Chapter I

THE SEARCH FOR ENGINEER OFFICERS AND THE FORMATION OF THE GEOGRAPHER'S DEPARTMENT

When the American colonies went to war with Great Britain in April 1775, they had to do more than fight. They had to build an army. At first colonial militia units, acting independently, fought the British regulars; but on 14 June 1775 Congress established the Continental Army with General George Washington as Commander in Chief. On July 3 Washington assumed command in Cambridge, Massachusetts. His immediate concerns were to strengthen his fledgling army and confine the British to Boston. To enable his forces to check any British advances into the countryside, Washington quickly had to supplement existing earthworks with new ones.

From the start the predominantly defensive nature of the war convinced Washington he would need trained engineers, but he experienced continual frustration in his efforts to find them. "The Skill of those engineers we have . . . [is] very imperfect and confined to the mere manual exercise of cannon," he complained to the president of Congress, "whereas the war in which we are engaged, requires a Knowledge comprehending the Duties of the Field and Fortifications."[1] The shortage of qualified engineers was so acute because formal schooling in siegecraft, the erection of field fortifications, and technology was practically nonexistent in America. Officers with technical knowledge had gained it largely through their reading, and the few officers with engineering experience had acquired it while serving under British engineers in the colonial wars.

EIGHTEENTH-CENTURY FRENCH ENGINEERING MANUAL. *This page taken from Deidier's* Le Parfait Ingénieur Français *includes designs for parallel trenches and defensive lines, as well as sketches of engineer tools and a sap excavation,* bottom right. *Because no American training manuals existed, the Continental Army's engineers had to rely on English and French texts. American editions of Englishman John Muller's treatises on artillery and fortifications and an English translation of the Count de Clairac's* Field Engineer *appeared in the early part of the Revolution.*

Deidier, *Le Parfait Ingénieur Français*

RICHARD GRIDLEY'S EARLY SERVICE AT LOUISBOURG. This ***plan of the siege of Louisbourg, 1745, was made from sketches by Richard Gridley (1710-96), who thirty years later would become the American Army's first Chief Engineer. An artillery officer in the Massachusetts forces who had worked as a surveyor and had assisted a noted British military engineer in the Boston area, Captain Gridley joined the colony's expedition against Louisbourg in April 1745. As the designer of several batteries, Gridley played a major role in the successful American siege of the French-held fortress. In the years before the Revolution, Gridley continued to serve Massachusetts as an***

engineer and artillerist, notably during the French and Indian War. In 1763 the crown rewarded him with the Magdalen Islands in the gulf of St. Lawrence-an area a bounding in seal and cod-and half-pay as an officer for life. In 1770 Gridley bought half-interest in an iron-rich pond near Sharon, Massachusetts. He soon opened a forge which later became a source of cannon and mortars for the fledgling Continental Army. When war broke out in 1775, his decision to side with the rebels cost him the Magdalen Islands and his life pension. No likeness of Gridley has been found.

Military Engineer, December 1947

Washington's first Chief Engineer was Col. Richard Gridley, a 65-year-old engineer and artillery veteran of the colonial wars, whom the Massachusetts Provincial Congress had named in April 1775 chief engineer, colonel of artillery, and major general of provincial troops. Gridley was the ranking engineer at the Battle of Bunker Hill, where he enlisted Capt. Jeduthan Baldwin, another colonial war veteran, as an assistant. Lt. Col. Rufus Putnam of the Massachusetts forces joined Gridley and Baldwin as an engineer when Brig. Gen. John Thomas, commander of the American right wing at Roxbury, needed assistance in erecting defenses.

Clearly Gridley had the most military experience, yet his knowledge was probably strongest in the field of artillery and limited in the area of fortifications—a situation that troubled Washington. On the other hand, Putnam, a millwright by vocation, felt himself lacking as an engineer, and was later to recall:

> I informed the General [Thomas] that I had never read a word on the Subject of Fortification, that it was true that I had ben Imployed on Some under British Eengeneers [*sic*] but pretended to no knowledge of Laying works. But there was no excuse would do, undertake I must.[2]

Putnam neglected to mention, however, that as deputy surveyor for the province of Florida in 1774 he had explored and mapped portions of the lower Mississippi.

For several reasons Washington was generally unenthusiastic about his first Chief Engineer. Gridley's age and a wound received at Bunker Hill kept him inactive throughout much of the summer and fall of 1775, a time when his advice and assistance were needed. In addition, until November 1775 Gridley commanded the Continental artillery, a role that diverted much of his attention from engineering. The fact that Washington had not personally chosen Gridley—he had assumed his position by virtue of his standing in the Massachusetts provincial forces—placed further distance between the Commander in Chief and his Chief Engineer. Gridley's rank of major general in the Massachusetts forces proved another thorn in Washington's side. Wishing to avoid alienating brigadier and major generals who thought Gridley's provincial rank too high to renew in the Continental Army, Washington recommended against a major general's commission for Gridley.[3]

In December 1775 Washington underscored his reluctant acceptance of Gridley as Chief Engineer. "We have no one here better Qualified, he has done very little hitherto in that department," Washington informed Congress. "But if the Congress chuse to appoint him, I will take care that he pays a proper attention to it."[4] Although Washington developed a strong preference for Putnam, Gridley continued as Chief Engineer until Washington

moved to New York City in April 1776. Thereafter Gridley remained as chief engineer for the Army's Eastern Department, headquartered in Boston, and Putnam joined Washington's staff as Chief Engineer.

Even had Washington and Gridley worked together more effectively, the Commander in Chief's need for more engineers would have been scarcely less desperate. The engineering crunch affected the states as well as the Continental Army. As most states gradually became convinced of the danger of attack to their coastlines, rivers, and key port cities, where the majority of colonial Americans lived, they planned new fortifications or restoration of defenses that had languished since the end of the Seven Years' War in 1763. In some cases the states managed to get technical assistance outside the Army. Pennsylvania, for example, enlisted David Rittenhouse, a noted inventor, to work on the Delaware River defenses. South Carolina employed Ferdinand de Brahm, the nephew of a distinguished geographer.

