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Fleming vs. Florey: It All Comes Down to the Mold

Kristen Hess

Without penicillin, the world as it is known today would not exist. Simple infections, earaches, menial operations, and diseases, like syphilis and pneumonia, would possibly all end fatally, shortening the life expectancy of the population, affecting everything from family-size and marriage to retirement plans and insurance policies. So how did this “wonder drug” come into existence and who is behind the development of penicillin? The majority of the population has heard the “Eureka!” story of Alexander Fleming and his famous petri dish with the unusual mold growth, *Penicillium notatum*. Very few realize that there are not only different variations of the Fleming discovery but that there are also other people who were vitally important to the development of penicillin as an effective drug. This paper will focus on the discovery of penicillin by Alexander Fleming and the subsequent controversy that entails over the ‘Fleming Myth.’

Coming from a large farming family, Alexander Fleming has ample chances to discover nature in its purest form and to develop a keen interest in science. His decision to go to medical school and become a bacteriologist led him to St. Mary’s Medical School, London University. After graduation, he served in the Royal Army Corp before returning to St. Mary’s to teach and do further experimentation. (Rowland, *The Penicillin Man*) While doing experiments using *Staphylococcus* bacteria, Fleming discovered lysozyme, an enzyme within the human body capable of fighting infections and destroying certain bacteria. This discovery was purely coincidental when he supposedly sneezed on a plate of bacteria and some of his mucous landed on the plate killing the bacteria around it. This observation proved important in analyzing the body’s defense mechanisms. He furthered his lysozyme work, which grew out of his interest in showing the ineffectiveness of chemical antiseptics to treat infection. Fleming believed it was more important to enhance the body’s own natural immune responses to treat disease. (Friedman, 168-181) It is also at St. Mary’s, in 1928, where Fleming discovered the saving mold.

Two accounts exist pertaining to the actual discovery of the mold. Both focus on Fleming’s untidy work habits and lack of sterile working conditions. Some sources suggest that the dedication and work ethic of Alexander Fleming drove him to go work one day even though he was covered in boils. At lunchtime, Fleming supposedly found a moldy sandwich, and having nothing else, he ate it and found his boils were cured shortly thereafter. Using this as a basis, Fleming began experimentation using the mold in hopes of discovering what led to his recovery. This has only been quoted a few times and seems to be the least reliable

of the two recollections.

More sources recall that on the day before he went on a two-week vacation, Fleming prepared petri dishes of bacteria cultures he wanted to grow over the break. Unbeknownst to him, a *Penicillium notatum* spore from a laboratory on the next floor landed on one of the plates. [The laboratory upstairs did not have a working hood over the lab bench, and the scientist was therefore forced to work under sloppy conditions, with the spores able to freely move about based on air circulation.] Because the vacation was two weeks long, Fleming noted he did not have to put the plates in the incubator to speed the growth; the time period would be such that the bacteria would flourish on their own. This was a fortunate occurrence because the penicillium spore would have died in the incubator and would not have been detected. Upon returning to the lab, Fleming found his Staphylococcus bacteria had grown very well on all the petri dishes but one. One had a fuzzy greenish mold growing in it and the area around the mold was void of bacteria.

The discovery of the green mold surrounded by the yellow halo void of bacteria is often described as the “Eureka!” moment of Fleming’s career. When asked about what he thought about that special moment, he said, “My only merit is that I did not neglect the observation and that I pursued the subject as a bacteriologist.” (Ho, 117-123) This stems from the fact that the ability of *Penicillium notatum* to kill bacteria had been noted by two other scientists: John Tyndall in 1875 and D.A. Gratia in 1925. Both scientists found the observation intriguing but did not follow it up with any further experimentation; believing simply that the substance would be of interest only to fellow scientists and not to the rest of the world. Fleming, however, decided to experiment with the mold and found out what other bacteria it would affect. He found that the *Penicillium notatum* killed streptococcus, staphylococcus, pneumococcus, gonococcus, meningococcus, and diphtheria bacteria. This information led Fleming to believe the penicillin had potential as a local antiseptic in order to treat wounds and concentrated diseases.



