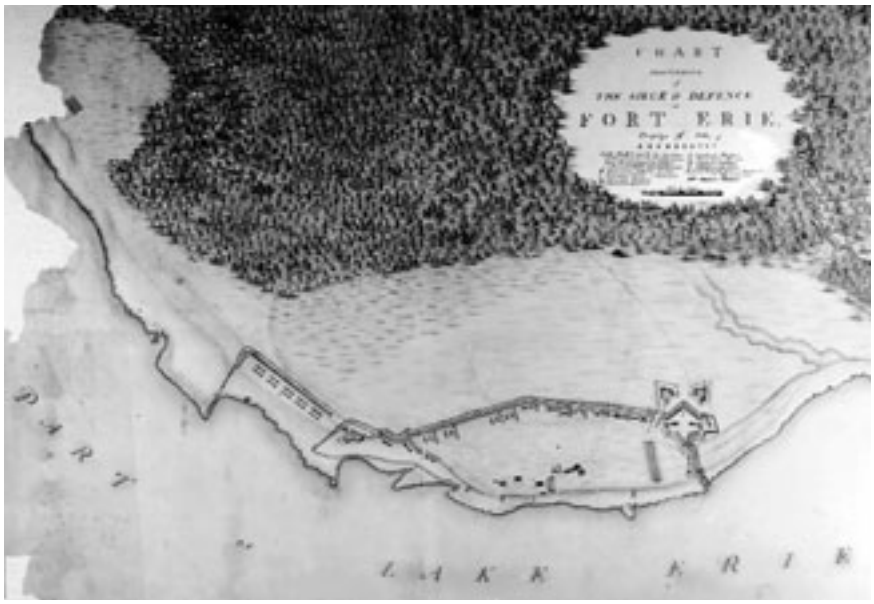
During the War of 1812, the record of the Corps was exceptional when compared with the record of the other branches of the U.S. Army, which suffered several notable defeats. Engineer officers assumed command responsibility for the first time. Captain Charles Gratiot, later Chief Engineer, at one point commanded all forces in the Michigan Territory. In 1813, Brigadier General Joseph G. Swift, another future Chief Engineer, commanded line units on Staten Island in addition to Fort Richmond and Hudson Battery. By late the next year, he commanded the entire New York operation, which included more than ten thousand soldiers and civilian volunteers.

Burning of the U.S. Capitol by the British, August 1814, from mural by Allyn Cox in the House of Representatives Cox Corridor

Architect of the Capitol Collection

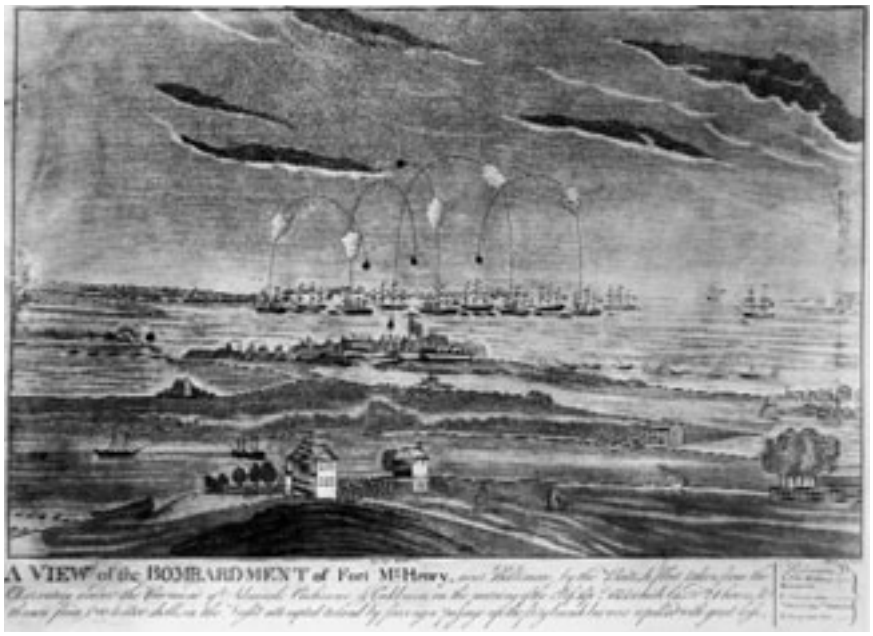
Battle of Lundy's Lane, where U.S. Army engineers figured prominently, July 1814

Library of Congress



Map of Fort Erie depicting how Army engineers changed the old British fort into a bastioned work

National Archives



Bombardment of Fort McHenry by J. Bower

Maryland Historical Society

As the war progressed, the War Department increasingly transferred engineers to serve in the field on the northern frontier. In combat, the engineers performed many of the same tasks they had in the Revolution, including constructing fortifications, reconnoitering and mapping, and assisting the movement of armies. In at least two instances, engineer officers directed construction of quarters.