There was so much work to be done that the states clamored for more engineers, apparently believing that Army engineers should be at their disposal. The Pennsylvania Committee of Safety, for example, wanted Washington to dispatch an engineer to plan and supervise the works it had authorized for Billingsport on the Delaware River. Rhode Island's Governor Nicholas Cooke wanted similar support at Newport. In both cases the Commander in Chief had to refuse: he had more than enough in New York to keep his few engineers busy. Actually Washington had to postpone completion of essential fortifications in the Hudson Highlands because of the shortage of Army engineers.[5] In June 1776, nearly a year after first taking command, Washington still lamented that he had "but one [Putnam] on whose Judgement . . . he would wish to depend in laying out any work of the least consequence." During that summer four volunteers received commissions as engineer officers, but still more were needed.[6]

Soon most states were required to accept the viewpoint of Maryland's Charles Carroll, Barrister. "We must . . . avail ourselves of the skill of such [engineers] as we can meet with among ourselves, though their Knowledge be not so perfect or complete," he advised the state's Council of Safety.[7] On the other hand, Virginia and South Carolina competed successfully with the Continental Army for engineers. As revealed in the following letter, the two states offered pay and travel allowances sufficient to win over from Maj. Gen. Charles Lee the only two engineers in his Southern Department. Despite Lee's badgering, it was a long time before Congress adequately settled the pay for Army engineers or acknowledged his arguments that engineer officers were required to travel more frequently than most other officers, usually alone, and hence were entitled to special benefits.

1. "IT WAS INDEED, IMPOSSIBLE FOR THEM TO EXIST"

Charles Lee to Richard Peters.

Charleston, August 2, 1776

I often represented to Congress how difficult or impossible it would be to engage, or retain after they were engaged, any engineers of tolerable qualification on the wretched pay established. The two appointed to my district have, as I expected, quitted the service. It was indeed, impossible for them to exist. [John] Stadler, I hear, has entered into the service of Virginia. [Baron] Massenbaugh is retained by this Province at fifty-four dollars per month, a servant, rations, and his travelling expenses. He formerly begged his dismission from me, assuring me, I believe sincerely, he was zealous in the cause of America; that he would willingly, if I chose it, enlist as a common soldier; but that to ride about the Continent from North to South, find horses, and appear like a gentleman, was impossible.

—Force, *American Archives*, 5th ser., 1:721.

As the hope of reconciliation with Britain faded in late 1775 and it became clearer that a protracted war was likely, the colonists began to look abroad for economic and technical assistance. On December 2 Congress directed its Committee of Correspondence "to use their endeavours to find out and engage in the service of the united colonies skilful engineers, not exceeding four," but no further action was taken that year.[8]

Finally in April 1776 Congress sent Silas Deane, an ambitious ex-congressman from Connecticut, to France as an agent. His instructions charged him with arranging the exchange of American goods for needed supplies; purchasing clothing, munitions, and artillery; and pursuing the possibility of an alliance with France. In addition Congress directed Deane to implement its earlier resolution regarding engineers. Deane's mission marked the first active recruiting by Congress of engineers across the Atlantic.

As Britain's most powerful enemy and the center of technical education in Europe, France was the most logical source of engineers for the Continental Army. The French engineer corps was a highly developed branch of the army with its own rigorous training program provided by the Ecole du Corps

SEBASTIEN LE PRESTRE DE VAUBAN. ***Most of the foreign engineers in the Continental Army had studied the principles of this master of military engineering at the great French engineering school at Mezieres.***

Library of Congress

Royale du Genie, founded in 1749 at Mezieres. This program combined theoretical instruction with practical exercise.[9]

At Mezieres, the young officers still keenly felt the influence of Sebastien le Prestre de Vauban, the great seventeenth-century French engineer and master of siegecraft. Vauban's theories on the attack of fortified places emphasized that besieging forces could cut their losses by approaching

tresses systematically through a series of interconnected parallel trenches, and that additional protection in the form of temporary earthworks and other trenches was essential. The best defense was a defense in depth, substituting small-scale forts for the usual projecting outworks attached to the main enceinte.[10] Most of the French volunteers who eventually served as engineers in the Continental Army had been imbued with Vauban's doctrines at Mézières.

Deane's activities in France provoked immediate controversy at home. He was suspected of profiteering and was criticized for encouraging so many foreigners to come to America with promises of positions in the Continental Army. Literally besieged by volunteers, Deane often proved incapable of recognizing the best qualified officers among them.

Philippe Charles Tronson du Coudray,[11] a French artillerist and author of technical works on gunpowder, metallurgy, and artillery, was an exception. The artillerist combined proven expertise with access to valuable military stores. He was a competent, if somewhat headstrong, officer; and, as described by Deane, his manner and disposition were well suited to the antimonarchical American cause. That Coudray planned to bring "two hundred pieces of brass cannon, with every necessary article for twenty-five thousand men" clinched the argument in his favor.

2. "HE IS A PLAIN, MODEST, ACTIVE, SENSIBLE MAN, PERFECTLY AVERSE TO FRIPPERY AND PARADE"

Silas Deane to the Committee of Secret Correspondence.

August 15, 1776

. . . M. Coudray, the Engineer, . . . obtained liberty last week to go for America with as many Engineers as he should choose, and was not only assured of M. Beaumarchais[12] being able to procure the stores he had stipulated for, but received orders for them, and liberty to take two hundred pieces of brass cannon, lest part might be intercepted. M. Coudray has the character of the first Engineer in the Kingdom, and his manners and disposition will, I am confident, be highly pleasing to you, as he is a plain, modest, active, sensible man, perfectly averse to frippery and parade. My friends here rejoice at the acquisition; and considering the character of the man, and at whose hands I in effect received him, I must congratulate you on it. Several young gentlemen of fortune, whose families are nearly connected with the Court, are preparing to embark for America, by each of whom I shall, without disguise, write you the characters they sustain here. I have told them that merit is the sole object with the Congress. . . .

. . . M. Coudray was not in the Turkish service as I was informed; it was a gentleman [Kermorvan] who proposes accompanying him; but he is an officer of the first eminence, an Adjutant-General in the French service, and his prospects here of rising are exceeding good; but he is dissatisfied with an idle life. His proposals in general have been, that he should be General of the Artillery, and subject only to the orders of Congress or their Committee of War, or of their Commander-in-Chief of the Army where he might be. In the next place, that he should rank as Major-General, and have the same wages, etc., coming in as youngest Major-General for the present, and rising of course.