Alexander Fleming: The Man responsible for discovering Penicillin

Fleming had two assistants who helped him with the penicillin experiments: Frederick Ridley and Stuart Craddock. These two were in charge of finding more of the properties of the mold, doing toxicity tests, and using the mold grown in broth to put on local wounds. Fleming did titrations, a procedure used in determining acidic and basic properties of a substance, with their experimental results and then decided to inject some of the broth into living animals - a rabbit and a mouse. In using live animals he made an error - he did not use animals that were infected with a bacteria; rather he used healthy animals just to see if any penicillin would have any effect on their biological systems. He noted that in the presence of blood and serum the *Penicillium notatum* lost a large percentage of its activity; consequently, Fleming incorrectly assumed that penicillin would be unsuitable for use in a living organism. Had he injected it into an infected animal the potential of penicillin to kill bacteria could have been realized earlier; instead it was left untested at this point. Fleming did write an article about his findings to date and stated, "It has been used in a number of indolent septic wounds and has certainly appeared to be superior to dressings containing potent chemicals." (MacFarlane, 139) In the summer of 1929, Fleming abandoned his research on penicillin because he was not a chemist and he was having difficulty isolating and identifying the active component involved.



Ernst Boris Chain



Sir Howard Walter Florey

It was now in the overall scheme of things, that other people became intimately involved in experimenting with penicillin and from this controversy inevitably arose. Howard Walter Florey took over as the Chair of the Pathology Department at Oxford University. He was looking for a project to revitalize the program and he stumbled across the work of Alexander Fleming. Florey felt lysozyme appeared to hold medicinal importance, seeing as it had once demonstrated the ability to destroy bacteria and that it existed in multiple bodily fluids. Florey got right to work on more experiments with lysozyme and hired

Ernst Boris Chain to help him with the chemistry aspects of the experiments. While doing research for the project, Chain found Fleming's paper on the possibilities of penicillin and the two scientists decided to take on that project instead. Fleming did not publish all the information about the random experiments he had his assistants do with penicillin, leaving Chain and Florey with little to go on. The two men had no alternative but to test and learn by trial and error. Chain was responsible for purifying and identifying the active principle of penicillin and toiled numerous hours doing so. There were other members of the Oxford team who also participated: N. G. Heatley (production work), A. G. Sanders (pathologist), A. D. Gardener (bactericidal work) as well as some lab hands. This was an incredibly large investment both in time and energy for a Chair (Florey) to put into a project - had it failed miserably the consequences, undoubtedly, would have been dire.

The team isolated penicillin in 1939 and began proving its safety and efficacy. Florey had always been a big promoter of simply doing the experiment instead of wasting time hypothesizing. He promptly set up a trial involving eight mice - all infected with bacteria. Four of the mice were given doses of penicillin and four were left alone as control mice. The four treated mice lived and the other four lasted a few days before dying. Before allowing themselves to get excited, the two researchers did the experiment over - this time with ten mice and again the five treated mice lived and the five control mice died. Based on these findings the team published an article in **The Lancet** entitled, "Penicillin a Chemotherapeutic Agent," on August 24, 1940. After reading of the Oxford team's article, Fleming decided to pay them a visit. When Chain found out Fleming was coming he supposedly said, "Fleming? Good God, I thought he was dead!" When Fleming showed up at the lab he said, "I've come to see what you've been doing with my old penicillin." (Parshall, 58-63) It was these words that provoked a bit of controversy. Even though Fleming can be credited with discovering the agent, the Oxford team felt that after all their hard work and difficulties, they too had rights to penicillin. No harsh words or ill feelings were exchanged at this meeting, however, and Fleming gladly walked the laboratory and took note of their experiments and latest findings.

The meeting with Fleming had no effect on the actions of the Oxford team; they continued to do experimentation and decided to take it a step further by actually seeing the effects of penicillin in a human being. Because they did not think it prudent to inject a healthy person in case of adverse side effects, they used a terminally ill patient who was supposed to die within two months and who agreed to it, Mrs. Akers. The effects penicillin had on her were not promising - she merely had a slight seizure. A second patient, Albert Alexander, who had developed a bacterial infection after getting a small scratch from a rosebush in his garden,

normalized after being given penicillin but the supply ran out and he died soon after. Various other tests were done, leading the team to publish their second article in August 1941 in **The Lancet** - "Further Observations on Penicillin" which included details about techniques for developing cultures of the mold, extracting the active ingredient, purifying the penicillin and then testing it. The results were proving optimistic and Florey decided he needed financial aid to get penicillin production underway in hopes of aiding the war effort. Because the financial burden of World War II was less strenuous on the United States in the beginning of the war, U.S. labs were continuing experimentation and financial backers were willing to aid the research. Florey received the money from the Rockefeller Fund and began producing penicillin as fast as possible.

