

CONTESTED GROUNDS

AN ENVIRONMENTAL HISTORY OF THE 1777 PHILADELPHIA CAMPAIGN

Blake McGready
Villanova University

ABSTRACT: In the third year of the American Revolution, war moved into the Delaware River Valley and wreaked havoc. Throughout the series of battles for the American capital of Philadelphia, both the Continental Army and British forces had to contend with multiple environmental factors. The need for food and supplies dominated the armies' military strategies. Daily atmospheric conditions and fluctuating temperatures bred deadly diseases. Soldiers manipulated landscapes and waterways for their survival needs. Weather sometimes determined the outcomes of major battles. In their writings, Continental and British soldiers consistently reflected on these environmental conditions and used them to justify their battlefield performance. During the Philadelphia Campaign, neither army effectively harnessed nature to its advantage or overcame nature's challenges. Yet soldiers had a deep understanding that the success of their endeavor was directly related to environmental circumstances that they seldom could control.

KEYWORDS: Environmental history, American Revolution, military history, Pennsylvania, Delaware Valley, Battle of Brandywine, Battle of the Clouds

In August 1822 Elizabeth Smith traveled to her maternal grandmother's farmhouse in Chester County, Pennsylvania seeking to learn more about her family's involvement in the American Revolution. Her grandmother, Mary Frazer, was the widow of Persifor Frazer, late brigadier general of the Pennsylvania State Militia. Grandmother and granddaughter sat on the porch in the late afternoon, listening to the sounds of blue jays and cattle, looking at chickens on the hillside, and watching a gum tree near the well-cast shadows on the lawn. Smith described the "mingled smells of the damask monthly rose, the shrub, the sweet herbs, and the fox grapes,

coming from the old fashioned terraced gardens.” As the women gazed out on the landscape, Smith reminded herself that nearly forty-five years ago the Battle of Brandywine upset this bucolic scene. “We looked over the fields, and woods, and hills and meadows, now lying in such serene repose,” Smith wrote, “but which had been the scene of events so full of painful interest to [my grandmother] and her family, and which were also a part of the history of the country, in its great revolutionary struggle.” To Smith and others, woods, hills, meadows, and other natural features were more than reminders of war. According to the revolutionary generation, the natural world was an uncertain, yet active, participant in the struggle.¹

As the War for Independence engulfed southeastern Pennsylvania in 1777, individuals on both sides frequently commented on the environment around them. Before the September 11 Battle of Brandywine, a Hessian officer described Chester County, Pennsylvania, as “extremely mountainous and traversed by thick forests; nevertheless it is very well cultivated and very fertile.” A local citizen wrote, “The whole country abounded in forests interspersed with plantations more or less detached . . . both banks of the [Brandywine] creek were pretty densely covered with woods. The country is undulating, the larger hills usually skirting the creek separated by flats now forming beautiful and luxuriant meadows.” Patriot Elkanah Watson described the region as “a delightful country . . . which stretched from the Susquehanna to the Schuylkill . . . the hill-sides are laid out into regular farms and are under high cultivation. The verdure of the fields, and the neatness and superior tillage of the farms in the rich vales, were so grateful to the eye.” These rolling hills, thick woods, and fertile lands were more than just vistas. In fact, at the Battle of Brandywine and throughout the entire Philadelphia Campaign, the environment played a decisive, and to this point largely unknown, role in shaping military strategy and the outcomes of battles.²

For years, environmental historians have examined nature as it has related to warfare. Scholars have long established that geography, climate, natural resources, and other environmental features have consistently been crucial elements in combat. Some historians have researched increasingly specific environmental concerns, from the impact of forests to the effect of mosquito-borne illnesses. Others have considered how environmental history can reshape our understanding of entire wars. For instance, growing numbers of American Civil War historians are employing environmental perspectives in their scholarship. Works such as Lisa Brady’s *War Upon the Land* (2012), Kathryn Shively Meier’s *Nature’s Civil War* (2013), and the scholarly essay

collection *The Blue, the Gray, and the Green* (2015) all investigate the ways Civil War–era Americans developed relationships to landscapes they were so readily destroying.³

Although environmental historians generally have not taken to the War for Independence with the same enthusiasm as they have for the Civil War, a handful of works have established a broad environmental perspective of the American Revolution. Historian Elizabeth Fenn's *Pox Americana* (2001) examined the 1775–82 North American smallpox epidemic that took more lives than the revolution itself. In *The Republic of Nature*, Mark Fiege devoted a chapter to the environmental history of the period, exploring how colonial nature, combined with geographic isolation from the mother country, contributed to the development of revolutionary antagonisms, and how the revolutionaries dealt with environmental obstacles. Historian David Hsiung's article, "Food, Fuel and the New England Environment in the War for Independence" (2007), addressed some of the prevalent environmental concerns during the war's early years in Massachusetts. Hsiung argued that securing grain, meat, and wood drove British and American military policies. He demonstrated how both armies' survival depended upon "controlling essential environmental components" like plants, wood, and animals. "Britain did not lose the war because of trees, animals, and grains," Hsiung claimed, "but its inability to obtain and control these elements of the environment contributed to the army's defeat." According to Hsiung, when thinking about the Revolution, military historians cannot take environmental factors for granted. By the time the war reached Philadelphia years later, the fate of both armies still depended on commanding these "elements of the environment."⁴

In 1777 Philadelphia was the largest city in British North America and the capital of the recently declared independent United States. According to Continental Army major general Nathanael Greene, the Quaker City was the crown jewel of the thirteen colonies, "the American Diana." However, Philadelphia's significance extended beyond its urban center and into the countryside. Historian Craig Zabel described eighteenth-century Philadelphia as the nexus of an "agrarian kingdom, the gathering point for the agricultural and other natural riches of the countryside and an entrepôt that economically, politically, and culturally connected his city to the British empire and the rest of the world." The region's "major rivers, navigable streams," and seaports encouraged the growth of the hinterland's abundant manufacturing and agricultural resources. Beyond the city, surrounding-area farmers grew crops and raised livestock. Forest areas provided timber for fuel,

wagons, and building. The countryside generated large quantities of salt, limestone, and iron ore; sizable creeks powered flour and powder mills and forges. Beyond the city's political importance, the Philadelphia Campaign was also a fight for the control of even more crucial environmental resources.⁵

In the process of trying to capture or defend Philadelphia, the Crown Forces and the Continental Army had to contend with a variety of environmental factors. The armies had to navigate the region's powerful rivers, the Schuylkill and the Delaware, and overcome formidable creeks, such as the Brandywine and Wissahickon. They fought opposing soldiers not only for the control of territory, but also for the control of wild animals and livestock. Soldiers suffered from diseases keeping them off the front lines and in hospitals. And whether it took the form of heat, thunderstorms, or fog, the weather consistently affected both sides' strategies. The campaign was just as much a contest between American and British military strength as it was to see which side could more effectively harness the power of the natural world.