Many other particulars are not yet adjusted; but considering the importance of having two hundred pieces of brass cannon, with every necessary article for twenty-five thousand men, provided with an able and experienced General at the head of it, warranted by the Minister of this Court to be an able and faithful man, with a number of fine and spirited young officers in his train, and all without advancing one shilling, is too tempting an object for me to hesitate about, though I own there is a silence in my instructions. I therefore honestly declare I am at your mercy in this case, and I have no uneasiness of mind on the occasion; for should I be sacrificed, it will be in that cause to which I have devoted my life. . . . The terms of M. Coudray may be thought high; but consider a person having a certain and permanent service and leave his native country, to go he hardly knows where, and it must be supposed he will ask at least as good terms as he could have in his own country. . . .

—Force, *American Archives*, 5th ser., 1:1018, 1020–21.

Deane was right: volunteers like Coudray were venturing into the unknown by joining the Continental Army and they deserved ample rewards. But the certain alienation of native American officers as well as the volunteers' self-interested desire ultimately to advance their own rank in France were important factors that Deane ought to have weighed more carefully.

In September 1776 Deane concluded an agreement with Coudray. The terms were exceedingly generous and sure to evoke renewed controversy. The agreement gave Coudray the rank of major general and command of the artillery and the yet-to-be-formed corps of engineers. He was to receive a pension equal to half-pay; and when he traveled on duty the Congress was to supply him with horses and carriages, a benefit Washington and Lee had been seeking in vain for engineers already in service.

3. AGREEMENT BETWEEN DEANE AND COUDRAY FOR SERVICE IN THE CONTINENTAL ARMY

September 11, 1776

1. The Sieur Du Coudray, under title of General of Artillery and Ordnance, and in rank of Major-General in the Forces of the United Colonies, shall have the direction of whatever relates to the Artillery and Corps of Engineers, under the order and control only of the Congress of the United Colonies, their Committee of War, or the Commander-in-Chief for the time being.

2. The Corps of Artillery and Engineers, as well officers as soldiers composing the same, shall be under his immediate command, with all the privileges and authority annexed to such command respecting either rewards or punishments, and in case of vacancy in said corps by death, removal, or new creations, it shall be for him to recommend to the Congress, or their Committee of War, the persons proper for filling the same.

3. Whatever relates to the supplying the said corps with provision, to the construction of artillery and fortification, to any plan or scheme relative to these objects, will be consulted on with him, and the execution of whatever may be agreed on committed to him, as within his department.

4. His allowance for pay and table shall be the same as to a Major-General in the service of the United Colonies in a separate command. Should he be made a prisoner, the same shall be continued. Should he by accident of war in the said service be rendered incapable of serving, or should he choose after six years' service to retire, he shall be allowed an honourable annual stipend or reward by the Congress, the particular amount of which Mr. Deane refers to the honourable Congress.

5. Monsieur Du Coudray shall be furnished with an Adjutant, two Aids-de-Camp or one Aid-de-Camp, and a Secretary, and Designer, at the expense and in the pay of the United Colonies.

6. Monsieur Du Coudray's expenses, also those of his servants, in their voyage to America, shall be refunded him by the United Colonies. . . .

11. Considering the particular situation of Monsieur Du Coudray as a foreigner, and his uncommon exertions for and in behalf of the United Colonies, it is agreed, that his pension or annual stipend on his quitting the service, as afore-agreed, shall be the one-half of his pay and table whilst serving, or other equivalent gratification.

12. Horses and carriages will be supplied Monsieur Du Coudray, at the expense of the United Colonies, when he has occasion for removing from one part of the Continent to another; also to the officers proposing to go

out with him, or advance to him such sum as will be sufficient to procure them in the Colonies where they are serving.

13. Considering the situation of the American war at this time, Mr. Deane thinks that two Engineers, four Captains, and four Lieutenants, with the proposed Adjutant-General will be as many as he can prudently agree for at present. ...

-Force, *American Archives,* **5th ser., 2:284-85.**

In early December 1776 **Benjamin Franklin joined Deane in Paris to negotiate a treaty of alliance with the French. Upon his arrival Franklin reiterated Congress's call for engineers to King Louis XVI, who responded**

BENJAMIN FRANKLIN AT THE COURT OF FRANCE. ***Franklin spent almost nine years,1776-85, in France, furthering the interests of America.***

Record Group 66, National Archives

by ordering the Comte de St. Germain, his minister of war, to recruit a group of Royal Engineers to serve in America. St. Germain turned to Louis Lebègue Duportail, an engineer officer whose work the previous summer on a new set of regulations for the Royal Engineers had earned him the war minister's acclaim.

Duportail offered his services to the American commissioners on condition that his grade in the Continental Army would be higher than the one he currently held in the French army. Then on 11 January 1777 he demanded command of all engineers in America. The next day Duportail laid down further stipulations: his pay was to begin on the day of his departure from France and his rank in America was to be higher than his new rank by brevet upon leaving France. Unlike Coudray, Duportail agreed to pay his own passage to America.

As a treaty of alliance had yet to be signed, the king ordered utmost secrecy surrounding the preparations to send French engineer officers to aid in the American Revolution. To accompany him to America Duportail chose three men of lesser rank in the Royal Engineers—Jean Baptiste de Gouvion, Jean Baptiste Joseph de Laumoy, and Louis de Shaix La Radière. By 17 February 1777 all four volunteers had signed contracts with the American commissioners.[13] Granted a two-year leave by the king, they sailed from Nantes under assumed names. The group landed initially at Santo Domingo; and from there, except for Laumoy, who was detained by illness, they made their way first to North Carolina and then to the seat of Congress at Philadelphia.

Meanwhile, under the terms of the Deane-Coudray agreement, several French officers signed up as members of Coudray's staff. They began arriving in America in March and April 1777. Because Coudray's actions jeopardized the secrecy of French aid, the French government ordered him to renounce his commission and stay home. He ignored the order, stole out of the country, and finally reached America in May. Additional officers hoping to join the Coudray group crossed the Atlantic of their own accord.

The need for engineers remained acute, particularly in the south, where Charles Lee complained with characteristic hyperbole: "There is not a man or officer in the Army, that knows the difference betwixt a Chevaux de Frise, and a Cabbage Garden."[14] However, the price of attracting engineers threatened to wreck the chances of obtaining any more. Most members of Congress and Army officers were revolted to find foreigners granted commissions that in many cases placed the newcomers above Americans already in service. When Coudray presented himself in Philadelphia, his reception was chilly. In the eyes of Congress Deane had gone too far.