Meanwhile, Fleming, who for the most part had taken a spectator seat during all this experimentation and development of his "discovery," decided things were looking up for his 'old penicillin' and therefore began to emphasize his rights on penicillin. The articles that came out about the new findings were responded to by a regurgitation of his original conclusion in regards to penicillin and its possible medicinal use, "suggested that it may be an efficient antiseptic for application to, or injection into, areas infected with penicillin-sensitive microbes." (MacFarlane, 188) Fleming felt it necessary to make sure people remembered that he was the one who first realized the potential of penicillin. Slowly he was integrating himself back into the picture after his ten-year hiatus. When one of his close friends was taken ill, Fleming called on Florey and asked for a supply of penicillin for the patient. Florey answered and gave direction for dosage etc. The patient was cured and Fleming was finally able to place confidence in his discovery. He then began supporting mass production of penicillin for medical purposes and the public caught wind of the story.

Publications began to appear with stories of the "wonder drug" and the amazing recoveries that happened because of it. When an article appeared without giving credit to any one person for penicillin, Sir Amroth Wright took action and wrote a letter into **The Times** stating that, "... it should be decreed to Professor Alexander Fleming of this research laboratory. For he is the discoverer of penicillin and was the author of the original suggestion that the substance may have medical importance." In response, letters came in giving Florey credit saying, "...if the laurel wreath was to be given to Fleming then Florey deserved a bouquet at least, and a handsome one too." (MacFarlane, 198) The press bombarded the two researchers; Fleming welcomed the attention and allowed pictures to be taken and stories ran. Florey, on the other hand, was skeptical of publicity on his project and then was ruined when his experiment did not come out as expected. Florey may have also been hesitant because he was afraid the great publicity would create a demand for penicillin that could not possibly be met, seeing as production

was slow and tedious. The reporters had to report on the information that they were given and it was Alexander Fleming that welcomed them with open arms. (Goldworthy, 176-178) It is with this that the Fleming story erupted.

Alexander Fleming had not been an active participant in the quest for medicinal penicillin for ten years and all of sudden he found himself in the middle of a media swarm. There was a constant demand for Fleming to appear in public - both to receive awards, present awards, give inspirational speeches, and talk of his discovery of penicillin. The favorite way the media liked to portray him was a hero figure. The 'hero' figure is a result of the exaggeration by the media not only of Fleming's original discovery but also of the subsequent years when he literally stopped work on penicillin. Pictures of the original plate of bacteria with the mold growth on it circulated. Publicity began hitting the press about how Fleming was simply brimming with anticipation during the years he was not working on penicillin, waiting for the world to accept his findings and realize his genius. As is the case with journalism, the world saw the headlines and read the stories and attached onto Fleming as a brilliant scientist, making his name synonymous with penicillin. Every patient that received penicillin was quoted as saying, "Thank you Alexander Fleming!"

At first Fleming laughed at all the publicity. He clipped the newspaper articles and pictures and continued about his work trying not to draw so much attention to himself. Any time it was appropriate, Fleming mentioned the contributions of Florey and the Oxford team. He stated, "... although my work started you [Florey] off on the penicillin hunt, it was you who made a practical proposition and it is good that you get the credit." The two men mutually exchanged thanks and appreciative letters. Soon enough though, Fleming found himself overwhelmed with social obligations - he constantly was being awarded honorary degrees and giving lectures. There was little time left for his actual work. The continuous adoration of Fleming by the public began to gnaw at the nerves of Florey, who managed to hold his tongue but was generally aggravated by the situation. The closest he came to publicly downplaying Fleming's discovery was when he was quoted as saying, "In 1940, the first observations on penicillin were published...up to this time the real nature of penicillin has escaped detection." (Parshall, 58-63) All the members of the Oxford team felt slighted at the lack of recognition being given to them. Chain was especially upset because he had urged Florey to get a patent on penicillin and Florey had felt it would not be fair to monopolize a scientific discovery - exactly what was happening with Fleming. [John Sheehan of a United States institution was the first to synthesize penicillin and; consequently obtained a patent for penicillin in 1957.] The glorified hero story of Fleming's discovery was taking all the limelight.