In the end, neither side would control the environment during the Philadelphia Campaign. Both the Crown Forces and the Continental Army struggled with natural disadvantages and enjoyed natural advantages. In that sense, in this campaign, nature was neutral. And yet this assessment can be pushed somewhat further. At multiple battles, the British reaped nature's benefits, such as by using fog to shield their movements at Brandywine or relying on storms to assist in their capture of Philadelphia. But in the end, these advantages were only momentary. While nature shielded the British at Brandywine, it also slowed their military maneuvers, allowing the Continental Army the time necessary to escape the battlefield. And while intense rain helped the British conquer Philadelphia, it also prevented a major clash at a time when the Continentals were badly bruised and unprepared for a fight. Nature took no side in the Philadelphia Campaign, but in the long run those same short-term advantages that created momentarily beneficial conditions for the Crown Forces ended up aiding the Continental Army.⁶

THE BRITISH VOYAGE AND EMBARKATION: JULY–SEPTEMBER 1777

In June 1777 both armies began to mobilize following their winter encampments. In late July approximately 17,000 British soldiers crammed onboard over 250 ships in New Jersey's Raritan Bay slated for Philadelphia. By the end

of the month, the fleet had reached the mouth of the Delaware River and appeared prepared to strike the American capital. At this juncture, however, British commander Sir William Howe decided to change course. Instead of striking the city from the river, he decided to land instead at the northern end of the Chesapeake Bay and make his approach overland—a costly decision. What was supposed to be a quick strike at the American capital became a damaging, “circuitous voyage.” Environmental factors would prevent the British from making landfall until August 25.⁷

While at sea, British soldiers complained of the heat, the wind, and strong thunderstorms. Howe’s secretary, Ambrose Serle, wrote, “The thermometer in the shade and at Sea stood frequently at 84 degrees and 86 degrees, what must it have been upon the shore?” Carl Baurmeister, a Hessian major, remembered that “during most of the voyage we had contrary wind and intense heat, which was accompanied almost daily by terrific thunderstorms, causing much suffering among men and horse and damage to the masts and sails.” Not only did the storms force Howe’s fleet to drop anchor and wait for the downpours to pass, they also claimed lives. Baurmeister believed the voyage cost the lives of twenty-seven soldiers and 170 horses, which he called “a natural consequence of spending more than five weeks on a voyage which on good weather can be made in six or eight days.” Serle also complained that the long voyage encouraged the spread of seasonal diseases such as “bilious fevers.” For five weeks, the Crown Forces were crowded into malodorous, steamy, lice- and rat-infested ships, where they ate “spoiled” bread and meat and drank “stinking water.”⁸

As the ships sailed into Chesapeake Bay, soldiers commented on the shoreline’s tobacco plantations, pastures, and forests. Few had positive impressions of this region. A Hessian soldier wrote that the landscape was “desolate” and nothing more than a “bare woods.” One of General Howe’s aides-de-camp, Friedrich von Muenchhausen, complained of the “intolerable heat” and remarked that if he had to stay in America, he would never return to “hot regions” like Maryland. Ambrose Serle believed that the area was “a mass of stagnated waters & mud of a vast extent. These Swamps & marshes render this Country so extremely unwholesome.” After disembarking a few days later, Captain Johann Ewald of the Hessian Jaegers wrote,

The whole peninsula, or headland, was a real wilderness. Just as we found the uncultivated vine, the sassafras tree, and wild melon in this region, so also was it full of different kinds of vermin. The woods, especially, are

filled with snakes and toads. Each tree was full of big chafers [cicadas], which made such noise during the night that two men cannot speak to each other and understand what was said. Added to this, a violent thunderstorm came with a downpour whereby the warmth of the air, which had been extremely intense during the day increased to such a degree that we believe we would suffocate in the fiery air.

For the Crown Forces in need of some relief following a cramped five-week voyage, the Chesapeake region was not too rewarding.⁹

The British made landfall near Head of Elk, Maryland on August 25 (although several larger ships trailed behind them as they were unable to find deep enough waters to drop their anchors). The weakened state of his army forced Howe to delay movements toward Philadelphia. General Washington's aide-de-camp Alexander Hamilton reported that the lengthy voyage had "made skeletons" of the British horses. On August 31 Muenchhausen wrote that the army planned to "stay at [Head of Elk] today and tomorrow to give our horses, which suffered exceedingly because of the unexpectedly long voyage, a chance to recover." Moreover, for several days after the landing, heavy rains pounded the area, further limiting British mobility. After a miserable, prolonged journey, the Crown Forces were eager for a fight, and a fresh meal.¹⁰

Despite the "great quantities of stores" abandoned by nearby residents, British soldiers tore through the surrounding countryside to satisfy their hunger. They killed wild animals, particularly local fowl, to feed their men. When wild creatures could no longer be found, they turned to area livestock such as cattle, sheep, and pigs. The British also confiscated locally grown crops, such as "orchard fruit and Indian corn." They seized acres of buckwheat, bushels of grain, rye, oats, barley, and potatoes. In one single raid, soldiers under the command of Hessian general Wilhelm von Knyphausen captured "261 head horned Cattle and 568 sheep and 100 horses." One farmer lost milk cows, "spring calves," sheep, swine, colts, as well as 230 bushels of wheat, 100 bushels of potatoes, 120 bushels of corn, 20 bushels of buckwheat, an estimated 70 pounds of damage to his pastures, 70 pounds of fruit, and over seven pounds of timber. Locals compared the devastation wrought by British to that wrought by a hurricane. Following the voyage, in search of fresh food, ravenous British and Hessian soldiers robbed households and family farms at a frantic pace. Hunger, thirst, and pain, products of their extended voyage, were motivating factors.¹¹

It did not take long after the landing for accounts of plunder to reach the British high command. "There was a good deal of plunder committed by the Troops," Major John André remembered, "notwithstanding the strictest prohibitions. . . . The soldiers slaughtered a great deal of cattle clandestinely." Ambrose Serle was "mortified by the accounts of plunder, &c., committed on the poor inhabitants by the Army and Navy." General Howe took notice. The day the army disembarked at Head of Elk, two British soldiers were hanged and six others were beaten "within an inch of their lives" for "marauding." In fact, within the next four weeks, five soldiers would be executed for plundering. In order to calm the apprehensive civilian population near the Chesapeake, the British issued a proclamation on August 27. Howe "hath issued the strictest Orders to the Troops for the Preservation of Regularity and Good Discipline," it read, "and has signified that the most exemplary Punishment shall be inflicted upon Those who shall dare to plunder the property, or molest the Persons of any of his Majesty's Well-disposed subjects." Plundering did more than create political problems with civilians. On August 29 Friedrich von Muenchhausen wrote, "Because of increasing acts of pillage and our corps, last night we lost several men who had advanced too far and were captured."¹²

The British troops were not the only soldiers marauding the countryside. General George Washington also had trouble preventing his men from "robbing orchards" or tearing down fences. Washington felt particularly incensed because he saw no reason his soldiers should disassemble fencing in "a country abounding with wood, & by men with hatchets in their hands". Nevertheless, the accounts of British plundering in late August were more frequent and severe. Four weeks later, when Crown Forces moved into Germantown, their conduct with local civilians and desire for goods were comparatively restrained. The voraciousness of the British quest for rations in the upper Chesapeake was directly related to the long, uncomfortable voyage they endured. The heat, lack of winds, and general suffering meant that once the army landed at Head of Elk, their hunger drove them to rob and pillage.¹³

Meanwhile, Washington's Continental Army, while better supplied than their adversaries, struggled to find suitable terrain. In the months prior, the Continentals enjoyed the defensive advantages of northern New Jersey's Watchung Mountains. They were able to launch a series of small attacks on the British and retreat into the relative safety of the north Jersey hills. But now, near Wilmington and the Christiana River, no such advantageous landscape could be found. "This country does not abound in good posts,"

Alexander Hamilton wrote. "It is intersected by such an infinity of roads, and is so little mountainous that it is impossible to find a spot not liable to capital defects." Nathanael Greene agreed: "The face of the country is favorable to the Enemy, being very flat and level."¹⁴

On September 3, the British, seizing upon these landscape advantages, attacked General William Maxwell's Light Infantry at the Battle of Cooch's Bridge in northern Delaware. It was the first sizable engagement of the campaign. Roughly 1,000 Continental soldiers were positioned in the woods, but after an intense exchange of "hot fire," and with no hills or mountains to aid them, Maxwell's soldiers speedily fled, throwing down their blankets and weapons in a hasty retreat. The only thing preventing a complete rout of the Patriot Light Infantry was an impassable swamp that blocked British maneuvers. Had it not been for the obstructive swamp, British engineer John Montrésor believed, the "little spirited affair" at Cooch's Bridge would have been "so decisive."¹⁵