Still, fortifications were the primary concern of the engineers during the War of 1812, as they had been earlier. Despite the views of later critics, coastal harbors and river towns heavily fortified by the engineers did deter British attack. Notable examples of this were at Fort Meigs in Perrysburg, Ohio, and Fort McHenry in Baltimore, Maryland.

The performance of the U.S. Army engineers in combat between 1812 and 1815 helped them earn respectability and strengthened the military academy at West Point, which had been languishing on the eve of the war. While many battles in this indecisive war ended in a standoff, the results might have been far worse without the contributions of the U.S. Army engineers.

An Engineer Helped Save New York City from British Attack During the War of 1812

From the beginning of the War of 1812, the British captured American ships, blockaded major ports, and raided towns along the coast. In 1814, British troops even seized Washington, D.C., burning the White House and U.S. Capitol and occupying Alexandria, Virginia. Recalling its own capture by the British during the American Revolution, New York—the Nation's largest city—felt especially threatened.

While British ships cruised just off Sandy Hook, New Yorkers turned to the U.S. Army for help. During most of 1813 and 1814, Brigadier General Joseph G. Swift, Chief Engineer of the Army and superintendent at West Point, directed the city's defenses. Until mid-1814, he concentrated on the harbor's permanent forts.

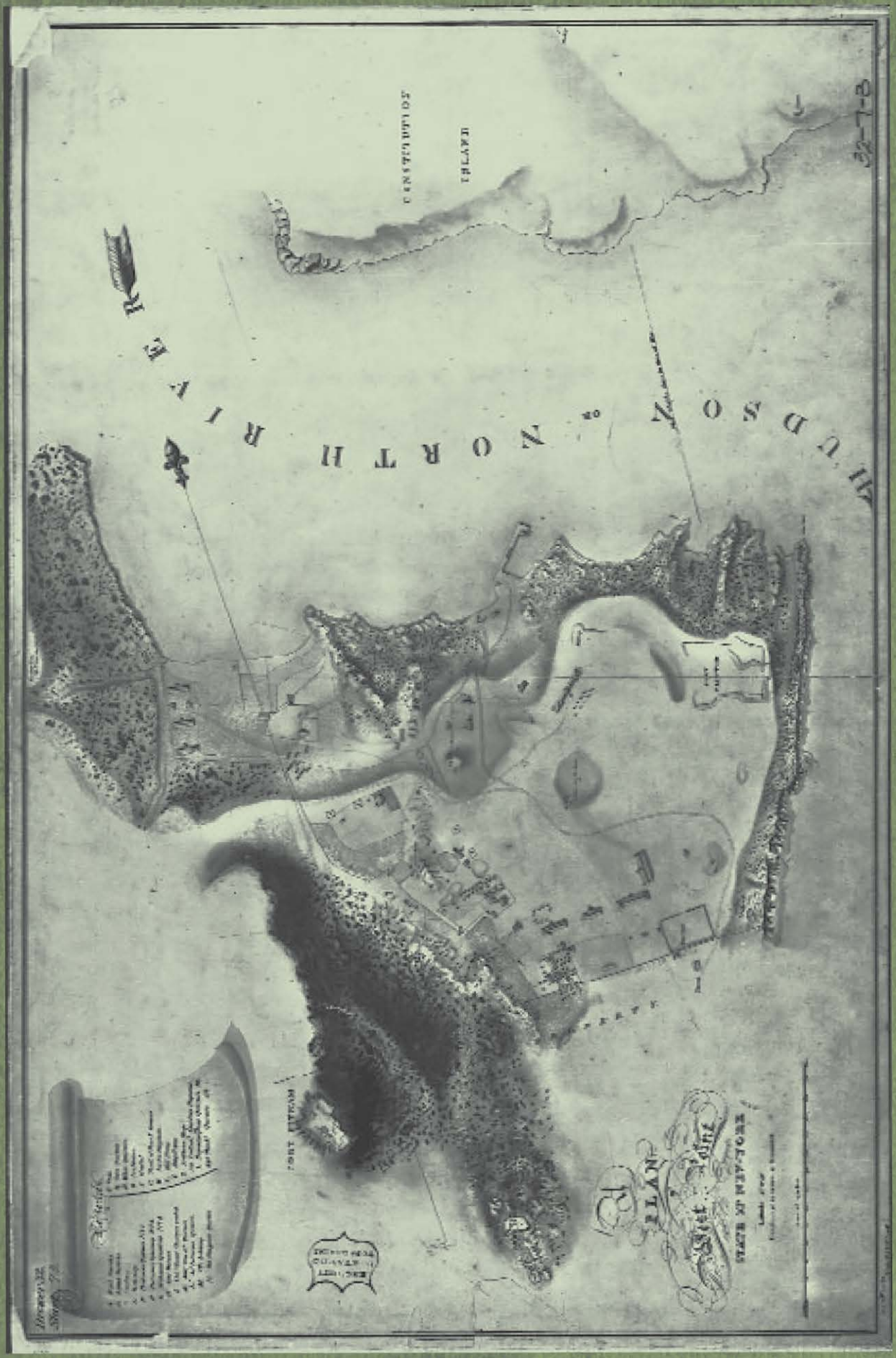
In the summer of 1814, a reinforced British fleet appeared off New York's coast. Fearing an amphibious attack from the north or east, the city's Committee of Defense asked Swift to take charge of emergency preparations. Quickly, he drew up a plan calling for two lines of field fortifications, one stretching along hilltops outside Brooklyn, the other cutting across Manhattan from the mouth of the Harlem River to the Hudson. Then he began to implement the plan and called upon citizens for support. The response was overwhelming.