People could not believe how unselfish and altruistic Fleming was - he

had not even made money off of his discovery and yet people's lives were being saved! Donations began flowing into the newspaper publishers and people willingly gave money to support awards to Fleming. It was easier for people to comprehend the deductive insight of a single individual than the technical feats of a team of scientists. (MacFarlane, 198) Florey had always placed strong emphasis on the teamwork factor involved in the experimentation and discovery. This attitude was not as understood by the general public who appreciated the idea of one lone genius. Florey's desire for privacy allowed Fleming to take center stage.

In the midst of all the publicity, it appeared that Alexander Fleming was taking more credit for more than he was due or at least that he was not actively trying to set the story straight. Was he a conniving man that longed for attention that he felt he would never get otherwise? Or was he just human and enjoying the fame bestowed on him by the public, although inwardly realizing the depth of his contribution vs. the contributions of the Oxford team? Those closest to Fleming felt he was a man of good character that honestly did not realize that there was any slight being committed. Everyone who knew him generally spoke of him highly - not only for his scientific insight but also for his social skills in games and after dinner drinks. He was described as easy-going, modest, uncritical, and gregarious. His meek mannerism and far-from commanding presence left one liking Fleming right from the start. When awarded the Nobel Prize in 1945 along with Florey and Chain, he disclosed to one friend that he felt he might not deserve such esteem. Fleming admitted, however, that he enjoyed the publicity and was excited at the momentum from the public over his discovery. The source reiterated that one could not help but see how sincere Fleming was in these comments.

Meanwhile, the Oxford team believed the publicity was all contrived and that behind it was a dishonest campaign trying to credit Fleming and therefore get financial aid to St. Mary's. They felt their anger was justified mainly by the fact that Fleming was not awarded the Nobel Prize when he first discovered penicillin but was only awarded it after the Oxford team had proved its importance and developed penicillin into a practical substance. Fortunately, Chain and Florey were co-recipients of the Nobel Prize in regards to penicillin but it was difficult for them to fathom why Fleming was basking in glory. Fleming's main contribution was simply observing the original mold. He had little inkling that the mold could be as medicinally important as it turned out to be. It had taken a team of scientists to turn the discovery into something really worth being excited about and the least amount of credit was going to them.

There is no evidence that Alexander Fleming purposely took credit for anything that he did not do. Numerous quotes suggest he insisted that he 'didn't

make penicillin...nature made it, he just discovered it.' The ambiguity found when researching this topic suggests the publicity was simply media driven and Fleming, not knowing how to handle the situation, decided to go with it. This circumstance where one scientist develops another's discovery, bringing it to full potential, is a difficult one because the line for credit becomes blurred and it becomes dependent on the public to decide based on the information provided. Perhaps in the end the constant fame and publicity given to Fleming gave Florey the opportunity to focus on developing penicillin and was therefore a good thing. Because Fleming is enshrined in encyclopedias and books everywhere as the 'penicillin man' and the 'good doctor Fleming,' it is unlikely public knowledge will be enhanced much beyond that. The scientific and medicinal circles will always have the opportunity to debate this issue but as always it will forever come down to the mold.

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The Battle of Germantown:
A Forgotten Fight for Philadelphia and Freedom
Tony Giammarco

Throughout the past three years, my teammates and I have crossed streets and fields that have bore witness and stood as seldom noticed monuments to an event that has helped to define our nation's momentous past. As a member of the LaSalle University Cross-Country Team, our daily routine, a brisk nine-mile run, takes us through the heart of historic Germantown. Turning left from Belfield Avenue, we begin our ascent up Church Lane. Reaching its summit, we then make a right onto the cobblestones of Germantown Avenue. After another quick left, we find ourselves on Schoolhouse Lane and on our way to the wooded trails of Valley Green. On the way to our final destination, we cross streets named Greene, Wayne, and Cliveden. Although my teammates and I have made this trek countless times, I wonder if any of them realize the historical significance of their surroundings. Do any of them take into consideration the great sacrifices made by many men their age upon the streets that they now shuffle along? Unfortunately, I fear the answer to this question is no.