BRANDYWINE: SEPTEMBER 11, 1777

About a week after the fighting at Cooch's Bridge, Washington took up a position near Chadds Ford in Chester County, one of the most traveled fords along the Brandywine Creek. The creek winds its way through southern Pennsylvania and northern Delaware until it joins the Christiana River. Locals could only cross the Brandywine via its fords, of which there were several in the battlefield's vicinity. Washington positioned nearly the whole of his army along the east side of the creek where they constructed defenses on hillsides that John André called "advantageous eminences." As the British traveled toward the Brandywine, they removed felled trees cut down by the rebels who had hoped to obstruct roads along the way. John Montrésor described the trek through Chester County: "Our march this day about six miles through an amazingly strong country, being a succession of large hills, rather sudden with narrow vales, in short an entire defile. . . . Encamped on very strong ground." The hills and meadows of southern Pennsylvania had replaced the wetlands of the Chesapeake region. General Howe quickly moved into position a few miles west of the Americans.¹⁶

As the British recuperated following their ocean voyage, the Continental Army endured ailments of their own. Washington's soldiers made the overland march from central New Jersey to Philadelphia. According to Joseph

Plumb Martin, a private with the Eighth Connecticut Regiment, throughout these marches soldiers were often hungry, freezing, or ill, and would frequently rest in “woods or fields, under the side of a fence, in an orchard or in any other place but a comfortable one—lying down on the cold and often wet ground.” One soldier described the days in a poem. “Since we came here for to encamp / Our mornings have been very damp / But at noonday excessive warm / And like to do us all great harm.” For many, the heat of the summer of 1777 was unbearable. John Adams compared the prevailing Philadelphia heat to the “fierce Breath of an hot oven,” and locals living in southeastern Pennsylvania described the season “as hot a summer as they have known.” While the Continentals did not have to contend with tight quarters aboard ships, their march throughout the heat of summer encouraged the spread of camp diseases. Chester County resident Joseph Townsend wrote that many Patriot soldiers were incapacitated with disease “in consequence of their long marches through the excessive heat of that season of the year.” The army’s doctors converted several buildings, including the nearby Birmingham Meeting House, into hospitals to accommodate the sick troops. The long overland journey and the diseases it engendered forced Washington to engage the British at the Battle of Brandywine at less than full strength.¹⁷

On the morning of September 11, Crown Forces and Continentals were poised for one of the largest battles of the war. Howe divided his men, directing roughly half of his army under General Knyphausen straight at Washington across the Brandywine at Chadds Ford. Meanwhile, Howe and General Charles Cornwallis would lead the remainder of the troops on a flanking mission around the center of the action. Howe planned to march his army about six miles north of Chadds Ford and cross two smaller branches of the creek at Jeffries and Trimbles fords. From there, Howe could strike Washington’s right flank.¹⁸

At daybreak Howe moved from Kennett Square on his flanking mission, while Knyphausen’s troops made their way slowly toward Washington. The Crown Forces “arrived at a place where the road passes through some swampy land,” Major Baurmeister wrote, “On both sides of this lowland are hills and woods . . . full of enemy troops.” Fast-moving Patriots firing from “under the cover of trees” and darting throughout the woods prevented the effective use of British artillery. Thanks in part to marshes, trees, and hills, Knyphausen’s attack noticeably stalled and could not break the Continentals. Howe meanwhile continued his march around the fighting, through “hills, woodlands, marshes, and the steepest of defiles,” aided noticeably by a low-hanging mist

along the creek. Captain John Montrésor wrote, "A thick fog contributed greatly to favour our march." The fog was so dense, local inhabitants scarcely knew Howe's men were crossing through their property. At 8:30 a.m., Howe's troops crossed the Brandywine near Trimble's Ford.¹⁹

By two o'clock in the afternoon, Howe's soldiers had crossed the Brandywine. If they expected to find any relief from environmental obstacles following their fording of the creek, they were mistaken. Immediately after crossing Jeffries Ford the Crown Forces encountered a steep ravine. In order to attack Washington's flank before nightfall, Howe had no choice but to send his army through this narrow gorge. Only a few soldiers could pass through the defile simultaneously, sometimes crossing in twos, inevitably slowing Howe's movement. Multiple British soldiers that day were amazed not to find any Continentals using the topography along the ravine to their advantage. Captain Johann Ewald was shocked that the Americans had not made use of the steep hills and natural defensive positions. "I was astonished when I had safely reached the end of this terrible defile which was over a thousand paces long, and could discover nothing of the enemy," he wrote. "The pass had been left wide open for us, where a hundred men could have held up either army whole day." According to Ewald, both Howe and Cornwallis were also surprised to find no Continentals protecting the ravine. Having conquered another environmental obstacle, British officers celebrated their slow but safe passage and prepared to strike the Continental Army's flank.²⁰

By early afternoon, the tide of battle turned. Knyphausen and his artillery had begun to relentlessly batter the Continentals near Chadds Ford, and Howe's entire force had crossed the creek, completing their seventeen-mile march. After a much-needed rest, Howe and Cornwallis approached Washington's flank, stretching their troops into a mile-wide column along Osborne's Hill. Washington, now aware of Howe's strategy, dispatched soldiers to the Birmingham Meeting House to hold off the British advance. Joseph Townsend, watching the battle near the meetinghouse, wrote, "[The British] arms and bayonets being raised shone as bright as silver, there being a clear sky and the day exceedingly warm." Despite the tough fight his right flank gave the British, Washington's army collapsed. Protected by Major General Greene's division, the Continentals precipitously fled.²¹

Brandywine was a terrific victory for Crown Forces, but several British soldiers noted that their victory could have been more decisive. Friedrich Muenchhausen claimed, "If daylight had lasted a few hours longer, I dare

say that this day would have brought an end to the war. Without doubt we would have taken half of Washington's army and all of his cannon." Sergeant Thomas Sullivan of the British Forty-Ninth Regiment of Foot agreed that the Continental Army escaped "a total overthrow, that must have been the consequence of an hour's more daylight." Yet while multiple British officers agreed that their army nearly missed the opportunity to destroy or permanently weaken the Continentals, they failed to recognize that throughout the day natural barriers had markedly slowed their actions. The fords along the Brandywine forced Howe to consider an alternative flanking strategy to attack Washington. Marshes and woods around Chadds Ford prevented General Knyphausen from barreling through the Americans positioned there. The steep ravine near Jeffries Ford only allowed a handful of British soldiers to pass at a time, creating a natural bottleneck. While the British were able to overcome these and other obstacles, they certainly hampered their movements, providing the Continental Army enough time to defend themselves and eventually escape. Although Washington was unable to harness nature's power at Brandywine, it nonetheless aided him in keeping his force alive.²²

**THE BATTLE OF THE CLOUDS AND THE FALL OF PHILADELPHIA:
SEPTEMBER 16–26, 1777**

In the days following the defeat at Brandywine, Washington led his army through Philadelphia, and then recrossed the Schuylkill back into Chester County. Howe and the British forces remained at Chadds Ford, gathering supplies from farms and homes, preparing for the next major clash. For a few days the armies repositioned themselves, inching steadily closer to one another. On September 15 members of the Continental Congress wrote that they expected another massive battle to occur. Continental Army adjutant general Timothy Pickering ordered that ammunition be inspected, and that soldiers travel only with essential goods. General Washington emphatically promised the president of the Continental Congress that another fight was imminent. Meanwhile, Henry Melchior Muhlenberg, the father of both the North American Lutheran Church and a Continental brigadier general, noted in his journal that at his home in Trappe, Pennsylvania, it began to rain.²³