Between August and November, thirty-eight thousand people worked on the defenses. Carpenters and pharmacists, brewers and lawyers, butchers and college students, tailors and artists, free blacks and city officials, rubbed shoulders in the trenches, wielding axes, shovels, and spades. Organized in parties of 1,200–2,000, often working from sunrise to sundown, and singing to keep their spirits high, they built two lines of field defenses. Volunteers put in a total of more than one hundred thousand workdays. People unable to work contributed money, food, tools—and more than five thousand fascines for the parapets.

Swift oversaw all defense preparations. Before long, he also was plotting strategy; inspecting troops; and directing ordnance, artillery, quartermaster, and medical activities. In the event of a British landing, he intended to lead the main force to repulse them. Impressed by the strength of New York's defenses, the enemy chose easier targets to attack.

In gratitude for Swift's service, the New York Common Council declared him a benefactor of the city, showered him with gifts, and commissioned John Wesley Jarvis to paint his full-length portrait. After the war, to commemorate the Chief Engineer's heroic effort on their city's behalf, officials hung the painting in New York's City Hall.

Joseph Gardner Swift (1783–1865)
Courtesy of the Art Commission of the City of New York



Plan of West Point, 1780
National Archives

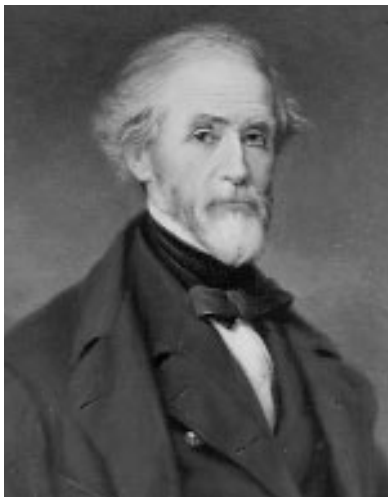
The Corps and the Military Academy at West Point, 1802–1866

During the American Revolution, many officers, including General George Washington, the Commander-in-Chief, saw the need for technical education so that the Army would have skilled, native-born American engineer officers in the future. When Congress established the companies of Sappers and Miners in 1778, it stated that the companies were to receive instruction in field works. In subsequent general orders, Washington referred to the Sappers and Miners as "a school of engineering." Regulations issued in 1779 for the Corps of Engineers and companies of Sappers and Miners declared that the Sappers and Miners were to receive instruction at times when they were not exercising duties. The Chief Engineer was to devise an instructional program and appoint engineer officers to give lectures; however, the amount of education actually given the Sappers and Miners during the Revolution was minimal.

During the debate over a peacetime military establishment in 1783, several Army officers proposed establishing an academy at West Point, either as the sole military academy or as one of several academies. Army leaders thought engineers in particular needed formal

L'Enfant watercolor of West Point, 1780

National Archives



Dennis Hart Mahan
U.S. Military Academy Library

training. When Congress decided against a peacetime standing Army, the need for an academy disappeared.

Some instruction did occur at West Point from 1794 until 1796, but it was not until March 16, 1802, that Congress reestablished a separate Corps of Engineers to remain at West Point and constitute the U.S. Military Academy. As Chief Engineer, Jonathan Williams, grandnephew of Benjamin Franklin and a man keenly interested in the development of science, became the Academy's first Superintendent. Williams introduced new texts from England and the continent and, by 1808, had broadened the curriculum from its heavy emphasis on mathematics to include engineering. In 1812, Congress created a professorship of engineering at the Academy. It was the first such position at an institution of higher learning in the United States.

Training in practical military engineering
U.S. Military Academy Library

Major advances in the organization and the course of study, as well as an honor code and a disciplinary system, followed under Sylvanus Thayer, superintendent from 1817 until 1833. Thayer patterned the reorganization of the Academy on the program he observed at the *Ecole Polytechnique* while on a visit to France. Claudius Crozet, who occupied the professorship of engineering from 1817 to 1823 and who was a graduate of the *Ecole Polytechnique,* introduced numerous French texts in his courses. Later, under professor Dennis Hart Mahan, the Academy's reputation as a school of civil engineering advanced still further. In his lectures, Mahan, an 1824 graduate with a commission in the Corps of Engineers, drew upon his experiences while on duty in Europe (1826–1830). He prepared and added several texts to the West Point curriculum. The most important were *A Treatise on Field Fortification* (1836) and the *Course of Civil Engineering,* which first appeared in 1837.