The Germantown of today looks little like it did during the late 18th century. Now expanding on both sides of Germantown Avenue for miles, the once small village has grown to a small city within a city. Choked with buses and strangled with decrepit row homes, the image of Washington and Howe's Germantown, with its stately stone mansions, rich farmland, and vast orchards, has been lost forever. More importantly, and perhaps more disturbing, the very events that took place in Germantown, which helped to shape the outcome of the American Revolution, might very well be lost as well, hidden under the trash and blocked from view by the burnt out buildings that cover modern day Germantown.

Although there are few plaques or statues commemorating the events of October 4, 1777, the blood spilt by American patriots on the streets and fields of Germantown is no less significant than that of more heralded places like Bunker Hill or Yorktown. In the early morning hours of October 4, over 200 years ago, American forces, of both the Continental army and militia, valiantly attacked encamped British and Hessian troops. For hours, the American forces struggled against the early morning darkness, fog, and unfamiliar terrain in a courageous attempt to dislodge the British and Hessian troops stationed at Germantown. Ultimately, the outcome of the battle was unfavorable for the Americans. However, even in defeat, the brash and tireless American forces displayed to the world that their farmer led uprising was for real.

Outnumbered and poorly equipped, the American army could have never

defeated the British without foreign assistance. The Battle of Germantown, along with the American victory at Saratoga, secured a Franco-American alliance that proved absolutely crucial for the success of the American Revolution. For this reason, the events leading up to and of the Battle of Germantown must be brought to light. History has proven to be unkind to the soldiers that fought and died at Germantown, little has been written in textbooks and even less has been discussed in schools across the country about the battle. Any individual that takes pride in the actions and sacrifices made by patriotic Americans throughout the centuries on days like October 19, 1781, July 4, 1863, or June 6, 1944, must be properly informed about the events of October 4, 1777.

By 1777, the Americans and British has tasted both victory and defeat. The Americans, under the generalship of George Washington, had been decimated at Brooklyn, but had also scored opportunistic victories at Princeton and Trenton. As for the British, after experiencing early troubles at Lexington and Concord, they had rallied to capture strategically important New York City. Prior to spending the winter of 1776-1777 in the comfort of New York City, the British had devised a plan that they believed would win the war. Their plan called for the isolation of various regions throughout the country. General Burgoyne, commanding the British army of the North, would march down from Canada in an attempt to capture Albany in order to isolate New England. While Burgoyne made his way towards Albany, the British Southern army, under General Howe, would attempt to secure Philadelphia. The British believed that if the capital was under occupation and New England isolated, the Americans would lose their will to fight and surrender. (Jackson, 3)

While the British prepared to implement what they believed to be their war ending campaign of 1777, Washington and his army spent the winter of 1776-1777 in the less hospitable confines of Morristown, New Jersey, vigilantly watching the British forces in New York City. Sensing a British invasion sweeping down from Canada, General Gates and the Northern army prepared to meet Burgoyne in upstate New York. By June of 1777, Howe had not yet departed New York City for Philadelphia. Parliament, becoming increasingly weary of the American rebellion and its costs, desired a hasty conclusion to the conflict. Hoping to fulfill King George III and Parliament's wishes, Howe finally set off for Philadelphia. (Jackson, 5)

As the British were boarding ships in Sandy Hook, New Jersey destined for the Chesapeake Bay area, Washington was already aware of their movement, but not their destination. He later received information that the British 256-ship flotilla, the largest ever assembled in America, was sailing south down the Atlantic coast. Maintaining the British within sight for most of their journey, Washington's 11,000-man army humped their way from northern New Jersey to

Wilmington, Delaware, approximately 20 miles south of Philadelphia. After several miserable weeks at sea, Howe and 17,000 British troops landed at Head of Elk, Maryland. In an attempt to save time lost at sea, Howe quickly organized his army for their march north towards Philadelphia. During all this excitement, a nervous Continental Congress, residing in Philadelphia, watched, waited, and listened while Washington scrambled to position his troops between Howe and the city. (Jackson, 7)