On September 16 it appeared as if the next large battle was inevitable. A number of cavalry, a few hundred Pennsylvania militia, and portions of

General Wayne's and General Maxwell's brigades engaged Cornwallis's Light Infantry and Hessian Jaegers in the valley near Whiteland Township amid a light rain. An artilleryman remembered that the Patriot riflemen covered the locks of their weapons with animal skins, to prevent misfires and keep their gunpowder dry. As the fighting intensified, so did the rainfall. Future Supreme Court Chief Justice John Marshall, a Continental soldier in the Eleventh Virginia Regiment, wrote, "Both armies immediately prepared, with great alacrity, for battle. The advanced parties had met, and were beginning to skirmish, when they were separated by a heavy rain, which becoming more and more violent, soon rendered the retreat of the Americans an absolute necessity." After suffering a few dozen casualties, the rebels retreated into a dense forest.²⁴

On both sides of the battle, soldiers described the effects of the rain. A Pennsylvania rifleman remembered that "the tremendous rain" incapacitated "small armes" and muskets on both sides. "I wish I could give a description of the downpour which began during the engagement and continued until the next morning," Carl Baurmeister wrote, "It came down so hard that in a few moments we were drenched and dank in mud up to our calves." A Virginia loyalist called the day's weather a "Mud deluge . . . [an] Equinoctial storm" that left "the Roads so deep there was no bringing on the Artillery." The near-action prevented by the rain on September 16 earned the name the Battle of the Clouds. Its effects were not limited just to that one day.²⁵

The strong weather swelled nearby streams and rivers to impassable levels. Lieutenant James McMichael, serving in the Thirteenth Pennsylvania Regiment, wrote that for eighteen hours the rain "fell in torrents," and that "the small brooks were so large by the excessive rain . . . that we had repeatedly to waid [*sic*] to the middle in crossing them." A Continental artilleryman from Reading, Jacob Nagle, remembered that the men needed to swim across small streams several times. The incessant rain made the roads "very heavy, and the lowlands overflowed." The high river levels and rushing waters made some crossings dangerous and others impossible. One of the major effects of the storm of September 16, therefore, was the limitation it posed on the armies' mobility. It was merely one consequence of the rain.²⁶

At Yellow Springs, following the battle, Continentals reckoned with a second major effect of the storm: the destruction of ammunition. While both armies' rounds suffered from the weather, the single-flap unseasoned leather used to make the Continental Army's cartridge boxes provided the American rounds little protection from the deluge. Adjutant General Pickering wrote

that the destruction was so widespread that “it became necessary to keep aloof from the enemy till fresh ammunition could be made up and distributed.” Jacob Nagle described the ammunition wagons as “dripping wet and shivering cold.” According to General Washington the forty rounds of ammunition provided to each soldier were “intirely [*sic*] ruined.” And his artillery commander, Henry Knox, estimated that the rain destroyed 400,000 individual rounds. Two days after the heaviest rains fell, the Continentals inspected the damage and determined that in their present state they could not engage the British. The storm also revealed the staggering supply deficiencies of the Continental Army, as men were in need of warm clothes and blankets. Washington maneuvered his water-logged army closer to Reading, further away from the enemy, avoiding, for the time being, another fight.²⁷

Meanwhile, the battles over forage raged on. Howe had all but severed his supply train from the Chesapeake Bay, creating an increased incentive to find food and goods. The Crown Forces continued marauding the countryside, leading them to the small community of Valley Forge along the Schuylkill. On September 18 the British descended into the town to destroy or capture supplies located near the forges. A small band of American soldiers, including Alexander Hamilton, escaped across the river, raging on account of the recent rains, with what supplies they could salvage. Three days later, Washington ordered Hamilton to Philadelphia to gather “many necessary articles of Cloathing [*sic*]” to prepare for the “approaching inclement season.” Feeding and sheltering men in the wake of changing environmental conditions continued to influence, if not dominate, both armies’ military policies.²⁸

The brunt of Washington’s army avoided Crown Forces until they could repair their soaked ammunition. Nothing but the Schuylkill stood between the British and Philadelphia. Despite Washington’s attempt to place some men near the river’s crossings, the Continentals could not adequately defend every single ford. “To defend an extensive river when it is unfordable is almost impossible,” Henry Knox believed, “but when fordable in every part, it becomes impracticable.” A British victory against Anthony Wayne’s men at Paoli on September 20 and the poor state of the Continental Army’s ammunition provided the British an opportunity to take the American capital. Congressman Richard Henry Lee expected the British to capture Philadelphia as soon as the water level in the Schuylkill lowered. He was right. By September 23 the water level receded, enabling the British to complete their crossing. They captured Philadelphia three days later without firing a shot. Congressman Elbridge Gerry described the

situation frankly: “The principal Cause of their obtaining the City without a second Battle . . . was a heavy rain.”²⁹

But for some in the Continental Army, the Battle of the Clouds was something of a godsend. As skirmishes began on September 16, soldiers in the army speculated that Washington had misjudged the terrain and provided his enemy with an advantageous position. Timothy Pickering wrote that as the first shots were fired, “It was now discovered that the ground on which the army was drawn up for battle . . . was not well chosen.” Furthermore, Persifor Frazer wrote that at the Battle of the Clouds the Continental Army “was inferior in numbers, in equipment, in discipline, and in morale, having just suffered defeat at Brandywine.” To some Continental soldiers, had it not been for the rain, a clash on September 16 would have meant certain defeat, if not destruction. Once again, natural conditions created short-term advantages for the British, but those same conditions managed to keep the Continental Army in the field another day.³⁰

GERMANTOWN: OCTOBER 4, 1777

A day before Howe’s army captured Philadelphia, they completed an eleven-mile march through “a great deal of wood land and some stony ground.” The woods and forests disappeared, revealing Germantown, one of the most scenic communities in the area. The Crown Forces commented on the “very beautiful” landscape surrounding them. A Hessian soldier described the area as “beautiful a region as to be seen in America. The wilderness ends and three or four houses stand near one another . . . the region is hilly and stony.” For the British troops who fought through the marshlands of the Chesapeake and the farmlands of Chester County, Germantown was surely an impressive sight. The Wissahickon Creek flowed through steep gorges, emptying into the Schuylkill near what used to be a series of dramatic waterfalls, sending white water cascading over river stones. Here is where the British focused the brunt of their force, and where Washington planned to launch his bid to recapture the Quaker City.³¹

Washington’s ambitious strategy (arguably his single-most ambitious strategy of the entire war) called on four columns of soldiers to begin a coordinated attack on the British army at Germantown before daybreak, following a long overnight march of nearly twenty miles. But a dark, cloudy night foiled Washington’s plan for a quick march. The Continentals planned to be in

position to attack Germantown by 2:00 a.m. but many soldiers did not arrive until the time the attack was supposed to commence at 5:00 a.m. Moreover, the long march led to “unspeakable fatigue” throughout the Continental ranks. The British also enjoyed some landscape advantages in defending their position. Johann Ewald was positioned along the Wissahickon when his men intercepted Washington’s right column of Pennsylvania militia. “Toward day-break on the 4th,” Ewald “immediately ordered the rocky heights occupied from the left bank of the Schuylkill along the ravine and bridge . . . and awaited the enemy. . . . I held out at this post until the end of the engagement.” Ewald protected the British left flank for the entire battle and made use of the “rocky heights” near the Wissahickon Creek. In some places, the attacking Continentals had to fight not only the British, but also nature.³²