In 1800, Secretary of War James McHenry emphasized that fortification was only one part of military engineering. The engineer's utility, he declared, "extends to almost every Department of War; besides embracing whatever respects public buildings, roads, bridges, canals and all such works of a civil nature."

A June examination by the Board of Visitors

U.S. Military Academy Library

Cadets working with models, Class of 1904

U.S. Military Academy Library

After the War of 1812, West Point exemplified McHenry's dictum. The Academy was the first school of engineering in America. For many years it produced graduates who, in addition to heroic battlefield achievements, played a major role in the Nation's internal improvement in areas such as mapping, roadbuilding, constructing canals, improving harbors, and building railroads. President Andrew Jackson labeled it "the best school in the world."

The Military Academy continued under the supervision of the U.S. Army Corps of Engineers until 1866, when Congress opened the superintendency to all branches of the Army and placed control of the Academy under the Secretary of War, thus ending the Chief of Engineers' role as Inspector. This change responded, in part, to the fact that the Academy supported the entire Army, not just the engineers; however, mathematics, science, and engineering continued to remain at the center of the curriculum.

Robert E. Lee as an Army Engineer

Robert E. Lee was a U.S. Army engineer officer from 1829 to 1855. Coming from a well-known family that already had its military heroes, Lee's career as a military officer was virtually foreordained. After preparatory school, Lee, gifted at mathematics, sought admission to West Point.

Robert E. Lee as a captain

The number of applicants rejected by West Point far outnumbered those accepted each year so a relative wrote to Secretary of War John Calhoun on Lee's behalf and Lee presented the letter to the Secretary in person to make a positive impression. Family connections to important congressmen further aided him in his quest. On March 11, 1824, Lee received admission to the Academy for the class beginning in the summer of 1825—the delay resulting from a backlog of admitted cadets.

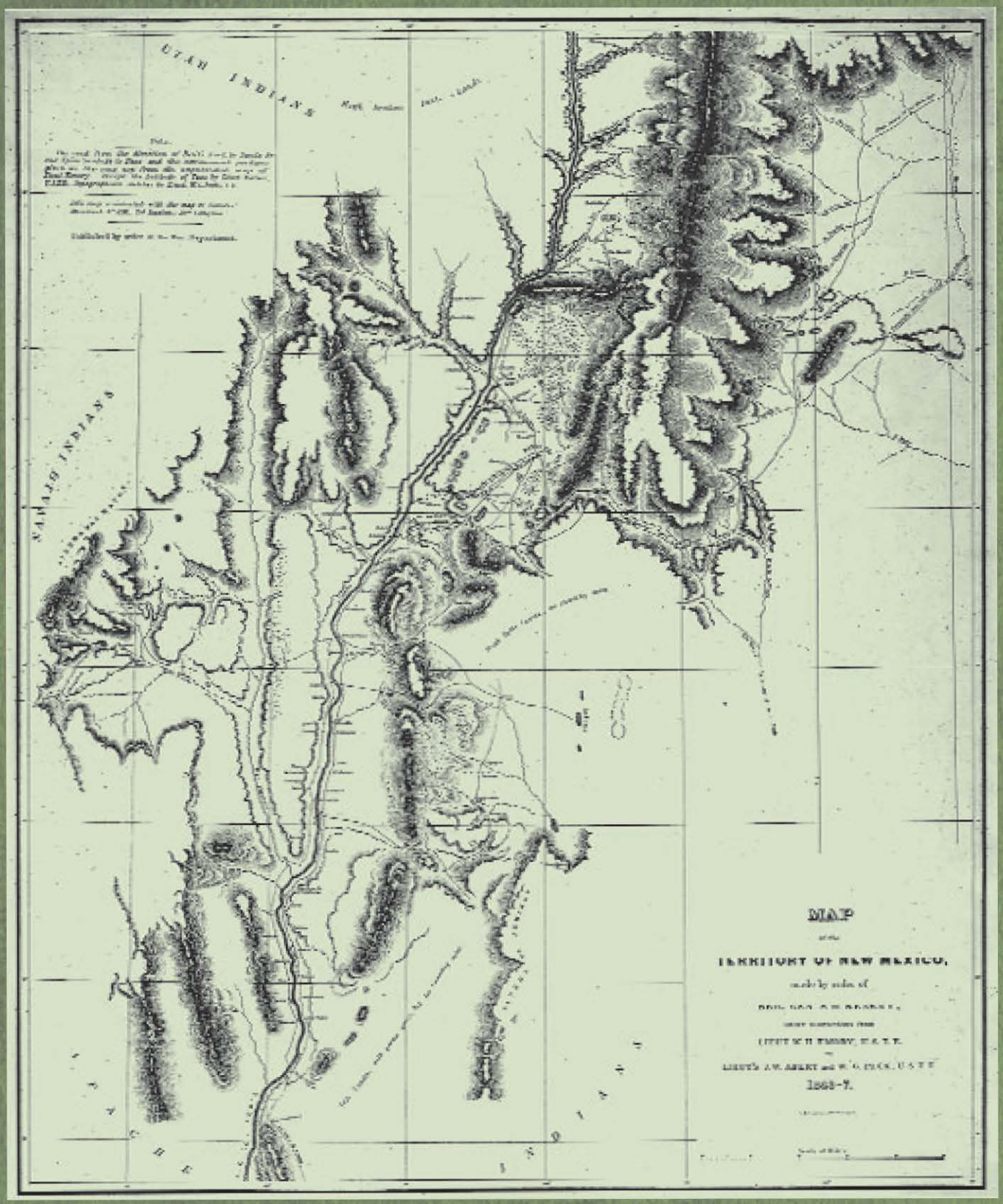
Lee entered the U.S. Military Academy in West Point, New York, on July 1, 1825. An excellent student, he graduated number two in the Class of 1829. As most top graduates did in the nineteenth century, Lee entered the U.S. Army Corps of Engineers as a second lieutenant.