For weeks after their landing, the British made their way north from Maryland towards Philadelphia. Small groups of militia confronted the British along their journey and only a few light skirmishes broke out. Easily sweeping past the bands of militia, the British continued their drive towards the American capital. However, on September 11, British and American forces clashed along the Brandywine Creek in Pennsylvania. The plan was to confront and defeat the British before they ever reached Philadelphia. Unfortunately, the Americans were unsuccessful in thwarting the British advance towards the city. After the engagement, the British encamped on the battlefield as the Americans regrouped and fled for Chester, Pennsylvania. Finding little refuge in Chester and in no condition for another battle, Washington and his battered army crossed the Schuylkill River and marched along its east bank to the Falls of Schuylkill near Germantown. Guarding against a British surprise attack, General Wayne and a detachment of 1500 troops remained on the west side of the Schuylkill. With Philadelphia's comforting church steeples in sight and only a few miles down river, Washington's troops begrudgingly followed Washington north along the river. (Gifford, 69)

Washington ordered Wayne and his men to cut off the British baggage train and to harass the British rear guard. By September 20, Wayne, believing his position was undetected by the British, planned an attack for the next day. Unfortunately for Wayne and his troops, his position was given away by the smoke of their campfires and by Tory farmers. (Gifford, 75) British forces, under General Grey, stealthily approached the small group of unsuspecting American troops. General Grey ordered his men to use only swords and bayonets in an attempt not to give away their position with loud volleys of musket fire. The Americans were taken completely by surprise and suffered heavy losses. Although many troops were taken prisoner, the British use of the bayonet, which the Americans considered somewhat barbaric, led the public to perceive the incident as a massacre. (Gifford, 76)

Following what came to be known as the Paoli Massacre, the British were able to move virtually unmolested up and down the banks of the Schuylkill River. On September 26, British and Hessian forces paraded into Philadelphia. Writing in her diary, British Loyalist and Philadelphia resident, Sarah Fisher remarked that she "rose very early this morning in hopes of seeing a most pleasing sight ... First came the light horse, led among by Enoch Story and

Phineas Bond, as the soldiers were unacquainted with the town and the different streets, nearly 200 I imagine in number, clean dress and their bright swords glittering in the sun. After that came the foot, headed by Lord Cornwallis. Before him went a band of music, which played a solemn tune and which I afterward understood was called "God Save great George our King." Then followed the soldiers, who looked very clean and healthy and a remarkable solidity was on their countenances, no wanton levity, or indecent mirth, but a gravity well becoming the occasion seemed on all their faces. After that came the artillery and then the Hessian grenadiers." (Gifford, 85)

Meanwhile, Washington, after receiving several thousand reinforcements, moved his army from Schwenksville, Pennsylvania, down the Skippack Road and encamped sixteen miles from Germantown. Determined to attack the British army at Germantown, Washington called a Council of War on September 28. By a vote of ten to five, Washington's council suggested that the army should move within twelve miles of Germantown to await more reinforcements. (Jackson, 29) Then, on October 2, Washington received very favorable information. He learned that Howe had sent 3000 men to Elkton in an attempt to gather supplies and another 3000 men were in Philadelphia under Cornwallis. In addition, the 10th and 42nd Regiment had been sent into New Jersey in order to capture a fort along the Delaware River. The council, upon receiving this information, decided that it was now time to attack Howe. (Gifford, 86)

Washington designed a plan that called for a four-pronged attack against Howe's position in Germantown. Although impressive on paper, his plan was extremely complicated and a bit naive. Washington's plan called for: "The Divisions of Sullivan and Wayne, flanked by Conway's Brigade, were to enter the Town by way of Chestnut Hill, while General Armstrong, with the Pennsylvania Militia should fall down the Manatawny Road by Vanderings Mill and get upon the Enemy's left and rear. The Divisions of Greene and Stephen, flanked by McDougal's Brigade, were to enter by taking a circuit by way of the Lime Kiln Road at the Market House and to attack their Right wing, and the Militia of Maryland and Jersey under Generals Smallwood and Foreman were to march by the Old York road and fall upon the rear of their right. Lord Stirling with Nash and Maxwell's Brigades was to form a Corps de Reserve. (Jackson, 31) In order for the plan to be successful, Washington's four columns had to travel great distances in darkness and over unfamiliar territory, separated by miles, with no form of communication, and arrive at their destinations simultaneously within two miles of the British pickets. Due to the inexperience of the American troops and officers, successfully implementing this plan was virtually impossible. (Gifford, 87) At seven o'clock in the evening on October 3, the American forces began to march