Washington recognized the problem too and suggested restraint in making promotions, except in the case of artillerists and engineers. Engineers, wrote the Commander in Chief, "are absolutely necessary and, not to be had here, but proper precaution must be observed in the choice of them."[15]

Washington declared further that he had two engineers (not named) "who, in my judgment know nothing of the duty of Engineers. Gentlemen of this profession ought to produce sufficient and authentic testimonials of their skill and knowledge, and not expect that a pompous narrative of their Services and loss of papers (the usual excuse) can be a proper introduction into our Army."[16]

In July 1777 tensions mounted. On the 5th Duportail and his companions presented their credentials to Congress. The Royal Engineers grumbled that Coudray had "duped Deane" and "made a . . . bargain for himself, and all the officers with him."[17] At the same time Major Generals John Sullivan, Nathaniel Greene, and Henry Knox threatened to resign because Coudray the newcomer would outrank them.

Still more volunteers, led by the Marquis de Lafayette, a wealthy nobleman inspired by the American cause, also arrived in Philadelphia in July. They too had promises from Deane. Congress was in a quandary. The various groups of French volunteers had besieged James Lovell, a French-speaking member of Congress's Committee on Foreign Applications, for assistance. Much to his displeasure, several of the French officers made him their interpreter and liaison with Congress. Lovell admitted to fellow congressman William Whipple, the "contending endless talkers and writers have entirely destroyed me," and noted, "there is as much pulling and hauling about rank and pay, as if we had been accustomed to a military establishment here 150 years."[18] Yet Lovell took up Duportail's cause.

Lovell's support for Duportail was based on his conviction that the four Royal Engineers were "the only officers . . . procured by the *real* political Agents of Congress." The congressman further argued that the four "legitimate" engineers were being grossly underpaid and that the nature of their profession demanded that horses be made available to them. Significantly, Lovell opposed utilizing "military strangers" except in the case of engineers and one or two officers to serve as instructors-at-large for the Army. Once again the critical shortage of engineers and the desperate need for their technical services combined to overcome American uneasiness about enlisting foreigners.

4. "THERE IS SINGULAR HARDSHIP IN THE CASE OF THESE GENTLEMEN"

James Lovell to George Washington.

Philadelphia, July 24th [1777]

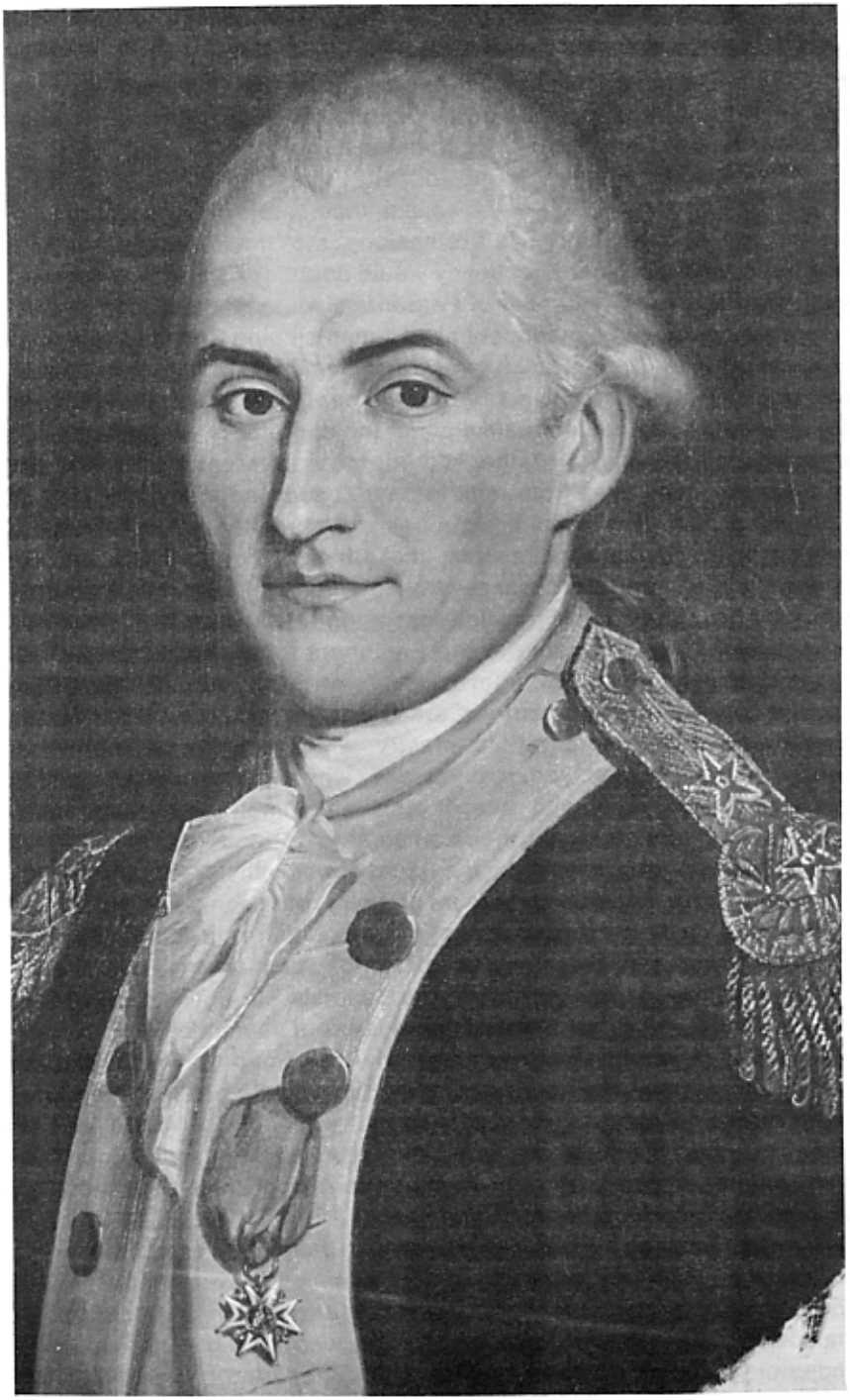
Sir

. . . The Corps of Engineers is very honorable in France; and officers from it are sought by different european Powers. These Gentlemen who are