His first assignment was constructing fortifications in Georgia and Virginia, including Fort Monroe. He later supervised navigation work along the Mississippi River, and for five years he oversaw upkeep of the forts in New York Harbor. In 1846, Lee was assigned to the campaign in northern Mexico. He eventually participated in all the main battles from Vera Cruz to Mexico City, and received a final brevet to colonel for his valor at Chapultepec. From 1848 to 1852, Lee was the supervising engineer for construction of Fort Carroll near Baltimore, Maryland.

In 1852, Lee accepted an assignment as Superintendent at the United States Military Academy, a position reserved for Corps of Engineer officers until 1866. While heading the Academy, he instituted many important changes to the curriculum. He also encountered cadets who would be prominent in the coming Civil War—including Union generals James McPherson, Philip Sheridan, and O. O. Howard, and Confederate generals John B. Hood and Jeb Stuart. Lee's son, G. W. Custis Lee, also served as a cadet while his father was Superintendent.

Lee left the Corps of Engineers in 1855 when he accepted an assignment as a lieutenant colonel in the 2d Cavalry Regiment. In 1859, he led a contingent of Marines to retake the armory seized by John Brown at Harper's Ferry. Offered command of all Union forces at the outset of the Civil War, Lee chose loyalty to his state and the South and accepted a Confederate generalship.

Douglas Southall Freeman, Lee's biographer, said that Lee's mind was mathematical and his imagination that of an engineer, and that his training as an engineer worked to his advantage when strategizing. Lee recognized and admired the engineers among his opponents, many of whom were his former students or fellow engineer officers. Asked to name the best Union general, Lee answered George B. McClellan, commander of the Army of the Potomac and Corps of Engineers officer from the West Point Class of 1846.



Map of the Rio Grande Valley, drawn in 1846–47 for Mexican War reconnaissance

National Archives

The Topographical Engineers

The U.S. Army played a key role as the young Nation rapidly expanded during the nineteenth century. During his first inaugural address in 1801, President Thomas Jefferson said, "However our present interests may restrain us within our own limits, it is impossible not to look forward to distant times, when our rapid multiplication will expand itself beyond those limits and cover the whole...continent." Seizing upon an opportunity to greatly increase the land size of the United States, Jefferson negotiated with Napoleanic France for the Louisiana Purchase. Soon thereafter, the imaginative president sought to have this large expanse explored, with the ultimate goal of finding a Northwest Passage. The reconnaissance of the Trans-Mississippi West began with the four-thousand-mile epic journey of Lewis and Clark in 1804-1806. They traveled the length of the Missouri, Clearwater, Columbia, and Snake rivers to the Pacific Ocean.

Another ten years would pass before the government began to professionalize official exploration. In 1816, topographical officers, known

View of "insulated tablelands" or buttes during Maj. Stephen Long's expedition to the Rocky Mountains, 1820

Library of Congress

Map depicting the route of Stephen Long's 1823 survey of the upper Midwest
National Archives

as Geographers during the American Revolution and as Topographical Engineers during the War of 1812 and thereafter, were added to the peacetime Army. Unlike the other officers of the Corps of Engineers, whose primarily military duties centered on the construction and maintenance of fortifications, "topogs" performed essentially civil tasks as surveyors, explorers, and cartographers. In 1818, the War Department established the Topographical Bureau under Major Isaac Roberdeau to collect and store the maps and reports of topographical operations. Like the topogs, who numbered only six at this early date, the bureau was placed under the Engineer Department.