along their various routes towards Germantown. For days prior to the battle, Washington has sent out mounted patrols to harass British outposts. Washington hoped that because of these mounted patrols, the appearance of American forces on October 3 would not create undue alarm within the British ranks. Unfortunately, before the first shots were even fired, the Americans suffered a huge setback. The Maryland and New Jersey militias, under Smallwood and Foreman, perhaps confused by the unfamiliar terrain, wandered aimlessly along Old York Road. Their meandering cost so much time that their arrival at Germantown was too late to be a factor in the battle. (Jackson, 32)

Despite this setback, the Americans were able to capture the upper hand during the early stages of the battle. General Conway's brigade was the first to engage the British at Mt. Airy. Their attack forced the British back, but not before their field guns alarmed the remainder of the British forces in Germantown. (Gifford, 88) After a brief British counterattack, Wayne's division, eager to avenge the Paoli Massacre, began to cut down scores of British troops. The British began to retreat while Wayne's men gave chase. Later, Wayne wrote: "Our people, remembering the action of the night of the 20th of September, pushed on with their bayonets, and took ample vengeance for that night's work. Our officers exerted themselves to save an many of the poor wretches, but to little purpose; the rage and fury of the soldiers were not to be restrained for some time, at least not until great numbers of the enemy fell by their bayonets. (Gifford, 89)

As the frightened and confused British scampered back towards Germantown, Colonel Musgrave, along with 120 British troops barricaded themselves in Benjamin Chew's country house, Cliveden. The events that followed proved to be the turning point of the battle. Musgrave and his men closed the heavy wooden shutters and gathered every available piece of furniture in front of the house's doorways. A few British troops were posted by the doorway on the first floor while the remainder of the men crouched below windows on the upper floors. After Musgrave delivered an impassioned speech, the British troops prepared to defend their "castle" against an impending American siege. (Gifford, 90)

Re-enactment of the battle of Germantown



At this point during the battle, a heavy fog descended upon the low-lying village of Germantown and the surrounding area. Stumbling their way through the thick mixture of fog and smoke, General Sullivan's division made their way past the virtual British fortress at Cliveden and began firing at every moving apparition that appeared or was believed to have appeared. Angered by this wasteful use of precious ammunition, Washington sent Timothy Pickering to settle down Sullivan and his men. After meeting with Sullivan, Pickering made his way back to Washington and discovered Musgrave and his men inside the Chew house. Pickering delivered the information of his discovery to Washington and advised him to leave a small detachment behind to deal with Musgrave and his men. On the contrary, General Henry Knox told Washington "It would be unmilitary to leave a castle in our rear." (Gifford, 91)

Despite Pickering's pleas, Washington was persuaded by Knox. Lieutenant Colonel Matthew Smith of Virginia volunteered to deliver the summons of surrender to Musgrave. Unfortunately, while carrying a flag of truce, Smith was cut down by a British musket ball. Enraged, the Americans quickly surrounded Cliveden while Knox positioned artillery pieces directly in front of the house. A hail of musket balls and grape pounded Cliveden's formidable stonewalls and blasted through its wooden shutters and doors. However, the British remained inside. While British blood splattered the interior walls and spilt on the floor, the blood of Americans painted the lawn surrounding the house a deep red. Whether attempting to enter the house or trying to light it on fire, courageous Americans were cut down by British troops raining fire down from Cliveden's upper floors. (Gifford, 94)



Cliveden (Cliveden of the National Trust)

Washington's decision to attempt to dislodge the British from Cliveden cost precious time and valuable American lives. Meanwhile, Sullivan and his men made their way towards the British center on the west side of Germantown

Road (now Germantown Avenue) as Wayne and his men traveled down the eastside. Due to the heavy fog, both Sullivan and Wayne made their way past Cliveden without noticing the battle that raged around it. At the same time, General Greene, along with two-thirds of the American army, had already reached the British center at Market House. (Gifford, 95) Unfortunately, General Adam Stephen, who was reported to have been drunk at the time of the battle, diverted his force away from Greene's right wing and started towards the noise coming from Cliveden. Amidst the thick fog, Stephen's men encountered Wayne's force and began to fire upon them, mistaking them for the British.