come over into our service made an agreement with our Commissioners to rise one degree from the rank they held at home, upon a supposition that the practice of Europe had been regarded here. But when they arrived, they found instances very different wth. respect to officers in all other corps. It was their mishap also to see a Major of Artillery [Coudray] affecting to be exalted four ranks, as a Chief in his proper line and theirs also. They made a representation of these circumstances and appealed to the Equity of Congress. But, they had arrived at a time when the Infatuation of some here and the wild conduct of one abroad [Deane] had rendered a Spirit of reformation absolutely necessary as to the point of rank. The ingenuous, however, must own that there is singular hardship in the case of these Gentlemen. The only officers ever sent for by us, procured by the *real* political Agents of Congress, coming out with the good wishes of the french Ministry, being of undoubted rank and ability in their Profession, find themselves in the Dilemma of becoming the first examples of our new reforming Spirit, or else of going home during a Campaign, which their high sense of honor will not allow. . . . Mr. Du C[oudray] having created himself to the Command of Artillery *and* Engineers, persuaded Mr. Deane that it would be impossible to get any from the *military* corps of Engineers now called *royal* because their Demands would be so exorbitant; and that it would be also unnecessary, because we ought not to build fortified Places in America to serve as secure Holds to our Enemy when once taken from us; and that therefore, a few *Bridge and Causeway-makers* would answer all the ends of military Engineers. Such he brought with him; who were quite ready to fall under the command of an *artillery* direction; when not the lowest officer of the royal corps of Engineers would have submitted to such a novel pretension. . . . Mr. Du C[oudray] has given full scope to *his* species of Ingenuity, here [before Congress], as in

LOUIS LEBÈGUE DUPORTAIL. *Charles Willson Peale painted this portrait of Duportail (1743–1802), who served as Chief Engineer in the Continental Army during 1777–83. Born to a noble family in Pithiviers, France, Duportail attended the French school of military engineering at Mézières and was a Royal Engineer when he volunteered for the American Revolution. He served with distinction during the Philadelphia campaign and at West Point, frequently helping Washington coordinate plans with officers commanding the French forces in America. Captured at Charleston in 1780, Duportail was exchanged in time to command the engineers at the Battle of Yorktown. He returned to France in 1783 to become a brigadier general of infantry and later secretary of war. His support for Lafayette during the French Revolution forced him into hiding. To escape the Reign of Terror, Duportail fled to America and as an émigré settled on a farm near Valley Forge. Heeding Napoleon's order that émigré officers return home, Duportail sailed for France in 1802. His ship was lost at sea.*

Independence National Historical Park Collection



the Neighbourhood of Mr. Deane. I have been told that he has said, if he could not be employed himself, he would bring it about that these others should not. This may be an absolute Falsehood. But, I will own it comes the nearest of anything, which I can conceive of, to explain the delays which have taken place in regard to these Engineers, who ought to have been sent to your Excellency long ago. They have remained subject to the crucifying expences of this city, because their employment seemed to interfere wth. Mr. Du Coudray's Pretensions, tho' those very Pretensions had been rejected. Your Excellency would doubtless smile, if you should ever hear, that even a number of *Peasants* disputed 3 days about the difference between the consequences of a man's being Colonel in Chief, or First Colonel, or Colonel to take rank and Command of all heretofore appointed, or Colonel *commandant* of Engineers. Would not a Brigadier or Major General of Engineers alike annul the supremacy of the differently worded commissions? Or rather, do not the 4 different modes give like command? I shall pass from rank to pay. These Gentlemen not only far from the prophesied exorbitancy in demand of rank, never received one shilling in France as Gratification; tho' others who were *not sent for* received large sums, and claim pay from their embarkation, and even pensions for life. But Doctr. Franklin, supposing it would be less trouble to himself and more agreeable to the Engineers to see to their own passages, stipulated their pay from the 13th. of Febry. As no Regulations have yet been made in regard to Cavalry or Engineers, these Gentlemen have received 5 months pay as Infantry; which will not refund the expenses of their voyage. I am really uneasy when I find manly honourable Intentions do not meet with at least equal emoluments with artful suspicious tricking contractors. If these officers do not walk to camp, it is not because they were furnished by the Board of war with horses upon my application for them: And yet the nature of their Profession demands a provision of this Kind. Are they suddenly to reconnoitre a Camp, a River, a shoar, or a whole neighbouring country thro' which an army is to march, and to make the speediest return to the Generals, on foot? I trust your Excellency when asking for Engineers had ideas of something beyond what the sinister views of an ambitious foreigner has sought to inspire us with here; which is forming a causeway, or cutting a ditch or planking a bridge. And I shall consequently rest satisfied that you will receive the Officers now presenting themselves to you, and secure to them such honors and emoluments as you shall find them to merit from their education and abilities *exemplified under your command.*

No one has been more backward than I in desiring to see foreigners in our service, to the slight of my countrymen. And, except Engineers, I could not admit the thought of our wanting any military strangers other than one or two veteran Adjutants or Majors, who know our language well, and could serve as instructors-at-large to our spirited and well-attached young american Officers.

I wish these Engineers could speak english better than they do; but they can receive orders and give them in english, and will speedily learn to speak. . . .

—Burnett, *Letters of Members of Congress*, 2:417–20.

On 29 July 1777, when Duportail, Radière, and Gouvion reported to Washington's headquarters near Philadelphia, they found Coudray already at work on defenses in the vicinity. Sensing the friction between Coudray and Duportail, Washington sent the latter back to Philadelphia. He confided to Maj. Gen. Horatio Gates, the commander at Philadelphia, "I perceive there is a Jealousy between them [Duportail and Coudray] and setting them to work together would only create confusion and widen the Breach."[19]

Throughout the summer of 1777 Duportail continued to press for acceptance of Lovell's argument: the Royal Engineers were the only engineers legitimately authorized by Congress. Even though Congress on July 22 attempted to soothe Duportail by voting him seniority and command over all previously appointed engineers, controversy continued to surround Coudray. On August 11 Congress appointed a special committee to define Coudray's powers, for the time being depriving him of his command duties and naming him to the innocuous post of "Inspector General of Ordnance and Military Manufactories."

The Coudray problem aggravated the inherently difficult engineering situation until mid-September, when Coudray's nervous horse jumped from a pontoon bridge into the Schuylkill River. Coudray drowned.[20]

Coudray's death made Duportail's position secure. Yet in the fall of 1777 the Royal Engineers nearly decided to return home because they felt mistreated. They were particularly disturbed about matters of pay, perquisites, and rank. Having used promises of rank and pay to attract foreign volunteers, particularly engineers, the rebels were now not fulfilling their pledges. Although the patriots could ill afford to lose Duportail's services, a number of times during the war they came perilously close to doing just that.