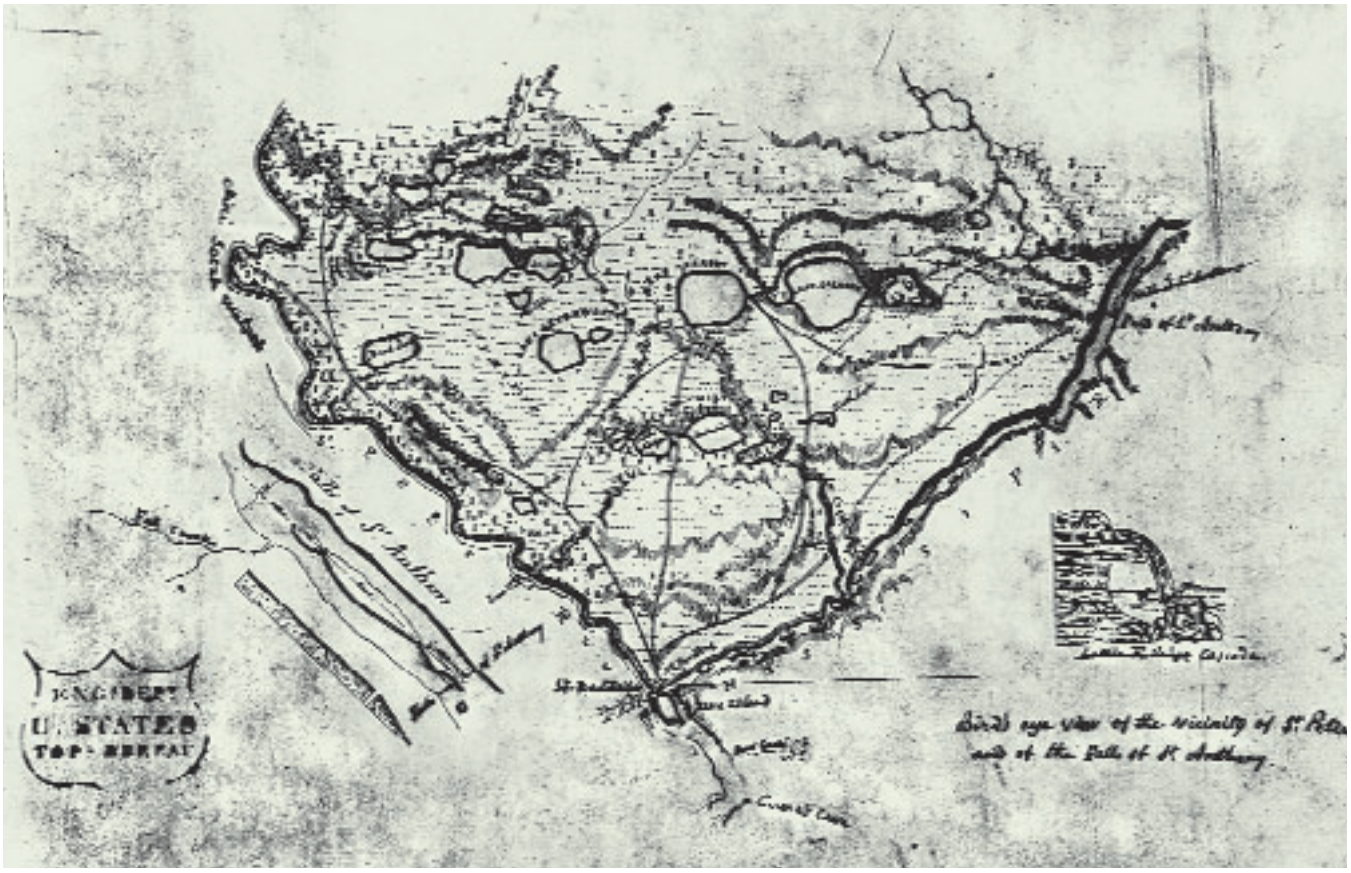
Almost from the outset, there was a great demand for the skills of the Topographical Engineers. The accelerated movement of Americans into the interior of the continent served to emphasize the Nation's

need for networks of transportation and communication. Congress recognized the compelling nature of the requirement in 1824 and passed the General Survey Act. This law, which authorized surveys for a national network of internal improvements, became the basis for topog involvement in the development of canals, roads, and later, railroads.

Along with the growing importance of the topogs came increases in their numbers and improvements in the organizational structure. Most of the changes came during the first decade of Colonel John J. Abert's tenure as Chief of the Topographical Bureau. A strong-willed and ambitious West Pointer who received the appointment after Roberdeau died in 1829, Abert sought independence

John J. Abert
Historical Society of Pennsylvania

Joseph Nicollet's map of the confluence of the Minnesota and Mississippi rivers
National Archives



for both the bureau and the topogs. He realized the first goal in 1831 when Congress removed the bureau from the Engineer Department and gave it departmental status under the Secretary of War. Seven years later, he attained the second objective and became Chief of an independent Corps of Topographical Engineers, a position he held for twenty-three years.