Believing to be under heavy enemy fire, Wayne's division broke ranks and began to flee. Pushing their way forward, Sullivan's men battled their way towards the British center to meet up with Greene. Unfortunately, Sullivan and his men ran out of ammunition and were forced to join Wayne in retreat. Instead of chasing after the retreating Americans, the British decided to focus their attention on Greene. (Gifford, 96) Despite many setbacks, Greene and his men were fighting very well. If Sullivan and Wayne remained in the fight, the Americans would have been able to pin the British against the banks of the Schuylkill River. Instead, with Sullivan and Wayne being forced to retreat, the British were able to muster their full force against Greene. Hungry, tired, and short of ammunition, Greene and his men began a fighting retreat. (Gifford, 97) Despite encouraging pleas from Washington, the inexperienced American forces were unable to reorganize for a counterattack. At this point, realizing defeat, Washington reluctantly sent out couriers to all commands ordering a general withdrawal. (Gifford, 101)

After the battle, the British remained in Germantown while the Americans retreated towards Schwenksville. The victorious British reported 4 officers and 66 men killed, 30 officers, and 396 men wounded, and 1 officer and 13 men missing. The defeated Americans reported 30 officers and 122 men killed, 117 officers and 404 men wounded, and approximately 400 missing. Although the British were victorious, the battle proved to be an ultimate success for the Americans. News of the battle spread to Europe and more importantly France. The French, covertly supporting the Americans with supplies throughout the war, were now leaning towards openly supporting the weary Americans. (Jackson, 50)

By late 1777, the French had received news about both Germantown and Saratoga and they were very pleased with what they heard. French diplomats learned that in the north, General Gates had surrounded General Burgoyne and forced his surrender. They believed that this victory had raised American spirits throughout the continent and had disheartened the British. (Murphy, 58) The French also believed that Washington scored a near victory at Germantown.

French diplomats were told that if the smoke and fog had not created disorder amongst the American forces, the British would have been defeated. More important to the French, the Battle of Germantown demonstrated that the British attempt to crush the Americans during the campaign of 1777 was a failure in the northern as well as the central theaters of the war. The battle also displayed that the Americans would be a welcomed addition to the French who were preparing to make the Revolutionary War a world war. (Murphy, 64)

A young British officer, Wilfred Owen, once penned these poetic words shortly before his death in the First World War:

If in some smothering dreams you too could pace /
Behind the wagon that we flung him in, /
And watch the white eyes writhing in his face, /
His hanging face, like a devil's sick of sin; /
If you could hear, at every jolt, the blood /
Come gargling from the froth-corrupted lungs, /
Obscene as cancer, bitter as the cud /
Of vile, incurable sores on innocent tongues- /
My friend, you would not tell with such high zest /
To children ardent for some desperate glory, /
The old Lie: Dulce et decorum est /
Pro patria mori. (Kennedy and Gioia, 41)

This old line that Owen refers to in Latin at the closing of his poem is "It is sweet and fitting to die for one's country." The Americans that fell and bled the ground red along the streets of Germantown believed in this ancient Latin axiom. They felt that the ultimate sacrifice they were laying before the altar of freedom would make their home a better place to live in for the one they loved. What they did not realize was the fact that their sacrifices would help to create a country that would become a beacon for life, liberty, and the pursuit of happiness.

October 4, 1777 was a huge milestone in the life of young America. Throughout the colonies, there was a belief that the revolution would be a success. Many Americans believed that they could fight toe to toe with the British, however, most of Europe did not. The Battle of Germantown changed the opinions of many Europeans and the Americans quickly garnered the respect and admiration of many foreign nations. If the events of October 4 had never taken place, the Americans might have found themselves fighting a war against a world power by themselves, hopelessly outnumbered and under supplied. Fortunately, the Battle of Germantown was fought and the heroic sacrifices made by many Americans on that day changed the course of the war and American history forever.

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