“Bull-dogs” and “curs” barked at Washington’s soldiers as they marched on the Germantown Road before sunrise, alerting the Crown Forces to their presence. British soldiers under the command of Colonel Thomas Musgrave fired the opening shots of the battle as the main column of the Continental Army advanced “furiously thro’ buckwheat fields.” Musgrave’s men retreated south down the road, firing along the way. By 6:30 a.m. the Continentals had driven the British toward an impressive stone estate known as Cliveden, the summer home of Philadelphia’s Chief Justice Benjamin Chew. Musgrave led his force into Cliveden, preparing to defend the house to the last man. The colonel ordered nearby horses killed, preventing their capture by Americans. Under advice from Henry Knox, Washington decided to have several brigades attack the Chew House, halting his army’s momentum down the Germantown Road in hopes they could dislodge the British. The attack on Cliveden proved to be a fatal mistake. Musgrave’s men defended the stone fortress for hours. Johann Ewald heaped praised upon Musgrave after the battle, and Carl Baurmeister called it a moment of “courageous defense.” Musgrave’s men defended Cliveden valiantly, and Washington’s attack was undoubtedly misguided. The house itself, then, structurally played a major role in repelling the American assault.³³

Built in 1767, Cliveden was one of the first structures travelers would see when they entered Germantown traveling south on the community’s namesake road. None of the surrounding buildings were quite as impressive. More important, to the environment and to the battle, was the building’s composition. Historian of the Philadelphia Campaign Thomas McGuire wrote, “Cliveden was solidly built of Wissahickon schist, a locally quarried light gray stone glimmering with particles of mica. The front façade was

nearly two feet thick, constructed of large ashlar blocks carefully cut and laid in courses. . . . The back and side walls were formed with randomly laid rubble stone finished with layers of sand-colored-stucco scored to resemble cut stone.” Unlike the nearby residences and Quaker meeting houses (typically wooden buildings), Cliveden was an imposing stone structure. Continental firepower throughout the battle managed to tear off shutters and doors, but the building remained intact. In other words, the Wissahickon schist and local fieldstones repulsed the Patriots as much as Musgrave’s men did. At Germantown, even the earth below the Continental Army’s feet fought against them.³⁴

According to the generals of the Continental Army, fog also played a significant role in deciding the outcome of Germantown. For several days, the area along the river had been experiencing “foggy mornings,” a natural consequence of warmer river waters meeting cool night air as the seasons changed. “The fogg together with the smoke Occasioned by our cannon and musketry made it almost as dark as night,” Anthony Wayne wrote. Private Joseph Plumb Martin remembered that the “low vapor lying on the land . . . made it very difficult to distinguish objects at a distance.” According to John Marshall, “A fog of uncommon thickness,” threw the soldiers into “great confusion.” “In this unusual fog” Henry Knox could not determine what “to support or what to push.” The morning conditions caused the Continentals to significantly stumble as they approached Germantown.³⁵

Visibility was a major problem, leading to self-inflicted wounds in the Continental Army. Carl Baurmeister wrote that the fog limited visibility to fifty paces, while Knox claimed that visibility extended twenty yards, and Washington believed thirty yards. Regardless of the specific distance, the Continentals could not distinguish friend from foe, leading to cases of friendly fire. As Nathanael Greene’s column joined with the rest of the main assault around 7:30 a.m., they fired through the fog and on Anthony Wayne’s men to their right. They would not be able to recover, and Wayne’s startled soldiers fled. Soon after, the rest of the Patriot army followed. According to General Washington, “if the uncommon fogginess of the morning and the smoke has not hindered us from seeing our advantage, I am convinced it would have ended in a compleat Victory.” In fact, after the defeat at Germantown, Washington identified the fog as a factor in his army’s defeat in at least eleven separate letters.³⁶

Reflecting on the battle, William Howe’s aide-de-camp Freidrich Muenchhausen admitted the brilliancy of Washington’s four-pronged

strategy, calling it “very well planned” and praising the Continental Army’s intelligence network. In the end, it was nature that significantly impeded the plans of “Clever Washington.” Three days after the battle, Henry Knox, the architect of the imprudent attack on Cliveden, wrote, “had it not been for the unlucky circumstance of the fog, Philadelphia would probably have been in our hands.” Washington’s coordinated attack strategy suffered more from the fog than the Crown Forces defending the Germantown Road and Cliveden. For the noncombatants living along the road and near Cliveden, the destruction was palpable. After the campaign, a Philadelphian compared his city to a “dreary picture of want and desolation.” He lamented the “gardens ravaged and destroyed; forests cut down,” and could barely recognize the landscape that had been “a few weeks before, the most beautiful, the best cultivated and the most fertile environs of any city in America.”³⁷

CONCLUSION

Unfortunately for the Continental Army, the Philadelphia Campaign did not end at Germantown. The armies would continue to engage with some strength all the way into December from the banks of the Delaware to Whitemarsh. Unlike at the battle of the Clouds or Brandywine, Continental soldiers did not write that their defeat at Germantown had unintended silver linings that benefited the overall health of the army. Germantown was a stinging defeat, partially blamed on the misguided attack at Cliveden, the soldiers’ lack of discipline under fire, and the most discussed factor, the environment. A few days after the battle, Nathanael Greene assured his soldiers that “if the Weather had been clear,” they would have given the British a “Compleat route [*sic*].” Had it not been for the fog, the Continentals may not have lost their momentum down the Germantown road.³⁸

In fact, the memoirs and letters of soldiers on both sides are full of similar references throughout the Philadelphia Campaign. Men regularly wrote that had it not been for disadvantages in the landscape, untimely weather, or limited forage nearby, whole battles might have ended differently. In early September, at the small battle of Cooch’s Bridge in northern Delaware, John André remembered how a swamp prevented the British from outmaneuvering and overtaking the Continental light infantry. “The attempts made by our Troops to get round them were defeated by their being unable to pass a

swamp,” he wrote. After Brandywine, Carl Baurmeister was merely one of several officers in the Crown Forces who complained that nightfall prevented a more decisive British victory, if not the destruction of the Continental Army itself. Even George Washington frequently blamed nature in describing the fates that befell his army. After Germantown, it appears he could find no other reason than fog for his army’s defeat.³⁹

Soldiers sometimes used environmental obstacles to justify lackluster or poor battlefield performance. In hindsight, Washington’s misguided attack on Cliveden probably had more to do with his army’s defeat at Germantown than the fog. Yet because the Revolutionary generation’s livelihood was tethered more closely to environmental changes than ours is today, their frequent descriptions of the role nature played during this campaign highlight a very specific type of historical contingency. Would the British have been able to take Philadelphia had it not been for the storm that precipitously ended the Battle of the Clouds? Perhaps they could have, but certainly not as easily. The rain so decimated the Continental ammunition that it left their commanders little choice but to leave the route to the American capital wide open. Without the rain, another Brandywine-size engagement would have most certainly occurred, if not that day then very soon thereafter. Indeed, it was the weather and the situations it created that allowed the British to take the Quaker City without another major battle. The Battle of the Clouds is merely one example that demonstrates how throughout the campaign the environment was just as important in deciding outcomes as military strategy, battlefield leadership, or either army’s strength.