By November Congress had still not paid the French engineers and Washington was loaning them horses and servants. As demonstrated in the following two documents, Duportail's response to this situation was prompted by a genuine feeling of humiliation and real need. In seeking a settlement of pay and perquisites, he argued that engineers deserved more pay as their duty in comparison to other officers "is much more laborious and painful." Moreover, because engineers were frequently away from camp and thereby facing higher living expenses, they deserved special compensation. Horses and servants were added necessities.

Although he commanded all engineers, Duportail found the rank of colonel intolerable. He no longer accepted Congress's argument that his promotion and those of his companions were being delayed to discourage claims by other foreigners seeking advancement. In Duportail's view the Chief Engineer should have been at least a brigadier general to earn respect for his opinions among the generals he frequently advised and to gain compliance with his commands. Moreover, Duportail contended, higher rank would silence the personal insults leveled by those "who do not love the french."

5. "I HAVE HERE REQUESTED NOTHING BUT WHAT IS ABSOLUTELY NECESSARY FOR OUR SERVICE"

Memorial of Louis Duportail to Congress.

Fall 1777

I beg to lay before the honourable congress the following requisitions to be by them determined or to authorize his excellency general washington to Settle them according the knowledge he has of our Service.

1. To Know what pay is allowed to our rank, I would observe that the pay of engineers in europe is much higher than any of the other officers, it is, that the duty of an engineer is much more laborious and painful, in time of war their pay is raised Because in actual Service their expenses are much increased, they are obliged to be continually out to acquire a Knowledge of the country, therefore cannot live So cheap as in camp.
2. To fix the number of horses, a lieutenant engineer in france have tow [two] horses, I hope it will not Be thought unreasonable when I ask tow for a lieutenant colonel and tow for a major, I ask three for me Because it is necessary that I Be always near the general [Washington].
3. To fix the rations of forage according the number of horses, when to our rations the number fixed for your officer in the artillery in the Same rank as our Seems to me Sufficient.
4. As it is impossible to find here Servants, I hope that his excellency general washington may be allowed to appoint us out of the troops.
5. There are Several Small expences attending our Service, for an instance the labourers we are obliged to employ, proper, colours, are to Be considered, it is our custom to make this a Separate account. Signed By the engineer who has employed those things. And after By me, and Soon after By his excellency the general washington.

I beg the honourable congress to observe that I have here requested nothing but what is absolutely necessary for our Service, as we must join

the army as Soon as possible I hope for an Speedy answer, and if the requisitions accepted, that we may Be allowed our pay to commence the 13th of february as has Been fixed; if the honourable congress authorized his excellency general washington to settle this Business, I ask to the honourable congress to let me have 200 dollars, and 150 to mr. de la radiere and the same to m de Gouvion. We want absolutely that monney to be provided with every thing for the campain; for our purses have Been empty in our passage from france, and what we have received is very far from that we have expended. . . .

—Papers of the Continental Congress, roll 51.

6. "THE CHIEF ENGINEER SHOULD HAVE A RESPECTABLE RANK IN THE ARMY"

Louis Duportail to the President of Congress.

November 13, 1777

Sir:

When we [the Royal Engineers] entered the Service of the united States, we publicly declared to the honorable Congress that we would Serve during this campaign only in the Stations of colonel, lieutenant-colonel and major. . . . The congress found our reasons well grounded; but wished that we might, for the present, remain satisfied with our commissions, to give an example and in order to Stop the pretensions and Claims of the french officers and other foreigners. We were told that it was intended that the different grades Should be considered and regarded as on a level with the commissions in the european armies; and to accustom to consider them in the Same light, but in the mean time we were promised that we Should not [be] left long with the commissions we then accepted and that the congress only wanted to have an opportunity of Saying that a lt colonel in the royal corps of french Engineers had been Satisfied in this army with the rank of colonel, a major in Said corps with the rank of lt. Colonel, a Captain with that of a major.

As this Scheme of government Seeme'd to us very sound and Judicious, and that we wished from the very beginning to be useful we consented to Serve with our present commissions, but as we are to pay a proper attention to our rank and to the corps we belong to in france, as it must not be Said against us, that, when the french Engineers are usually preferred in foreign Courts we have been here worse use'd than the other french officers, we declared to the honorable Congress, that we would Serve during this campaign only, with our actual rank.

Now as the campaign is drawing to its end, and Supposing that, contrary to our wishes, we Should be induce'd to leave this continent, as we have hardly time enough left to reach france towards next January (which is the time appointed for appearing at our corps if we do not continue the Service here) I have the honour to present your Excellency with the present petition, Demanding for me the rank of Brigadier-general, for Mr. de la Radiere of colonel, for Mr. de Gouvion the rank of lt. Colonel.

Intreating your Excellency to convey our demand to the honorable congress. I could undouted apply directly to congress Since i ask only the accomplishing of the promises made to me; but i own that the ranks we call for would flatter us infinitely more if they were granted to us by the recommendation of your Excellency. The motives i have already mentioned only concern our Selves. But i could add Several relating to the Service. In all the european armies the Chief Engineer is almost always a general officer, because as he is to take orders from the commander in Chief only it is fit he Should himself be a general officer. More over the Chief Engineer who has a most essential department Should have a certain weight and be regarded in the army, as he is continually in the Case of consulting general officers he ought to be upon an equal footing with them, or else being oblig'd to Submit to their opinion or Shy of defending his own, his Zeal Cools by degrees; he withdraws, and Soon becomes an useless member in the army.

The execution of the different works requires that the chief Engineer Should have a respectable rank in the army, I must add that it is more necessary in this country than elsewhere. Have i not Seen the colonels of the army and even the militia colonels refusing to follow my directions about the works. They have been accustomed to Say that they are colonels as much as I and had no orders to receive from me; accordingly each of them worked as he thought proper.

I cannot express all the difficulty i met with, and i can Say that i had need of the largest, Stock of patience and Zeal to be kept from abbandoning them entirely.