Colonel Abert sought a great deal more for the topogs than prominence within the bureaucracy. While Roberdeau had been content to manage the office as a depot for maps and instruments and as a clearinghouse for correspondence, Abert saw his role as a planner and administrator for national policy regarding internal improvements and western exploration. As a member of the Board of Engineers for Internal Improvements, established to evaluate projects considered under the General Survey Act, Abert had a part in the selection of tasks and their execution. In western exploration, though, which for many years took a back seat to internal improvements, Abert's role remained minor. His bureau distributed instruments, collected maps, and forwarded correspondence.

Individual members of the Corps of Topographical Engineers, however, achieved great importance in western exploration and surveys. During the expansionist era of the 1840s, from the first stirrings of Oregon fever in the early years of the decade to the acquisition of the huge southwestern domain after the Mexican War, topogs examined the new country and reported their findings to a populace eager for information about the lands, native peoples, and resources of the West. Best known of all was John C. Frémont, the dark-eyed and flamboyant pathfinder who led three parties to the Rockies and beyond during this age of expansion. The ranks also included William H. Emory, author of a perceptive assess-

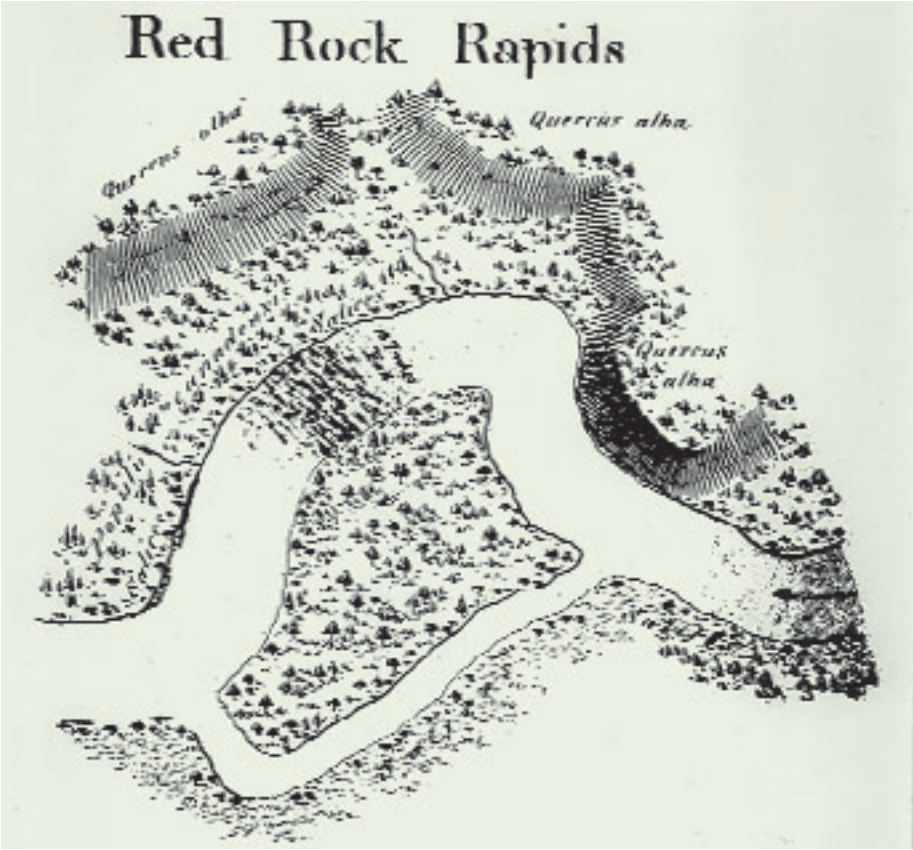
(pictured above) Rare Corps of Topographical Engineers Model 1839 pattern uniform coat, from the USACE museum collection. This example is believed to be the uniform of First Lt. Jacob E. Blake.

(pictured right) Sword hilt insignia of the Corps of Topographical Engineers

(pictured far right) Corps of Topographical Engineers cap device

ment of the Southwest, and James H. Simpson, discoverer of the ruins of the ancient Pueblo civilization of New Mexico. Howard Stansbury, whose report of an exploration of the Great Salt Lake is still considered a frontier classic, also wore the gold braid of the Corps of Topographical Engineers. In the 1850s, when the emphasis shifted from reconnaissance to more detailed exploration and roadbuilding, topogs continued to make their marks. John N. Macomb laid out the basic road network of New Mexico, George H. Derby initiated harbor improvements in California, and Joseph C. Ives became the first Anglo-American to descend the Grand Canyon.