Also, weighing the natural advantages and disadvantages of the Philadelphia Campaign does not produce a clear assessment of which side benefited more from nature. At Brandywine, natural elements seemingly turned against the Continentals, creating conditions (be it fog, fords, and terrain) that allowed the British to nearly envelop Washington’s soldiers. However, those same environmental factors slowed British movements and prevented them from capitalizing on their victory. The Continentals could not defend Philadelphia on account of the Battle of the Clouds. More significantly, the rain from September 16 to 17 prevented another engagement at a time when Washington’s army was recovering from their defeat at Brandywine and unprepared for battle. While fog at Germantown wreaked havoc on the Continental Army’s strategy, within weeks American generals were considering sites and plans for re-forming the army during the upcoming winter encampment. And by June 1778 the Continental Army would emerge

stronger and more unified following their six-month stay at Valley Forge. Essentially, the short-term advantages the British gained from the environment in the end helped to preserve their enemy's army. Therefore, neither side could call nature an ally.⁴⁰

In years to come, scholars will continue to ask questions about the environmental history of the American Revolution. While a handful of historians have researched and written on this topic, the environmental history of this period has only scratched the surface. Moreover, the country's understanding of the War for Independence is so heavily imbued with nostalgia, images of heroism, and potent nationalism. Environmental history as a discipline can work to create more accurate narratives. By placing the Crown Forces and the Continental Army in their environmental context, we are reminded that their successes and failures more often depended on the conditions of rivers and roads than on their commitment to national ideals. Environmental histories of the American Revolution are small but essential steps in the direction of fully understanding and appreciating the United States' founding moments.

BLAKE MCGREADY received his master's degree in history from Villanova University. He works as an interpreter at Valley Forge National Historical Park.

NOTES

1. Elizabeth Smith and Persifor Frazer, *General Persifor Frazer: A Memoir Compiled Principally from His Own Papers by His Great-Grandson* (Philadelphia, 1907), <https://archive.org/details/cu31924029841636>, 157.
2. Johann Ewald, *Diary of the American War: A Hessian Journal Captain Johann Ewald Field Jäger Corps*, trans. and ed. Joseph P. Tustin (New Haven, CT: Yale University Press, 1979), 80; Joseph Townsend, *Some Account of the British Army, Under the Command of General Howe, and the Battle of Brandywine, on the Memorable September 11th, 1777* (Philadelphia, 1846; GoogleBooks), https://books.google.com/books/about/Some_Account_of_the_British_Army_Under_t.html?id=AlZSAAAcAAJ, 8; Elkanah Watson and Winslow C. Watson, *Men and Times of the Revolution; or, Memoirs of Elkanah Watson*, ed. Winslow C. Watson, 2nd ed. (New York: Dana and Co., 1856), <https://catalog.hathitrust.org/Record/008640310>, 73–74.
3. Brian Allen Drake, "New Fields of Battle: Nature, Environmental History, and the Civil War," in *The Blue, the Gray, and the Green: Toward an Environmental History of the Civil War*, ed. Brian Allen Drake (Athens: University of Georgia

- Press, 2015), 2, 7; Albert E. Cowdrey, "Environments of War," *Environmental Review* 7, no. 2 (1983): 161, <http://www.jstor.org/stable/3984498>; J. R. McNeill, "Woods and Warfare in World History," *Environmental Review* 9, no. 3 (2004): 389, <http://www.jstor.org/stable/3985766>; J. R. McNeill, *Mosquito Empires: Ecology and War in the Greater Caribbean, 1620–1914* (New York: Cambridge University Press, 2010), 2–5; Kathryn Shively Meier, *Nature's Civil War: Common Soldiers and the Environment in 1862 Virginia* (Chapel Hill: University of North Carolina Press, 2013), 2; Megan Kate Nelson, *Ruin Nation: Destruction and the American Civil War* (Athens: University of Georgia Press, 2012), 4; Lisa Brady, *War Upon the Land: Military Strategy and the Transformation of Southern Landscapes during the American Civil War* (Athens: University of Georgia Press, 2012), 2, 48.
4. Elizabeth A. Fenn, *Pox Americana: The Great Smallpox Epidemic of 1775–82* (New York: Hill and Wang, 2001), 9; Mark Fiege, *The Republic of Nature: An Environmental History of the United States* (Seattle: University of Washington Press, 2012), 60, 75; David Hsiung, "Food, Fuel and the New England Environment in the War for Independence, 1775–1776," *New England Quarterly* 80, no. 4 (2007): 637–39.
5. Nathanael Greene, *The Papers of General Nathanael Greene*, ed. Richard K. Showman, Robert E. McCarthy, and Margaret Cobb, vol. 2, *1 January 1777–16 October 1778* (Chapel Hill: University of North Carolina Press, 1980), 140 (hereafter cited as Greene Papers); Brian C. Black, "Introduction" in *Nature's Entrepôt: Philadelphia's Urban Sphere and Its Environmental Thresholds*, ed. Brian C. Black and Michael J. Chiarappa (Pittsburgh: University of Pittsburgh Press, 2012), 3–5; Craig Zabel, "William Penn's Philadelphia: The Land and the Plan" in *Nature's Entrepôt*, ed. Black, 31; *Commemorating the 200th Anniversary of the Battle of Brandywine September 11, 1777* (Chadds Ford Historical Society, 1977), VF The Battle of Brandywine, David Library of the American Revolution, Washington's Crossing, PA (hereafter cited as David Library); John B. Frantz and William Pencak, "Introduction: Pennsylvania and Its Three Revolutions," in *Beyond Philadelphia: The American Revolution in the Pennsylvania Hinterland*, ed. John B. Frantz and William Pencak (University Park: Pennsylvania State University Press, 1998), ix; Samuel J. Newland, *The Pennsylvania Militia: Defending the Commonwealth and the Nation: 1669–1870* (Annville, PA: Pennsylvania Department of Military Affairs, 2002), 120.
6. Brady, *War Upon the Land*, 2, 48.
7. Thomas J. McGuire, *Brandywine and the Fall of Philadelphia*, vol. 1 of *The Philadelphia Campaign* (Mechanicsburg, PA: Stackpole Books, 2006), 6, 65–66. As British forces boarded their ships near Staten Island and prepared to capture Philadelphia, the Quaker City was enduring another scourge of smallpox. The disease had a perennial presence in the city, so much so that those who traveled through the city understood Philadelphia as a kind of distribution center for the virus. See Fenn, *Pox Americana*, 83–85; Thomas J. McGuire, *The Surprise at*