As it is not just that we Should lead a more disagreeable life than the last officer of the army, i will beg leave from his Excellency to add a few reasons more. The rank of colonel unless with the command of a regiment is very little respected, because it is given to a vast many people who are not in the military line. We Suffer very much from this defect in the establishment and indeed very little regard is paid us in the army. If we take up quarters we have to contend for them; the Soldiers even offer to take them from us and we have often been forced to drive them out. If we pass before the line, the Soldiers who do not love the french and even some ill-bred officers give us bad language, our Servants are insulted, our Wagoners are chased from every place, and when they mention the names and ranks of their masters, they are laught at; thus on public Service and in private life we meet with anxieties and mortifications which we

can bear no longer. The rank of general officer which i call for will immediately put a Stop to those inconveniences, as it is respected here it will give our corps the becoming weight and regard So as to make us take a liking to our functions and to give us the means to fulfill them in the most useful manner for the Service of the united States.

—Papers of the Continental Congress, roll 51.

Congress accepted Duportail's immediate arguments pertaining to rank, making him a brigadier general on 17 November 1777. But the issues of pay and perquisites and that of command relationships among all of the Army's engineers were not resolved to his satisfaction for some time.

In considering the Royal Engineers superior to all other engineers in America, whom he viewed as "engineers only by name," Duportail identified a key problem that troubled Washington as well. Whatever his discontents, Duportail would serve as Chief Engineer for the duration of the war.

7. "WE BELIEVED THAT THE CONGRESS WOULD BE SENSIBLE"

Louis Duportail to the President of Congress.

Camp White plaines, 27th August 1778

Sir:

His Excellency Gen. Washington intending to establish in the Department of which I have the honour to be Chief, proper Order and Connection, I must give you notice of a Matter that is only for the Congress to determine.

When we first Came into the Country (I mean the few french Engineers sent by the Court) we inquired if there were in the American Army any Engineers, either born in the Country or Strangers, who had practised already in that Profession and thought able to do that duty. We learned that there were not—that all the Gent. who had the title of Engineers had received it for the first time of the Congress—and they were beholden for it to the necessity the Congress were under, at the time they were appointed, of giving Commissions in that department to the first gentlemen that offered their Service.

We then conceived it against Reason and the advantage of your Service, that we Should be exposed to follow the directions of those new Engineers; we believed that the Congress would be Sensible, that it would be unjust and contradictory to ask the Court of france for Engineers and to

place them in their Art under Persons who are Engineers only by name, that to do so would abase our abilities on a level with theirs, and therefore hinder our being more useful than they. Thus we required of the Congress that not any of us Should be ever commanded by them. The Congress found our request just and reasonable. They made a resolve by wich I was to command all the Engineers employed in the United States, whatever might be their Commission. The Same was expressed in my Brevet. As for the three other french Engineers, it was said to us that their Commissions were Constructed So, that they had a right to command the other Engineers who had not Similar commissions. The difference was that our gentlemen were Called Col, Lt Col or major *of the* Engineers whereas the others were called only Col. Lt. Col. or major Engineer. Thus it was understood likely, that they were in the Same Case of any officer, whatever, either of foot or Horse, that has a commission of Col. or Lt Col. and is not yet Col. or Lt Col. of the Reg[imen]t—his Commission do not hinder him being under the command of the Col. or Lt Col. of the Regt even of the major. Yet Some time ago there happened some difficulty about it—A Col. Engineer, would not acknowledge Mr. de la Radiere, Col. of the Engineers, for his Superior. It is a matter of importance, Sir, that these things Should be determined, and I beg you do your endeavors to have them as Soon as possible . . . .

—Papers of the Continental Congress, roll 51.

Though most of the Coudray group ultimately returned to France, Congress happily commissioned three of his associates as engineer officers.[21] In addition, three other Frenchmen received engineer commissions during the first six months of 1778.[22] Congress issued the last engineer commission to a foreigner on 2 March 1780.[23] Despite the influx of foreign volunteers, the Army never had as many engineers as it needed.

Washington's compelling need for technical assistance also forced him to seek creation of a separate geographer's department to supplement the work of the engineers. Reconnaissance of potential battle sites, camps, areas of troop movement, and enemy positions was vital. "The want of accurate maps of the country which has hitherto been the scene of war," Washington complained early in 1777, "has been of great disadvantage to me." While the British had a plethora of well-executed maps, inadequate facilities made extremely difficult the duplication of what maps Washington's overworked engineers could produce. To remedy the problem he proposed that the Army employ men specifically to map "Roads, Rivers, Bridges, and Fords over them, the mountains and the passes through them."[24]

As usual Washington had to badger Congress to act on his request for Army cartographers. Finally in mid-July 1777, he proposed the appoint-

ment of "a good Geographer to Survey the Roads and take Sketches of the Country where the army is to Act," and suggested placing the geographer in charge of the guides, "who must have a head to procure, govern, and pay them."[25] For the Army's first geographer Washington nominated Robert Erskine, a "thoroughly skilled" man who had already assisted the Army as a mapmaker and who before the war had developed a steam pump, worked on a centrifugal hydraulic engine, written on rivers and tides, and been accepted into the Royal Society of London.

Erskine readily agreed to the appointment as "geographer and surveyor of the roads." As revealed in his letter of consent, Erskine possessed a keen sense of the problems inherent in surveying and mapping. He carefully outlined the needs and capabilities of his department so "that more may not be expected than it is practicable to perform." As assistants he preferred "young gentlemen of Mathematical genius, who are acquainted with the principles of Geometry, and who have a taste for drawing." The new geographer was both eager to begin work and highly qualified.

8. ERSKINE OUTLINES "WHAT MAY REALLY BE ACCOMPLISHED BY A GEOGRAPHER"

Robert Erskine to George Washington.