The disparity between the renown of members of Abert's Corps and the obscurity of his bureau was due to the absence of a government policy regarding exploration. The Topographical Engineers frequently went into the new country on an *ad hoc* basis at the behest of a politically powerful figure like Missouri Senator Thomas Hart Benton or to accompany a military expedition. From Major Stephen H. Long's 1819 journey up the Missouri River as a minor adjunct of Colonel Henry Atkinson's Yellowstone Expedition



Lithograph, c. 1850s, depicting John C. Frémont ascending Snow Peak

A portion of John C. Frémont's 1841 map of the Des Moines River
National Archives

to Emory's southwestern exploration during the Mexican War and Mexican boundary surveys, topog exploration often took a secondary position to other purposes.

When exploration and surveys in the Trans-Mississippi West were finally organized and coordinated in the 1850s, Abert no longer wielded the political influence that had brought his ambitions so near fruition in the 1830s. Duties he hoped would devolve on the Corps of Topographical Engineers went instead to the Office of Pacific Railroad Explorations and Surveys, a small organization created by Abert's political foe, Secretary of War Jefferson Davis. This new office would manage the surveys for railroad routes to the Pacific Ocean.

Despite the lack of a unified policy and central direction, the history of topog expeditions forms a coherent entity. Topographical officers provided the necessary link between the first explorations of the mountainmen—those rude, brawling beaver trappers, who first probed far beyond the frontier and were no less than walking storehouses of geographical knowledge—and the civilian scientific specialists, who undertook a rigorous study of western natural history and resources after the Civil

Pacific Railroad survey party camped in the Mohave Valley

War. Between the trappers and the specialists of the United States Geological Survey, topogs provided the Nation with an overall picture of the Trans-Mississippi region. They explored bits and pieces, as opportunity allowed, until a coherent general understanding of western topography emerged in the form of Lieutenant Gouverneur K. Warren's map of 1858. His achievement, the first accurate, overall depiction of the Trans-Mississippi West, was a milestone in American cartography. Thereafter, topog activity centered on filling in the few blank spaces in Warren's map.

During the Civil War, the Corps of Topographical Engineers was merged into the Corps of Engineers, whose officers renewed the topogs' efforts after Appomattox. Their work continued until 1879, when primary map-making responsibilities passed from the Army to the newly established U.S. Geological Survey. By then, the officer-explorers had done their major task. They had extended and codified the knowledge of the mountainmen and, in turn, laid the groundwork for scholarly analysis. The Topographical Engineers had performed an essential service to a nation growing in size and in self-understanding.

Gouverneur K. Warren

National Archives

Toward a National Transportation Network: The Pacific Railroad Surveys

Henry L. Abbot as a general officer

By 1853, influential members of Congress had decided to support the construction of a transcontinental railway; however, there was a serious dispute over the proposed route for such a line. Congress amended Army appropriations to fund the reconnaissance of several potential routes by the Corps of Topographical Engineers. The Secretary of War, Jefferson Davis, established the Office of Pacific Railroad Explorations and Surveys and appointed Captain Andrew A. Humphreys of the Topographical Engineers to oversee the project. Ultimately, the topogs explored four different routes in seven different expeditions. The northernmost expedition, led by Isaac Stevens, a former engineer officer, traversed from Minnesota to Washington. Captain John Gunnison surveyed the area along the Arkansas Valley into the Great Salt Lake. Lieutenant Amiel Whipple explored the area along the 35th parallel through New Mexico. Two expeditions, those under Lieutenants John Pope and John G. Parke, surveyed the final route through the recent Gadsden Purchase and Texas. Additional survey parties under Robert S. Williamson and Lieutenant Henry L. Abbot and another by Parke probed the mountains of Oregon and California for railroad passes.

These parties faced an assignment of considerable complexity. Each expedition was required to report on the numerous determinants of railroad construction, among them were distances, grades, mountain passes, canyons, bridge sites, and tunnels. In addition, each survey had to consider natural resources, particularly timber, stone, coal, and water, all crucial for building and operating a railroad.

The surveying parties faced great hardships as they made their way westward. In the Northwest, the Stevens expedition ran into the blizzards of the Rocky Mountains. Pope and his men would spend many days without water on the barren Llano Estacado. The party of Abbot and Williamson stumbled into nests of rattlesnakes near Lake Klamath. In eastern Utah, Gunnison and several assistants were cut down in a predawn attack.

In spite of the obstacles, the topographic expeditions brought back a remarkable amount of data. The thirteen-volume final report was a comprehensive record of the trans-Mississippi region's flora and fauna, geological morphology, and geographical characteristics. The immense

compendium of this report remains as a reference that naturalists continue to consult.

Although Congress, divided by sectional animosities, failed to agree on any one route, the surveys ultimately proved of great significance. When the first transcontinental railroad, the Union Pacific–Central Pacific running from Omaha to Sacramento, was built after the Civil War, it followed the path surveyed by Gunnison's party after his death. Later lines also went along routes first examined by these Topographical Engineers. The Pacific railroads bound together the farms, markets, resources, and industry of a growing nation.

The Williamson survey party at work near Livermore Pass