- Germantown, or, the Battle of Cliveden October 4th 1777* (Philadelphia: Thomas Publications, 1994), 2; *Commemorating the 200th Anniversary*, David Library, 9; Alan Taylor, *American Revolutions: A Continental History, 1750–1804* (New York: W. W. Norton, 2016), 182.
8. Ambrose Serle, *The American Journal of Ambrose Serle: Secretary to Lord Howe, 1776–1778*, ed. Edward H. Tatum Jr. (San Marino, CA: Huntingdon Library, 1940), 241–42; Carl Baurmeister, *Revolution in America: Confidential Letters and Journals 1776–1784 of Adjutant General Major Baurmeister of the Hessian Forces*, trans. and annot. Bernard A. Uhlendorf (New Brunswick, NJ: Rutgers University Press, 1957), 97–98; Friedrich Muenchhausen, *At General Howe's Side, 1776–1778: The Diary of General William Howe's aide de camp Captain Friedrich von Muenchhausen*, trans. Ernst Kipping and annot. Samuel Smith (Monmouth Beach, NJ: Philip Freneau Press, 1974), 23; McGuire, *Surprise at Germantown*, 2; Stephen R. Taaffe, *The Philadelphia Campaign, 1777–1778* (Lawrence: University Press of Kansas, 2003), 50; Heinrich Carl Philipp von Feilitzsch, *Diaries of Two Ansbach Jaegers*, ed. and trans. Bruce E. Burgoyne (Bowie, MD: Heritage Books, 1997), 11. Head of Elk was named for its position near the end of the Elk River. The community was later renamed Elkton.
 9. Baurmeister, *Revolution in America*, 99; Serle, *American Journal*, 242, 249; Feilitzsch, *Diaries of Two Ansbach Jaegers*, 16; Wayne Bodle, “Learning to Live with War: Civilians and Revolutionary Conflict in the Delaware Valley in 1777,” paper presented to the Philadelphia Center for Early American Studies Seminar, February 17, 1995, VF Academic Papers, David Library; John André, *Major André's Journal: Operations of the British Army under Lieutenant Generals Sir William Howe and Sir Henry Clinton June 1777 to November, 1778, Recorded by Major John André, Adjutant General*, ed. C. DeW. Willcox, reprint (Tarrytown: W. Abbat, 1968), 38; Muenchhausen, *At General Howe's Side*, 24; Ewald, *Diary of the American War*, 75.
 10. Adding to the misery and hunger was the fact that Howe ordered “the stores and the camp equipage be left on board the ships after they made landfall, as not to burden an already weak army.” See André, *Major André's Journal*, 37–38; Alexander Hamilton, *The Papers of Alexander Hamilton*, ed. Harold C. Syrett and Jacob E. Cooke, vol. 1, 1768–1778 (New York: Columbia University Press, 1961), 321 (hereafter cited as Hamilton Papers); Baurmeister, *Revolution in America*, 99; Serle, *American Journal*, 246; Muenchhausen, *At General Howe's Side*, 26. According to Captain John Montrésor, the Americans believed the British would be unable to launch an assault from Head of Elk because the water was not deep enough. Montrésor described in his journals the process by which larger ships were “cutting channels” through the muddy bottom of the bay, creating a space for the following vessels to drop anchor. See John Montrésor, *Collections of the New York Historical Society for the Year 1881, The Montrésor Journals*, ed. and annot. G. D. Scull (New York: Printed by the Society, 1882), 442.

11. Thomas Sullivan, "Before and After the Battle of Brandywine, Extracts from the Journal of Sergeant Thomas Sullivan of the H. M. Forty-Ninth Regiment of Foot," *Pennsylvania Magazine of History and Biography* 31 (1907): 409, <https://catalog.hathitrust.org/Record/000677665>; Montrésor, *Montrésor Journals*, 443, 445; André, *Major André's Journal*, 37; Ewald, *Diary of the American War*, 75; Baurmeister, *Revolution in America*, 99; William Brooke Rawle, "Plundering by the British Army during the American Revolution," *Pennsylvania Magazine of History and Biography* 25 (1901): 114, <https://catalog.hathitrust.org/Record/000677665>; British Depredations, 1777–1782, Chester County Archives, West Chester, PA, 75.
12. André, *Major André's Journal*, 37–9; Serle, *American Journal*, 245–46, 248–49; Baurmeister, *Revolution in America*, 395; Rawle, "Plundering by the British Army," 114–15; Muenchhausen, *At General Howe's Side*, 26.
13. September 10, 1777, and September 20, 1777, in the Daniel Morgan Orderly Book, The Historical Society of Pennsylvania, Philadelphia (hereafter cited as HSP); McGuire, *Surprise and Germantown*, 13.
14. Hamilton Papers, 321; Greene Papers, 149; Taaffe, *Philadelphia Campaign*, 61, 63.
15. John B. B. Trussell Jr., *The Pennsylvania Line: Regimental Organization and Operations, 1776–1783* (Harrisburg: PHMC, 1997), 259; Sullivan, "Before and After the Battle of Brandywine," 410; André, *Major André's Journal*, 42–43; Montrésor, *Montrésor Journals*, 446.
16. Hannah Benner Roach, "The Pennsylvania Militia in 1777," *Pennsylvania Genealogical Magazine* 23 (1964): 189; Feilitzsch, *Diaries of Two Ansbach Jaegers*, 17; André, *Major André's Journal*, 45; Montrésor, *Montrésor Journals*, 449.
17. Joseph Plumb Martin, *A Narrative of a Revolutionary Soldier: Some of the Adventures, Dangers and Sufferings of Joseph Plumb Martin* (New York: Signet, 2010), 59; so strong was the association between the Continental Army and disease that men of military age shied away from joining the force because the high risk of illness. See Fenn, *Pox Americana*, 86, 99. James McMichael, "Diary of Lieut. James McMichael, of the Pennsylvania Line, 1776–1778," in *Journals and Diaries of the War of the Revolution with Lists of Officers and Soldiers, 1775–1783*, ed. William Henry Egle (Harrisburg, PA, 1893), https://archive.org/details/cihm_09819, 208; John Adams to Abigail Adams, August 13, 1777, *Adams Family Papers: An Electronic Archive*, Massachusetts Historical Society, <http://www.masshist.org/digitaladams/>; Montrésor, *Montrésor Journals*, 444; Townsend, *Some Account of the British Army*, 20–21.
18. For several days, the Americans anticipated an attack, knowing full well that the British were growing desperate in their search for supplies. See Robert Kirkwood, *The Journal and Order of Book of Captain Robert Kirkwood of the Delaware Regiment of the Continental Line*, ed. Joseph Brown Turner, reprint (Wilmington: The Historical Society of Delaware 1910), <https://archive.org/details/journalorderboookirk>, 165; Townsend, *Some Account of the British Army*, 18, 7–8.

19. Ewald, *Diary of the American War*, 83; Baurmeister, *Revolution in America*, 107; Sullivan, "Before and After the Battle of Brandywine," 414–15; Montrésor, *Montrésor Journals*, 449; Townsend, *Some Account of the British Army*, 8.
20. Frazer, *General Persifor Frazer*, 154–55; Ewald, *Diary of the American War*, 84; Michael C. Harris, *Brandywine: A Military History of the Battle that Lost Philadelphia but Saved America, September 11, 1777* (El Dorado Hills, CA, Savas Beattie, 2014), 392–93.
21. Muenchhausen, *At General Howe's Side*, 31; Thomas J. McGuire, "An Amazingly Strong Country . . .": *Contemporary Images of the Battle of Brandywine and the British Camp at Red Bank*, VF Battle of Brandywine, David Library; Townsend, *Some Account of the British Army*, 21. In the first volume of *The Philadelphia Campaign*, historian Thomas McGuire gives a detailed description of how the "heat of battle" affected the Revolution's soldiers. The smoke generated by thousands of muskets, combined with other factors, created a "maddening thirst" that "was a constant companion of the combat soldier." See McGuire, *Brandywine and the Fall of Philadelphia*, 264–65.
22. Muenchhausen, *At General Howe's Side*, 32; Sullivan, "Before and After the Battle of Brandywine," 416; for other testimonies, see André, *Major André's Journal*, 46–47, Ewald, *Diary of the American War*, 87 and Baurmeister, *Revolution in America*, 110.
23. Richard Henry Lee to Mann Page, *Letters of the Delegates of Congress, 1774–1789*, ed. Paul H. Smith et al. (Washington, DC: Library of Congress, 1981), Library of Congress American Memory edition, 667, and Henry Laurens to John Rutledge, *Letters of the Delegates of Congress, 1774–1789*, 675 (hereafter cited as *LDC*); Kirkwood, *Journal and Order of Book of Captain Robert Kirkwood*, 1743–75; Washington to the President of Congress, September 23, 1777, *The Writings of George Washington from the Original Manuscript Sources*, vol. 9, ed. John C. Fitzpatrick (Washington, DC, 1933), 258 (hereafter cited as *GW*); Henry Melchior Muhlenberg, *The Journals of Henry Melchior Muhlenberg in Three Volumes*, trans. Theodore G. Tappert and John W. Doberstein, vol. 3 (Philadelphia: The Evangelical Lutheran Ministerium of Pennsylvania and Muhlenberg Press, 1958), <https://catalog.hathitrust.org/Record/001593848>, 75.
24. David G. Martin, *The Philadelphia Campaign: June 1777–July 1778* (Conshohocken, PA: Combined Books, 1993), 81–82; Roach, "The Pennsylvania Militia in 1777," 191; Jacob Nagle, *The Nagle Journal: A Diary of the Life of Jacob Nagle Sailor, from the year 1775 to 1841*, ed. John C. Dann (New York: Weidenfeld and Nicolson, 1988), 10; John Marshall, *The Life of George Washington Commander in Chief of the American Forces, during the War which established the Independence of his Country, and First President of the United States*, vol. 3 (Philadelphia, 1804), <https://catalog.hathitrust.org/Record/008644275>, 157–58.
25. McGuire, *Brandywine and the Fall of Philadelphia*, 290–91; Baurmeister, *Revolution in America*, 114.