Ringwood, August 1, 1777

May it please Your Excellency:

. . . It is then perhaps proper to begin with a general view of the nature of the business in order to shew what may really be accomplished by a Geographer, that more may not be expected than it is practicable to perform; and that an estimate may be made of the number of assistants required should the Map of any particular district be required in a given time. It is obvious that in planning a country a great part of the ground must be walked over, particularly the banks of Rivers and Roads; as much of which may be traced and laid down in three hours as could be walked over in one; or in other words a Surveyor who can walk 15 miles a day may plan 5 miles; if the country is open, and stations of considerable length can be obtained, then perhaps greater dispatch can be made; very little more, however, in general can be expected; if it is considered that the Surveyor, besides attending to the course and measuring the distance of the way he is traversing, should at all convenient places where he can see around him, take observations and angles to Mountains, hills, steeples, houses and other objects which present themselves, in order to fix their site; to correct his work; and to facilitate its being connected with other Surveys. A Surveyor might go to work with two Chain-bearers and himself; but in

this case he must carry his own instruments, and some of them must frequently traverse the ground three times over at least; therefore, to prevent this inconvenience and delay, as men enough can be had from Camp without additional expense, six attendants to each surveyor will be proper; to wit, two Chain-bearers, one to carry the Instrument, and three to hold flag staffs; two flags, indeed, are only wanted in common; but three are necessary for running a straight line with dispatch; and the third flag may be usefully employed in several cases besides. From what one Surveyor can do, it will therefore appear that in making a plan, like all other business, the more hands are employed in it, the sooner it may be accomplished; likewise, that the director of the Surveyors will have full employment in making general observations, and connecting the different surveys as they come in, upon one general Map; and, at any rate, that a correct plan must be a work of time.

A great deal however may be done towards the formation of an useful Map, by having some general outlines justly laid down; and the situation of some remarkable places accurately ascertained; from such data, other places may be pointed out, by information and computed distances; in such a manner as to give a tolerable idea of the Country; especially with the assistance of all the maps in being, which can be procured: and this, perhaps, is as much as can be expected, should plans be required to keep pace with the transitions of War.

Navigable Rivers, and those which cannot be easily forded, and likewise the capital roads, should be laid down with all the accuracy possible; but, in the Map of a country, the general course of fordable rivers need only be attended to; it not being practicable to express small windings but on large scale, the same accuracy not being required here which is necessary to ascertain the quantity and boundaries of private property. In general, therefore, the adjacence to, and intersection of, such rivers with roads, will determine their course with sufficient exactness: the situation of woods and mountains, too, may be remarked in a similar manner.

Young gentlemen of Mathematical genius, who are acquainted with the principles of Geometry, and who have a taste for drawing, would be the most proper assistants for a Geographer. Such, in a few days practice, may be made expert surveyors. The instrument best adapted for accuracy and dispatch is the Plain-Table; by this, the Surveyor plans as he proceeds, and—not having his work to protract in the evening—may attend the longer to it in the day. One of these instruments, with a chain and ten iron-shod arrows, should be provided for each of the Surveyors it may be thought proper to employ. . . .

—Heusser, *Washington's Map Maker,* pp. 163–65.

Although regulations for the geographer's department were never formally established, Erskine's pay was set at $4 and four rations per day. In accepting that amount Erskine made it known that geographers in Britain received one guinea, or approximately $5, per day plus expenses; but he conceded that at that rate his pay would exceed that of a major general![26] The assistants—who numbered from two to six—received $2 per day and one ration, and the chain bearers 50 cents per day. Each member of the department was granted an allowance for travel and for purchasing instruments and other essentials.

Dissatisfaction with their pay led two of Erskine's assistants in 1780 to place before him the following urgent appeal. Especially at issue was the surveyors' contention that they had been bypassed when other departments of the Army received pay increments. Despite support for increased pay from both Erskine—who emphasized his department's contributions to the war effort—and Washington, Congress rejected the surveyors' request. As a result it became difficult to recruit surveyors.[27]

9. "WE ARE FAR FROM WISHING TO RAISE FORTUNES BY THE CALAMITIES OF OUR COUNTRY"

Simeon DeWitt and Benjamin Lodge to Robert Erskine.

Morristown, February 12th, 1780

Dear Sir:

As the Directors of our affairs undoubtedly wish to do justice between the Public and its servants, we beg leave to request the favor of you, when arrived at Philadelphia, to represent the difficulties under which the Surveying Department labors at present, which, we flatter ourselves, only requires to be known to be redressed.

Formerly common Surveyors, whose acquaintance with the business was limited by the Needle and Protractor, were paid at least fifteen shillings per day, exclusive of their expenses; while persons of acknowledged abilities received from twenty to forty shillings and upwards; which was a considerable inducement for those whose genius pointed that way to qualify themselves for the profession; whereas, our pay at present is no more than two Continental Dollars a day, without any kind of allowance or emolument, except a ration and travelling expences, a charge allowed in every profession.

The officers in the line of the Army, have received a considerable addition to their pay, under the denomination of subsistance money; besides the benefit of State supplies: and the wages of other Departments of the Army, whose pay was formerly less than ours, has been greatly

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augmented; while we have been entirely overlooked, merely for want of having proper application in our behalf.

In the present case, we are far from wishing to raise fortunes by the calamities of our Country; but at the same time we believe our Country is as far from wishing us to present our fortunes to them, along with our services, without any prospect of reimbursement, which at present is the case. Our pay, so far from supplying us with clothes, has not been adequate, for these twelve months past, to the furnishing us with shoes, and now is not sufficient for washing.

If therefore the continuance of our Service be thought necessary, we have no doubt that the Surveying Department will be so arranged, as in some degree to make up for the Depreciation; and fix our pay in such a manner, as shall prevent the like inconvenience in future; the readiest way to do which, in our opinion, would be to regulate it by the price of Specie.

—Heusser, *Washington's Map Maker*, pp. 208–09.

Upon Erskine's sudden death in October 1780, his 24-year-old assistant, Simeon DeWitt, immediately succeeded him. The following spring Congress created a new position, geographer general of the southern army.[28] Capt. Thomas Hutchins, a respected engineer and cartographer, filled the post. During the climactic Yorktown campaign of 1781, both geographers and their assistants provided invaluable aid to the Army. After the peace DeWitt resigned to become surveyor general for New York State; Hutchins remained with the Army to direct surveys in the Northwest Territory.[29]

SURVEY OF NEW YORK AND CONNECTICUT. *Under the direction of Robert Erskine (1735–80), the geographer's department accomplished a tremendous amount of work. This survey, prepared in 1778 by Erskine with the assistance of William Scull, was one of the numerous sketches designed to aid Washington. The key,* at right, *shows symbols for roads, both surveyed and unsurveyed, and for footpaths, "commanding heights," and taverns. By 1780 Erskine reported that "from the Surveys made, and materials collecting and already procured, I could form a pretty accurate Map of the four States of Pennsylvania, New Jersey, New York and Connecticut" (Erskine to Philip Schuyler, 12 February 1780, quoted in Heusser,* Washington's Map Maker, *p. 209).*

Courtesy New-York Historical Society, New York City