26. *Battle of the Clouds Technical Report* (Chester County, PA, and Washington DC, 2013), 25; McMichael, "Diary of Lieut. James McMichael," 211; Nagle, *Nagle Journal*, 10–11; Montrésor, *Montrésor Journals*, 453; Muhlenberg, *Journals of Henry Melchior Muhlenberg*, 75; Muenchhausen, *At General Howe's Side*, 33.
27. On October 13, having learned from the experience at the Battle of the Clouds, Washington wrote Congress requesting modifications to newly manufactured cartridge boxes, and demanded that each cartridge box use carefully chosen leather and contain an additional "small inner flap for the greater security of the cartridges against rain and moist weather." See Washington to the President of Congress, September 23, 1777, *WGW*, 258, 262, 266; Taaffe, *Philadelphia Campaign*, 83; "Col. Timothy Pickering's Account of the Battles of Brandywine and Germantown," *Historical Magazine* 7, no. 7 (July 1863): 219; Nagle, *Nagle Journal*, 10–11; Henry Knox to Lucy Knox, September 23, 1777, in Henry Knox and Noah Brooks, *Henry Knox: A Soldier of the Revolution, Major-General in the Continental Army, Washington's Chief of Artillery, First Secretary of War under the Constitution, Founder of the Society of Cincinnati 1750–1806* (New York: G. P. Putnam, 1900), 105; Hamilton Papers, 331. There is also good reason to believe that Washington moved his army further west to protect Reading and Lancaster as opposed to Philadelphia. Should these two significant cities fall to the British, Washington would lose the breadbasket of the army (Lancaster) and one of the army's principal munitions producers (Reading). Stephen Taaffe argues that Washington understood that even if the United States lost its capital the war would continue. But if they lost Reading and Lancaster, the army would lose major supply centers. See Taaffe, *Philadelphia Campaign*, 88.
28. Andre, *Major André's Journal*, 43; Hamilton Papers, 321–22, 330; Hsiung, "Food, Fuel and the New England Environment," 621.
29. Taaffe, *Philadelphia Campaign*, 81; Knox and Brooks, *Henry Knox*, 105; Muhlenberg, *Journals of Henry Melchior Muhlenberg*, 77–78; Muenchhausen, *At General Howe's Side*, 32; Richard Henry Lee to Mann Page, *LDC*, 5; Montrésor, *Montrésor Journals*, 457; Elbridge Gerry to James Warren, October 6, 1777, *A Study in Dissent: The Warren-Gerry Correspondence: 1776–1792*, ed. Harvey Gardiner (Carbondale: University of Southern Illinois Press, 1968), 86; Roach, "The Pennsylvania Militia in 1777," 191; With the Continental army bottled up on the north bank of the Schuylkill, American soldiers took what they needed from local civilians. Henry Muhlenberg, located near the Continentals, wrote, "In our neighborhood, around Providence . . . the farms are being drained of wood, hay, and crops and they are being ruined. Under the disturbed circumstances I can neither read nor write." See Muhlenberg, *Journals of Henry Melchior Muhlenberg*, 81.
30. Martin, *The Philadelphia Campaign*, 81–82; "Col. Timothy Pickering's Account," 219; Frazer, *General Persifor Frazer*, 160, 401.

31. Taaffe, *Philadelphia Campaign*, 88; Montrésor, *Montrésor Journals*, 458; McMichael, "Diary of Lieut. James McMichael," 207–8; Feilitzsch, *Diary of Two Ansbach Jaegers*, 20.
32. John André believed Washington's attack was intended before daybreak, and wrote, "The Rebels were each equipped with a piece of white paper in his hat, which made us imagine they meant a surprise by night," André, *Major André's Journal*, 57; McGuire, *Surprise at Germantown*, 34; McMichael, "Diary of Lieut. James McMichael," 213; Ewald, *Diary of the American War*, 93. In addition to the four columns, Washington also directed about 500 militia to create a diversion in Philadelphia, by severing the Schuylkill's Middle Ferry rope at High Street (present-day Market Street). This was more than a diversion. It was also an action to control British access to the river. See Roach, "The Pennsylvania Militia in 1777," 201, and a discussion of the action in the *Pennsylvania Evening Post*, October 11, 1777, in America's Historical Newspapers, 491.
33. Martin, *Narrative of a Revolutionary Soldier*, 63; McMichael, "Diary of Lieut. James McMichael," 213; McGuire, *Surprise at Germantown*, 49; Ewald, *Diary of the American War*, 93, 96; Baurmeister, *Revolution in America*, 416–17.
34. Thomas J. McGuire, *Germantown and the Roads to Valley Forge*, vol. 2 of *The Philadelphia Campaign* (Mechanicsburg, PA: Stackpole Books, 2007), 82; Ewald, *Diary of the American War*, 96; Baurmeister, *Revolution in America*, 416–17.
35. Montrésor, *Montrésor Journals*, 461; Muenchhausen, *At General Howe's Side*, 38; Anthony Wayne to Polly Wayne, October 6, 1777, 31, Wayne Papers, vol. 4 (September 1777–March 1778), HSP; Martin, *Narrative of a Revolutionary Soldier*, 63; Marshall, *The Life of George Washington*, 179–80; Knox and Brooks, *Henry Knox*, 110.
36. Baurmeister, *Revolution in America*, 119; Knox to Ward, October 7, 1777, 110; Washington to John Augustine Washington, October 18, 1777, and Washington to Thomas McKean, October 10, 1777, *WGW*, 346–47, 397–98; *George Ewing: A Soldier of Valley Forge* (Yonkers, NY, privately printed, 1928), <http://catalog.hathitrust.org/Record/000364750>, 13; James Duane to George Clinton, *LDC*, 75. It should also be noted, that in blaming the environmental factors for his army's defeat, the general might have been trying to shift some of the blame from himself. In hindsight, attacking the Chew House was a costly mistake, a mistake Washington wholeheartedly agreed to. In a sense, Washington might have been trying to shift the blame in order to make up for his blunder at Cliveden. Washington, *WGW*, 316, 318, 327, 330–31, 346–47, 355, 374, 397–98, 452.
37. Muenchhausen, *At General Howe's Side*, 39; Ewald, *Diary of the American War*, 93; Knox and Brooks, *Henry Knox*, 110; "Col. Timothy Pickering's Account," 9; Rawle, "Plundering by the British Army," 114.
38. Greene Papers, 171.

CONTESTED GROUNDS

39. André, *Major André's Journal*, 43; Baurmeister, *Revolution in America*, 110; Washington, *WW*, 316–18, 327, 330–31, 346–47, 397–98, 452.
40. Barbara Pollarine, *Great & Capital Changes: An Account of the Valley Forge Encampment* (Gettysburg, PA: Thomas Publications, 1993), 6–15, 19; Wayne Bodle, *The Valley Forge Winter: Civilians and Soldiers in War* (University Park: The Pennsylvania State University Press, 2002), 65–71.